PSYCHOLOGY OF LEARNING AND CREATIVITY
PSYCHOLOGY OF LEARNING AND CREATIVITY

Beatrice N. Kohol and Terumbur A. Iordaah

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DEDICATION

Dedicated to all our students (past and present) to the glory of God
ACKNOWLEDGEMENTS

The authors have acknowledged those who have made contributions to the production of this book. It is in line with this that, we appreciate Almighty God for the wisdom and privilege to write this book. We also profoundly appreciate our beloved husbands Dr. Abraham Kohol and Mr. Emmanuel A. Iordaah, and children for their spiritual, moral, social and financial support.

Our thanks also go to Dr. Tyokyaa C.I. who took time to read this book and wrote a foreword. In the same way, our appreciation goes to Seember Janet Nartondo, Viashima Sevkohol Pauline Igyo for editing the manuscript. The authors are also indebted to Victor Zamber who did the typesetting.

Finally, we acknowledge the numerous authors whose works have been used or cited in this book.
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PREFACE

Our desire to co-author this book is to bring our wealth of experience acquired over two decades of teaching to aid our students improve on their learning skills. The educational system of any nation is approved when students are innovative and diligent in learning and practicing what they are taught. Good teachers feel fulfilled when their well packaged lessons meet the needs of all their students. Both teachers and students will find simplified text useful.

Beatrice N. Kohol
Terumbur A. Iordaah
FOREWORD

Education strives to transmit into the learners’ relevant capacities or competencies, in terms of knowledge, abilities, attitudes, behaviours or skills with a view to producing desirable changes which adequately equip the learner to confront natural and societal challenges. Learning is relatively an internal and permanent process that ensures change in behaviour that is distinct from biologically maturing imprints. It occurs under conditions of directed attention and deliberate efforts. Creativity on the other hand, has to do with possession of capacity or traits of curiosity, flexibility and exploration that are capable of leading to inventions or development of new approaches or ideas of doing things in divergent human accomplishments. Learning and creativity processes are two important concepts of developing a holistic personality who would be able to not only function but manipulate his/her society.

This book, Psychology of Learning and Creativity, captures the scintillating perception of the concepts of learning and creativity. It is a documentation of the basic principles and the
psychological attributes and theories of learning including: theories of learning and classroom application, contiguity theory, behaviourist theories of learning and cognitive maps, piaget’s cognitive development theory as well as Bruner’s processes of thought. The book also succinctly presents creativity concepts and all its inherent psychological theories, components and properly packaged for higher level psychology, and guidance and counselling practitioners. Students and teachers of educational psychology, guidance and counselling, educational administration and planning, and all those who are involved in personality training and development will find the book an indispensable companion.

Consequently, I recommend this book without reservation to all who have stakes in the training and development of personalities.

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University of Agriculture, Makurdi.
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LEARNING

CHAPTER ONE

Learning

Concepts/Meaning
Learning is defined in many ways but most psychologists would agree it is a relatively permanent change in behaviour as a result of experience. Thus, if a behavioural change can be shown to be the result of some factors other than experience, then it is not considered to be learning. The psychology of learning focuses on the range of topics and theories related to how people learn and interact with their environment. Learning, as a subject of discourse, depends on so many factors, some of which include students’ motivation, and how they are engaged when trying to learn. Learning also depends on students’ readiness, quality of the instruction, students’ developmental readiness, and also conditions under which learning takes place. Once learning has taken place, the only yardstick to which a teacher can measure such is through the use of assessment (Siddiqui, 2008).
**Basic Characteristics of Learning**

i. Learning has to change behaviours

ii. The change should be relatively permanent. For example, if you have learnt to lace your shoes today, tomorrow you must repeat your action

iii. The change should be as a result of experience. For example, having learnt something previously should help in learning a new task.

iv. Learning is an internal process.

v. Learning is distinct from biological maturing and imprints.

vi. Learning occurs under conditions of directed attention and deliberate efforts.

**Stages of Learning**

Learning is a process and it often occurs in stages. Psychologists have identified three stages in learning. The three stages are not exclusive of each other, rather are interrelated and in succession. The three stages are:

1. **Acquisition**
   
   Information is received by the learner as stimulus. The process of receiving information by the learner is called acquisition.
2. **Retention**
The information received by the learner may be stored in the memory. This is the stage where mental processing begins in terms of meaningfulness, interpretation and encoding. Retention could be in Short Term Memory (STM) or Long Term Memory (LTM).

a. **Short Term Memory (STM):** The function of this storage system is to process information that had been stored which are immediately needed.

b. **Long term Memory (LTM):** In this type of memory, information which is not immediately needed is processed and pushed out of the short term memory into the long term memory. This implies that only information that is needed over a long period is stored in long term memory.

3. **Recall**
Recall is to reproduce encoded, filed or stored information in the Long Term Memory (LTM). It is to reconstruct events from the association and auditory representation already stored in the LTM. Recall is usually applied in easy type of questions in schools. For example, in free recall, a person is expected to reproduce a
material from memory without any clue (Iheanacho, 2015).

**Types of Learning**

An individual acquires learning both in school and outside of the school. Gagne (1965) identifies eight types of learning. These include:

i. **Chain Learning**: In this kind of learning, the individual links two or more units of stimulus-response learning. The primary conditions for learning of a chain is the re-statement of the stimulus–response units of the proper order. Some of the skills used here include using a pencil and eraser, throwing and catching a ball, among others.

ii. **Concept Learning**: It is a form of learning which requires higher order mental processes like thinking, reasoning, intelligence. Concept learning connotes the formation of the image that has already been formed in one's mind as a result of experience. It may also involve responding to stimulus in terms of abstract characteristics like colour, shape, position, length, weight, intensity, etc. For example, a child may learn to call a round
object such an orange a ball. Later, he may discover the difference between a ball and an orange.

iii. **Signal Learning:** In this type of learning the organism acquires a conditional response to a given stimulus. This type of learning is exemplified by animal training. When the animal makes precise movements in response to specific stimuli.

iv. **Discrimination Learning:** This is learning by distinguishing between stimuli and showing an appropriate response to these stimuli. An example is distinguishing between the cry of a cow from that of a sheep or a goat.

v. **Principle Learning:** This type of learning involves learning principles that are related to science, mathematics, grammar, etc. For example, in science, if water boils at 100°C, then boiling water has a temperature of 100°C. Principles, laws, associations, and correlations are powerful tools of thought that are used in interpreting events and conditions in the physical and social worlds of solving problems.
vi. **Verbal Learning:** This type of learning involves spoken language and communication devices used. Examples are signs, pictures, symbols, figures, sounds, words, among the tools used in verbal learning. Verbal learning is a chain learning where the links are verbal units.

vii. **Incidental Learning:** This is learning that is acquired by an individual without a direct attempt. In our environment much of our learning is unintended. It may be as a result of certain pleasant or unpleasant experiences. This often occurs when we learn things we do not intend. A teen may become pregnant without really giving a thought. Incidental learning results from our environmental influence and experiences.

viii. **Trial and Error:** In this type of learning a person tries to solve a problem or overcome a difficulty with persistent number of attempts. In trial and error the learner is not sure of what to do. Attempts that do not work are discarded or eliminated, while those that work are retained. This method of learning may take a long time and it’s time wasting.
Other types of learning include:

i. **Insightful Learning:** This is the sudden realization of the relationship between the elements in a problem situation that results in the solution to the problem. Insightful learning was discovered by the Gestalt psychologists.

ii. **Social Learning:** In social learning, people learn much from interacting with others in the environment (parents, peers, teachers, famous people, etc). This interaction with models can bring about either positive or negative changes in behaviour. Bandura and his associates postulated this theory.

iii. **Serial Learning:** The mastery of responses in a given sequence or order is called serial learning. Memorizing a poem, the national anthem, are examples.

iv. **Free Recall:** Free recall is learning to produce information without regard to predestined order. A good example is studying for exams.

v. **Paired Associated Learning:** This is Learning to link or associate a verbal or visual stimulus with a specific response. Examples are, when you pair a term with
its definition, a foreign word with its English equivalent, a coach’s signal with players, among others.

**Learning Strategies**

Learning strategies are specific behaviours or thought processes that students use to enhance their own learning. The word strategy comes from the ancient Greek word strategia, which means steps or actions taken for the purpose of winning a war. The warlike meaning of strategia has fortunately fallen away, but the control and goal directedness remain in the modern version of the word (Oxford, 1990). A given strategy is neither good nor bad; it is essentially neutral until the context of its use is thoroughly considered. What makes a strategy positive and helpful for a given learner? A strategy is useful if the following conditions are present: (a) the strategy relates well to the task at hand, (b) the strategy fits the particular student’s learning style preferences to one degree or another, and (c) the student employs the strategy effectively and links it with other relevant strategies.

Strategies that fulfill these conditions “make learning easier, faster, more enjoyable, more
LEARNING

self-directed, more effective, and more transferable to new situations” (Oxford, 1990). Learning strategies can also enable students to become more independent, autonomous, lifelong learners (Allwright, 1990; Little, 1991). Yet students are not always aware of power of consciously using learning strategies for making learning quicker and more effective (Nyikos & Oxford, 1993). Skilled teachers can help their students develop an awareness of learning strategies and enable them to use a wider range of appropriate strategies. Strategies used often relate to style.

i. **Underlining**: Underlining helps students to distinguish important points from unimportant points. Do not mark too many things to avoid confusion.

ii. **Summarizing**: Summarizing means writing brief points that represent the main ideas. (Do not take them into exam halls). Summarizing helps to reduce large materials into smaller bits.

iii. **Mnemonics**: The word Mnemonics is a Greek word meaning ‘aiding the memory’ (Janda & Klenke-Hamel, 1982). In this technique, you take the first letter from each of the items to be learned and make
up a word. It must not be a real name; but at times you get a real word/name. For example, movement, reproduction, nutrition, irritability, growth, excretion, and respiration give us MR NIGER, which stands for characteristics of living things. Where an acronym is not feasible, you can construct an acrostic sentence mnemonic thus – Richard of York gave battle in vain (ROVGBIV).

iv. **Self Questioning:** In assessing students they are expected to demonstrate much of what they know by answering written questions. Self questioning enables them to recognize the different types of questions and the tactics for handling them.

**Learning Styles**

Human beings have different characteristics that distinguish them from each other (Huit 1997). This fact has been recognized by psychologists and educationists; and, the fact that they have written a lot about it, suggests to teachers of the need to take note of the unique characteristics of individual children and cater for such differences as it affects teaching and learning.
Learning styles refer to the ways people encode store and retrieve information. While some people may have a particular style of learning, others may apply a combination of many. In learning, we make use of our sensory organs. Most people tend to have a dominant use one of their sense organs more than the others. Others may find that they have a style of learning which is far less used than others. Still, others may use different styles in different circumstances. There is no right nor wrong either. You can develop ability in less dominant styles, as well as further develop styles that you already use. The following are categories of learning styles:

**Visual learners:** They learn using pictures and maps. These learners need to see the teacher’s body language and facial expressions to fully understand the content of a lesson. They tend to prefer sitting at the front of the class to avoid visual obstructions, for example, people’s heads. They think in pictures and learn best from visual displays including: diagrams, flipcharts, transparencies and hand outs. During a lecture room discussion, visual learners prefer to take detailed notes to absorb the information.
Verbal/Auditory Learners: They prefer using sounds and words. They prefer using words both in speech and writing. They learn through listening. They learn best through verbal lectures, discussions, talking things through and listening to what others have to say. Auditory learners interpret the underlying meaning of speech through listening to the tone of voice, pitch speech and other nuances. Written information may have little meaning until it is heard. These learners benefit from reading text aloud and using a tape recorder.

Analytic/Sequencial Learners: They start with small pieces of information and use them to build the big picture. Analytic learners are sometimes referred to as sequencial learners because of their preference for organized, orderly information.

Kinesthetic (physical): They learn with hands, body, and sense of touch. Sitting on a desk for a long time is not for them. They prefer to have frequent breaks and move around the room. They learn best through a hands-on approach actively exploring the physical world around them.
**Social (interpersonal):** They learn in groups or with other people.

**Logical Learners:** They are mathematically inclined; they prefer to use logic in reasoning and are systematically inclined.

**Solitary Learners:** They work alone and make use of self study.

**Learning Style Dimension**
Learning Style Dimensions are a combination of two or more learning styles. Learning styles are not dichotomous (Black or white presence or absence). Learning styles generally operate on a continuum or on multiple, intersecting continua. For example, a person might be more active than reflected, more extraverted than introverted or equally visual and auditory but with lesser kinesthetic and tictile involvement. Few if any could be classified as having all or nothing in any of these categories (Ehrman, 1996). The following are classes of learning style dimensions:

**Active and Reflective Learners:** Active and reflective learners understand information by
doing something active, i.e. discussing, applying or explaining to others, while reflective learners prefer to think quietly and prefer to work alone. Note: People can be both active and reflective. Sometimes a balance is essential.

**Sensing and Intuitive Learners:** Sensing learners tend to like facts. They like solving problems by well defined methods and dislike complications. They are patient with details and good at memorizing facts and laboratory work. They are practical Intuitive learners, on the other hand, prefer discovering possibilities. They like innovations and dislike repetitions. They dislike courses that require memorization.

**Visual and Verbal Learners:** Visual learners remember best what they see; for example, pictures, diagrams and maps. Verbal learners get more from spoken words and explanations. Good learners can process information both visually and verbally.

**Sequential and Global Learners:** Sequential learners tend to gain understanding in linear steps with each step following logically from the previous. They follow logical steps in finding
solutions, while global learners tend to learn in large volumes, absorbing materials almost randomly. They solve complex problems quickly or put things in visual ways, once they have grasped the big picture; but they have difficulty explaining how they did it.

**Impulsivity and Reflectivity:** An impulsive learner is one who reacts quickly but makes comparative errors. A reflective style is the opposite; the learner reacts slowly and therefore makes few errors.

**Field Dependent and Field Independent:** In field dependent, the individual perceives patterns as a whole, rather than focus on some parts of the pattern separately. The individuals analyze overall patterns into parts. They work better in groups, like to study History and Literature. Field independence prefers highly analytic studies like Mathematics and Science.

**Test youself**
1. Define learning.
2. Justify how you can attest that a maternal has been learnt.
3. Discuss the strategies you will employ to prepare for examinations.
CHAPTER TWO

The Learner

Introduction
The learner refers to the pupil or student who is learning. It is on the account of the learner that schools are established. Without the learner, there is no learning. One anthill task a teacher has is understanding the learners. In understanding the learner the teacher has to take into cognizance cognitive and affective skills of the learner. Cognitive skills include previous knowledge, previous learning, stage of development, communication skills, intellectual ability, study habits, curriculum, etc. Affective skills which are mainly external include motivation, individual differences, interest, personality, etc. A good knowledge of the learner will help the teacher, counsellor, school administrator, parents, and social workers.

The learner in this context covers the period from birth to death.
Types of Learners
Denga (2002) categorized learners into three categories. They are:

i. **Slow Learners:** Slow learners are also referred to as backward learners. They usually lag behind the school and usually have learning difficulties. They have short attention span of about one to fifteen minutes, they get bored easily, and have poor communication skills. They have short memory and forget easily. These learners are made up of the mentally retarded and the learning disabled.

ii. **Gifted and Talented Learners:** The term gifted and talented learners, as used, means those who give evidence of high performance capabilities in areas such as intellectual, creative, artistic or leadership capacity in specific academic activities. They require services or activities not ordinarily provided by the school in order to develop such capabilities. They demonstrate remarkable abilities and potentials to perform outstandingly in academic, social, and vocational skills. They think fast and are highly creative. Gifted children should be encouraged and
helped by their teachers to develop and pursue their interests in particular subjects.

iii. **Normal Learners:** Most learners fall into this group even though there are still individual differences within the normal population. Learners in this category still have learning problems and some of them may manifest giftedness.

**Psychological Characteristics of Learners**

The concept of learner characteristics is used in the sciences of learning and cognition to designate a target group of learners and define those aspects e.g. their personal, academic, social or cognitive self that may influence how and what they learn. Learner characteristics are important for instructional designers as they allow them to design and create detailed instructions for a target group. It is expected that by taking account of the characteristics of learners more efficient, motivating or effective instructional materials can be developed. Learner Characteristics can be psychological, social emotional and cognitive. Deng (1988) identified the following as characteristics of learners:
i. **Inquisitiveness:** Young learners ask innumerable questions. They are selfish and animistic in nature. In asking questions, they also learn. Parents should try to satisfy their curiosity by answering them, even when the questions seem senseless and negative.

ii. **Routines:** A young learner likes routines, he wakes up, he takes his bath, eats breakfast, goes to school, eats dinner, listens to bed time stories, goes to bed, and starts the cycle again. If the routine is disrupted and is found to be incomplete, there will be a stormy period or some form of protest. Good habits can be routinely formed at this time of development.

iii. **Gregariousness:** The learner likes working in company of others. This is because man is a gregarious animal. Provision should always be made for children to work in groups and learn social skills. Parents who have tried to isolate their children for fear of contamination from bad children in the neighbourhood have failed. Children want to play and interact with one another.
iv. **Attention Span:** The attention aid duration of learning varies with age. Young learners in primary schools have relatively short attention span and their lessons should last just 20 minutes in between.

**Social Characteristics**

Biebler & Snowman (1990) identified social characteristics of learners, which include:

i. **Best Friends:** Most children have one or two best friends. This friendship will change rapidly. Pre-scholars claims to be flexible, socially; they are able to play with most of the other children in the class. Favourite friends seem to be of the same sex. When you notice a child is a loner, provide appropriate counselling.

ii. **Quarrels:** Quarrels are frequent but tend to be short lived. When possible, let the children settle the differences on their own.

iii. **Sex Roles:** Awareness of sex roles is evident. This awareness clearly shows in the use of toys, for example, the girls prefer dolls, playing and dancing, while the boys engage in rough and turbulent plays.
iv. **Dramatic Plays:** Young learners enjoy dramatic plays. Most of the plots are from their own experiences or television shows.

v. **Dynamic Play Groups:** Play groups tend to be small and not too highly organized, hence they change rapidly.

**Emotional Characteristics**

i. Young learners express their emotions freely and openly. Anger outbursts are frequent.

ii. Jealousy among young learners is common. At this age, they have affection for their teachers.

**Cognitive Characteristics**

i. They like to talk and have much facilities in speech than in writing. They are eager to recite whether they know the right answer or not.

ii. They are eager to learn. This is due to the high inbuilt motivation in them.

**Factors that Influence Learning:** Two factors that influence learning are (i) Factors associated with the learner and (ii) Factors related to the learning process.
a. **Factors Associated with the Learner**

i. **Motivation:** This is the force that propels an individual to start a task and persist on it. It is the most important factor influencing the learner. If the learner has no motivation to learn, any amount of force will be futile. The more the motivation, the better will the learning be. In addition to motivation, the learner should have a definite goal. It will give direction and focus.

ii. **Readiness and Will Power:** When an organism is ready to learn, the connection between the stimulus and response will be satisfying. But when the physiological neurons are not ready to conduct a learning act, it will not be successfully achieved or satisfying (Thorndike1958). If a learner is ready to learn, he will develop motivation to learn. Along with readiness is a strong will power which is essential to overcome hurdles and problems. Readiness will help to develop positive attitude in a learner.

iii. **Attention Span:** The length or duration of attentiveness varies with age. Younger learners have relatively short attention
span (Denga, 1988). The learner must learn to concentrate his attention on learning. Attentiveness helps to grasp learning material while distraction of attention affects learning.

iv. **General Health Condition of the Learner:** The state of health includes the physical and mental health of the learner. The learner with physical health defects like blindness, deafness, paralysis etc will experience learning difficulties, problems in the sense organs will lead to improper perception and chronic illness will lead to fatigue and lack of interest.

v. **Genetic factors and ability of the learner:** This refers to the level of intelligence, creativity, attitude, and other abilities necessary for learning. Intelligence enables the learner to learn better and understand things and relationship between them. It includes both general and specific intelligence.

There are also slow learners and backward learners. These are the learners who lag behind in their school work. They exhibit an enormous learning difficulty that seems to defy all effectively designed pedagogical procedures.
b. Factors Related to the Learning Process
Simple materials are better learnt than complex ones. And when learners understand the presentation they are more enthusiastic to learn. The following are factors related to the learning process:

i. **Good Physical Atmosphere:** Sufficient light, ventilation, good calm topography, good, normal, clean furniture and environment, for correct posture, are essential for learning.

ii. **Knowledge of Results as Feedback:** It is essential to know the material grasped so that changes may be made in the process of learning. Knowledge of results refers to getting feedback by means of testing, examination, and interview.

iii. **School Based Factors:** Those include poor methods of teaching, hostile teacher-pupil relation, and bullying or jagging by fellow students. While such negative factors adversely affect learning, the reverse would positively improve learning.

iv. **Methods of Learning:** There are several strategies that students employ, when they learn, to enable them grasp knowledge. Some of these methods
include underlining, summarizing, discussing with mates, note taking, etc.

5. **Over-learning:** While some people argue that over-learning does not improve learning, others attest that over-learning helps better learning and memory.

**Study Habits**
Study habit is the sustained learning practice one employs to help learning. Asagwara (1994) defines study habits as the strategies which a learner applies for acquiring knowledge, skills, ideas and competence. Maintaining good study habits can help one attain good grades. Asagwara adds that bad study habits can lead to untold hardship, waste of time and frustration that usually accompany failure. Study habits also entail the regular and uninterrupted time dedicated to learning a task for the absorption of information. Child (1981) maintained that a peaceful and quiet place is essential for the learner’s concentration and learning.

**Study Habit Techniques**
1. Try not to do too much studying at once.
   Space the work you have into shorter
periods of time to enable you refresh and absorb more materials. Taking shorter breaks will restore your mental energy.

2. Plan specific time for studying.
3. Study at the same time each day.
4. Set specific goals—goals for your study time.
5. Start studying when planned.
6. Work on the assignment you find difficult first. Difficult task require more effort. Start at the beginning when you have more mental energy.
7. Review your notes before beginning assignment
8. Study in groups. This helps you clarify difficult points and a great way of having social life while studying.
9. Take notes. Students often take notes during lectures that aid them to revise their work. Most students do not take notes but depend on the teacher’s textbook. When writing notes, use shorthand and listen before you write. Then develop fuller notes after the lecture.
10. Generate Self questions. Students often use their textbooks and notes to generate self questions, which, when they answer correctly, help in examinations.
Individual Differences
Individual differences are the facts that make people different from each other. All learners are not exactly the same; they differ according to their developmental stages. It is important for the teacher or counselor to understand this concept, because individual students differ in learning styles, learning abilities, and learning rates, even when they start school at the same time.

Causes of Differences
i. Heredity. Heredical traits bring a change from one individual to the other. An individual’s height, size, shape and colour of hair, shape of face, hands, legs and the entire structure of the body is determined by heredical qualities. Intellectual differences are also to a great extent inherited.

ii. Environment. Environment brings individual differences in behaviour, activities, attitudes, personality and other lifestyle characteristics. Environment may include culture, customs, traditions, social heritage and others.
iii. Sex
Due to sex variation, one individual differs from others. Men are strong in mental power. On the other hand, women on the average show superiority over men in memory, language and aesthetic sense. Women also excel men in shoudering social responsibilities and a better control over their memories.

iv. Race and Nationality. Race and nationality is one of the causes of individual differences. Nigerians are known to answer questions by questioning back. Americans are frank. Indians are peace loving, etc.

v. Age. Age is another factor of difference learning ability and adjustment capacity naturally grow with age. When one grows in age, can acquire better control over emotions.

Areas of Differences
There are many areas of differences including:

i. Prior Knowledge. This refers to the previous knowledge the students have. Considering the different home environments children come from, the requisite skills also vary. Teachers must use different styles of
teaching and learning, especially the use of visuals.

ii. **Learning Rate:** Students vary in ability and skills. Intelligent students learn with creativity and intelligence. A teacher should use variety of teaching methods such as demonstration. He needs to exercise patience for slow learners.

iii. **Learning Styles:** Students have different ways of learning. While others are verbal, visual, auditory learners, others are kinesthetic learners.

iv. **Attitudes:** A learner who has negative or positive attitudes towards the learning process will be affected in his/her interaction during the learning section, accordingly.

v. **Interest and Personality Differences:** Learners differ in terms of educational and vocational interests. They also differ in personality variables such as emotions, temperaments, motivation, etc.

**Motivation**

Motivation is the prerequisite for learning. Brophy (1998) defines motivation as a theoretical construct used to explain the
initiation, direction, intensity and persistence of behaviour, especially goal-directed behaviour. It also means the subjective experiences of students, particularly their willingness to be involved in learning activities including their reasons for the involvement. Teachers should motivate students by making every subject interesting. Elements of practice, investigation, social adventures should be embedded in a lesson plan, especially for young learners, to reduce anxiety. Briebler and Snowman (1986) assert that students may be unmotivated if the subject is boring, presented in a boring manner, or when students do not know what to do, among other factors.

Test yourself
1. Learners are alike as well as different from others, discuss.
2. Write short notes on how slow learners, gifted or talented learners and normal learners.
Theories of Learning and Classroom Application

Introduction
Human beings learn either consciously or unconsciously. When a child takes his first steps, it is said he has learned to walk, and, similarly, when he communicates his or her first words, laces his shoes among other activities, we conclude that he has learned. Conscious learning, which is also known as school learning, is believed to be a difficult process and it begins as soon as a child starts school. School learning modifies behaviour and prepares an individual for adult life. Psychologists have therefore tried to explain what constitutes learning and what happens when learning takes place, through experiments and research, which have led to the formulation of theories of learning. Many educational phenomena are difficult to understand and a theory serves the role of explaining or representing classroom reality. To test the validity of a theory,
researchers generate hypotheses, carry out research studies, and use their data to determine the adequacy of the hypotheses. If hypothesis is accepted, it is applied to solve learner difficulties in the classroom.

A Theory Defined

A theory is an interrelated, inherent set of ideas that helps to explain and make predictions (Santrock, 2004). Learning theories according to Hill (2002) serve mainly two purposes.

i. They provide vocabulary and conceptual framework for interpreting the examples of learning that we observe.

ii. They also suggest where to look for solutions to practical problems.

Classification of Theories of Learning

Psychologists have developed three broad categories of theories of learning. These are:

(1) **Behaviourist Approaches.** Stimulus-response theories without reinforcement.

   i. Classical Conditioning Theory by Ivan Pavlov
   ii. Watson Learning Theory
   iii. Guthrie Learning Theory
b. **Behaviourist Approaches:** Stimulus-response theories with reinforcement.
   i. Thorndike Learning Theory
   ii. Hull Theory
   iii. Skinner Theory

c. **Social Learning**
   i. Modelling by Albert Bandura

d. **Humanistic Theories**
   i. Carl Rogers Humanistic Theory
   ii. Abraham Maslow’s Self-actualization Theory
   iii. Drive-reduction Theory by Hull

(2). **Cognitive Field Theory**
   a. Gestalt Theory of Learning
      i. Kohler Instinct Theory
      ii. Lewin Field Theory of learning
      iii. Tolman’s Sign Gestalt Theory of Learning

(3). **Constructivism**
   i. Jean Piagets
   ii. Jerome Brunner
Educational psychologists have generated a number of theories that demonstrate the best ways children learn.

**Behaviourist Approaches: Stimulus Response Theories without Reinforcement**

**Classical Conditioning Theory by Ivan Pavlov (1849-1936)**
The classical conditionin also called respondent conditioning theorists define learning as association. To them, learning is the establishment of Stimulus-Response bond between initially unconnected stimuli or events (Watson, 1930; Guthrie, 1935). Classical Conditioning is a behaviourist learning theory without reinforcement. Behaviourism is of the view that behaviour should be explained by observable experiences and not by mental process (Santrock, 2004). They interprete things that can be directly observed. This theory was propounded by Ivan Pavlov in the year 1849. Pavlov, a Russian psychologist was basically interested in studying the digestive processes in animals.

**Pavlov’s Experiment:** Pavlov restrained dogs in cubicles isolated from all distractions. Pavlov
made a small incision in the side of each dog’s mouth. Then he attached a tube so that the flow of saliva could be diverted from inside the animal’s mouth through the tube and into the container, where the saliva was collected and measured. Pavlov’s purpose was to collect the saliva that the dog would secrete naturally in response to food placed inside the mouth. But he noticed that, in many cases, the dogs would begin to salivate even before the food was presented. Pavlov observed the drops of saliva collecting in the containers when the dogs heard the foot steps of the laboratory attendants coming to feed them. He observed saliva collecting when the dogs heard their food dishes rattling, saw the attendants who fed them, or spotted their food.

The thrust of Pavlov’s experiment was to discover the association of an involuntary response such as salivation and its association with sights and sound involved in feeding the animal. This type of learning is what is known today as classical conditioning.
Before Conditioning
1. UCS (Food in the mouth) $\rightarrow$ UCR (Salivation). An unconditioned Stimulus (UCS) produces an unconditioned response (UCR).

Neutral Stimulus (tone) $\rightarrow$ No Salivation. A neutral Stimulus produces no Salivation response.

2. During Conditioning
Neutral Stimulus (tone) + UCS (food in the mouth) = UCR (Salivation). The unconditioned stimulus is repeatedly present just after the neutral stimulus. The unconditioned stimulus continues to produce an unconditioned response.

3. After Conditioning
US(tone) $\rightarrow$ CR (Salivation)
The neutral stimulus alone now produces a conditioned response (CR), thereby becoming a conditioned stimulus (CS).

Basic Terms Used in Classical Conditioning
i. Unconditioned Stimulus (US). A response that elicits a specific unconditioned response without prior learning.
ii. **Unconditioned Response (UCR).** A response that is elicited by an unconditioned stimulus without prior learning.

iii. **Conditioned Stimulus (CS):** A neutral stimulus that after repeated pairing with an unconditioned stimulus, becomes associated with it and elicits a conditioned response.

iv. **Conditioned Response (CR).** The learned response that comes to be elicited by conditioned stimulus as a result of its repeated pairing with an unconditioned stimulus.

v. **Reflex.** A learned involuntary response.

Classical conditioning is therefore a learning process in which an association is made between a previously neutral stimulus and a stimulus that naturally invokes a response. In the above example, by pairing the sound of a bell and foot step with food, it acquired the characteristics of food and succeeded in eliciting the response of salvation. Classical conditioning is also called “substitution learning” because we substitute a neutral stimulus in place of a natural stimulus (Chauhan, 2005). Other
psychologists still interpret classical conditioning as field signal learning.

The conditioning theory of learning put forward by Watson and Pavlov actually involves the conditioning of respondent behaviour through a process of stimulus association and substitution. This is where the responses of the learner become so conditioned, behaving in the same way or responding similarly to similar situations, that he no longer needs the neutral stimuli to evoke the revealed response. As a result, the new substituted stimulus behaves like an original stimulus and is able to evoke the desired response.

**Principles of Classical Conditioning**
The theory of classical conditioning by Pavlov gave birth to a number of important concepts and principles in the field of education; these according to Mangal (2012) include:

i. **Extinction.** This is the diminishing of a conditioned response. If the ringing of the bell is presented alone a number of times without food, the magnitude of the conditioned response of salivation begins to decrease and so does the probability of appearing at all. This gradual disappearance
of the conditioned response or disconnection of the S-R is called extinction.

ii. **Spontaneous Recovery.** It is the reappearance after a pause of an extinguished conditioned response. The process of spontaneous recovery shows that somehow, the learning is suppressed, rather than forgotten. As time passes, the suppression may become so strong that there would, ultimately be no further possibility of spontaneous recovery.

iii. **Stimulus Acquisition.** In classical conditioning, stimulus acquisition is the initial stage when one links a neutral stimulus and an unconditioned stimulus so that the neutral stimulus begins triggering the conditioned responses.

iv. **Generalization.** This is a tendency to respond to stimuli similar to the conditioned stimuli (CS). Pavlov’s dog responded not only at the sight of food but to every stimulus like the ringing of bell, sound of footsteps, light among others.

v. **Discrimination.** Discrimination is the learned ability to distinguish between a conditioned stimulus and other irrelevant
stimuli (Myers 2010). Stimulus discrimination is the opposite of stimulus generalization. For example, Pavlov’s dog is made to salivate at a given signal.

**Implications of Classical Conditioning Theory for Classroom Learning**

Ngwoke (2005) has outlined the following implications of classical conditioning theory:

i. A careful planning of the initial learning situation includes the provision of learning cues, which will help the learner to acquire responses that are appropriate to both immediate and extended objectives.

ii. School children are not given to disliking particular subjects or teachers. However, owing to associations formed during some lessons, e.g. Mathematics, some students dislike not only the school subject, but also the teachers of those subjects (generalization).

iii. A student disturbs loudly in the class when he wants the teachers attention because, on previous occasions, noise making had gained him quick attention of the teacher.
iv. A burnt child dreads fire, similarly a child who fails or suffers punishment in school dreads school.

v. The teacher should not forget to reward good answers. The rewards should be continuous. This is necessary as it strengthens the S-R bond or learning.

**Conclusion**
Classical conditioning is a type of learning in which an organism comes to associate a stimuli. It is a basic form of learning that can be applied to many species.

**Test yourself**
1. What is classical conditioning?
2. How does a neutral stimulus become a conditioned stimulus?
Edwin Ray Guthrie (1886-1959), an earlier behaviourist, was professor of psychology at the University of Washington. While he was influenced by some of the theoretical findings of his contemporaries like selection, connection and associate shifting, advocated by Thorndike and classical conditioning propagated by Watson and Pavlov, he took quite a distinctive stand in propounding his own theory of learning. He devised a new model of learning by synthesizing his idea of temporal contiguity (togetherness of stimulus and response) with the Pavlovian model of classical conditioning. Guthrie defined contiguity principle as a combination of stimuli, which when it has accompanied a movement, will on its reoccurrence tend to be followed by that movement. This means that once a stimuli and a response have occurred jointly, then the next time the stimulus appears, the response will follow (Nwachukwu, 1994).
Guthrie tried to propagate his theory on the basis of a number of experiments performed on cats, in collaboration with G.P. Horton, by using a puzzle box (an apparatus similar to that used by Thorndike in his experiment).

**Guthrie’s Experiment**  
The first experiment was conducted by Guthrie and Horton in 1946 on cats in a puzzle box to prove that learning is a process of association, and nothing else. The experiment was a simple one. A cat was kept in a box with a small pole in the midst of the box as a release mechanism. The touching of the pole from any side and in any manner opened the door. The cat could come out of the box and eat the food put outside the cage. The cat found the solution immediately and whenever it was put in the box, the cat repeated its previous behaviour. He concluded that what any animal would do at any movement was based on a record of what he did the first time in the past. Guthrie reduced all types of learning to association by contiguity in time.

**Fundamental Principles of Learning**  
Guthrie developed several principles of
learning from the contiguity theory. Mangal (2012) outlines the fundamental principles as follows:

1. **The law of Contiguity**
   The law of contiguity proposed by Guthrie is the real corner-stone of his unique theory of learning. Guthrie asserts that all rules by which stimuli and responses become associated to give birth to any learning may flow from a single law, the law of contiguity. He gave two explanations for his law:
   
   i. A combination of stimuli which has accompanied a movement will on its recurrence tend to be followed by that movement (1952).
   
   ii. What is being noticed becomes a signal for what is being done (1959).

   According to these interpretations, stimuli acting at the time of response, tend to evoke that response on their recurrence and consequently if something has been done by us in a given situation, then in case we are provided again with that situation, we will tend to do the same thing. It happens on account of the formation of a close association between a
stimulus or stimuli and the response and this association is formed on account of contiguity, i.e. the coming together of the stimulus (or pattern of stimuli) and a response.

2. One Trial Learning
Most behaviourists believe in the law of frequency which implies that learning is proportional to the strength of an association which, in turn, depends upon the frequency with which it has occurred. This is why Thorndike emphasized repetition and drill for a satisfactory state of affairs. Similarly, Watson and Pavlov also emphasized the repetition of the association between conditioned and unconditioned stimuli for the conditioning of a required response. In contradiction to these behaviourists, Guthrie (1942) completely rejected the law of frequency by saying:

A stimulus pattern gains its full associative strength on the association of its first pairing with a response.

In other words, there is no need for repetition of the S.R. bond as the association develops its full strength and the learning becomes quite...
complete after only one pairing between the stimuli and the response. Guthrie thus emphasized one-trial learning in preference to the need for a number of trials for the establishment of an association. In other words, one experience or trial is sufficient to establish an association, i.e. learning.

3. The Recency Principle
Guthrie’s theory also rests on the principle of recency which states that what was being done in the past in the presence of a set of stimuli will tend to be done next when that stimulus combination occurs.

4. Movement-produced Stimuli Function
Learning is the result of contiguity between a pattern of stimulation and a response. The stimuli present in one’s environment and the response one makes to them are, however, separated by a fairly long interval of time and therefore, cannot be thought of as contiguous. There must, definitely, be something to fill in the gap or interval between the occurrence of an external stimulus and the response finally made to it. Guthrie explained this by inventing the term, movement-produced stimuli.
Movement-produced stimuli are those stimuli (distinctly different from the external stimulation that initially caused the movement) which are produced by the movement of our body and are responsible for conditioning the responses to elicit the desired behavior. Thus, when a response is being initiated by an external stimulus, the body takes on the responsibility of producing the stimulus for the next response and that response can furnish the stimulus for the next one, in the shape of a chain reaction (chaining) for the movements in a desired direction. To throw light on the mechanism of movement-produced stimuli, Guthrie (1935) writes:

Such a movement as listening or looking is not over like a flash or an explosion. It takes time. The movement, once started, maintains itself by the stimuli it furnishes. When the telephone bell rings we rise and make our way to the instrument. Long before we have reached the telephone the second has ceased to act as a stimulus. We are kept in action by the stimuli from our own movements towards the telephone. One movement starts another, then a third,
the third a fourth, and so on-our movements form series, very often stereotyped in the form of habit. These movements and their movement-produced stimuli make possible a far reaching extension of association or conditioning.

5. Learning of Acts or Behaviour
Our behaviour may involve learning of many skills like driving a car, playing badminton, typing a letter, eating a meal, etc. A skill is made up of many acts and acts are made up of many movements which result from muscular contraction, and it is these muscular contractions that are directly predicted by the principle of association. Therefore, learning of a skill or performing an act consists of learning thousands of associations between specific stimuli and specific movements.

The learning of a single movement (requiring association between a specific stimulus and a specific response or movement) requires only one trial and its degree is not dependent on practice. For example, the skill of typing or playing badminton involves an enormously large number of specific S-R bonds, each of
which is learned in a single trial. Naturally, it will require time and practice for the establishment of all the necessary connections or bonds and we may, therefore, conclude that learning of an act or skill needs practice, and it is the practice which helps in attaining proficiency in performing an act or skill. The need of such practice can be better emphasized in the words of Guthrie and Horton (1946):

Learning of an act does take practice. We assume that the reason for this is that the act names an end result that is attained under varied circumstances and by movements varied to suit the circumstances. Learning an act as distinguished from a movement does require practice because it requires that the proper movement has been associated with its own cues. Even so simple an act as grasping a rattle requires different movements according to the distance and direction and position of the object. One successful experience is not sufficient to equip the infant with an act because the one movement acquired on that occasion might never again be successful.
6. Role of Reinforcement or Reward
It was noticed by Guthrie in the behaviour of the cats that, though they often ignored the food placed outside the box, this did not affect their proficiency in coming out of the box. This observation led him to disagree with Thorndike and re-define the role of reward or reinforcement. Reward or reinforcement, according to him, is not an essential condition for the reoccurrence of the previous response. In other words, learning is not dependent on reinforcement of behaviour. The law of contiguity, accompanied by the recency principle, is enough to explain the learning behaviour. The animal is likely to repeat the preserved association between being in the puzzle box and moving the pole resulting in its release. Therefore, regardless of the food it gets after its release, the animal would try to repeat the last response which helped it to obtain its release.

Reward or reinforcement like food in this case, according to Guthrie, may simply work as a mechanical arrangement for changing the stimulating conditions and thereby preventing unlearning. In the words of Guthrie (1940):
The animal learns to escape with its first escape...what encountering the food does is not to intensify a previous item of behavior but to protect that item from being unlearned.

7. Forgetting and Extinction of Behaviour
According to Guthrie’s conclusion, extinction or forgetting (weakening or disappearance of the association or bond between a stimulating condition and a response) occurs not due to non-reinforcement but due to the phenomenon of interference. He accepts an extreme form of retroactive inhibition (interference in old learning by new learning) to explain extinction and forgetting. According to him, for the extinction and forgetting of a wrong response of undesirable learning, one is required to learn something new in such a way that the old learning is completely knocked out. According to Guthrie (1942):

Forgetting is not a passive fading of stimulus-response associations contingent upon the lapse of time, but requires active unlearning which consists in learning to do something else under the circumstances.
8. Role of punishment
The role played by punishment in learning or forgetting a behaviour was also studied by Guthrie. He accepted the role of punishment in this situation but emphasized that punishment is effective only through its associations resulting in a new response to the same stimuli. In the words of Guthrie (1952):

It is not the feeling caused by punishment, but the specific action caused by punishment that determines what will be learned. In training a dog to jump through a hoop, the effectiveness of punishment depends on where it is applied, front or rear. It is what the punishment makes the dog do that counts or what it makes a man do, not what it makes him feel.

In this way punishment works not because it reduces certain kinds of painful experiences but because it forces the organism to do something different and thus establishing inhibitory conditioning of unwanted habit, resulting in a behaviour incompatible with the punished behaviour. For example, in punishment meted out to a dog which is in the habit of chasing
your motorcycle, a slap on the nose or a slap on the rear is equally painful to the dog. However, the slap on the nose in this case would prove more effective because, the slap on the nose will tend to make him stop and jump backward in the presence of the motorcycle, resulting in incompatible behaviour. On the other hand, a slap on the rear will make him continue forward, perhaps with a little more speed and will thus fail its purpose by eliciting a behaviour not incompatible with the punished behaviour.

Thus, for making punishment effective, we have to arrange things in such a way that stimuli that previously elicited an undesired response, now elicit an unwanted response (incompatible with the punished response) that can make the organism think of changing its ways of behavior so that it may learn a favourable response, instead of an unfavourable one.

9. Motives and Drives
On the basis of his studies, Guthrie concluded that motives and drives occupy an important place in the field of learning as they provide for the maintenance of stimuli for keeping the organism active until a goal is reached. For example, by being hungry or thirsty, one is
stimulated and this stimulated behaviour is maintained until one gets food or water. Similarly, when one is anxious to achieve a target, it stimulates one and the stimulated behaviour is maintained until one gets what one aspires to, in terms of money, success or recognition. Drives and motives are, therefore, not only physiological but also socio-psychological and external, and in this way, any source of stimulation, whether internal or external, capable of maintaining stimuli, can be termed as a useful motive or drive for accelerating the movement of the organism to reach a goal.

10. **Transfer of training**
While rejecting the formal discipline theory outrightly, Guthrie’s theory of learning gives some consideration to Thorndike’s identical element theory of transfer. Therefore, according to its similarity between two situations may act as a deciding factor for the probability of a similar response in two situations. Guthrie’s theory, however, asserts that transfer in two situations can only take place if the stimulating conditions in both situations are identical and, consequently, on account of the variation in the
stimulating conditions, there is no guarantee that a child who learns something in his study room will be able to reproduce it in the classroom or examination hall.

**Summary of Guthrie’s Theory of Contiguous Conditioning**

Guthrie's theory is based on a single law of learning, that is, the law of contiguity which states that when two events occur together, they are learned. In other words, learning is based on the association or connection between a stimulus and a response, and this association occurs simply because of the contiguity, that is, occurrence of the stimulus and response together. Maintaining the chain of contiguity between the external stimuli and the response finally made by our body, through its movements, tends to produce the stimulus for subsequent responses in a chain-like mechanism. However, as far as learning in the form of establishing a bond between a stimulating situation and a response is concerned, it occurs in a single trial and this association tends to be continued until there is change in the stimulating conditions or a response is prevented from occurring. The
association once made, on this bond once established, makes the organism exhibit the same response (usually in the form of the last movement which helped it to reach a goal like a cat hitting the pole in a particular way to escape from the box), in case it is faced with the same stimulating conditions. And when this happens we say the organism has learned the way it should behave to attain its goal. Guthrie developed no concept or principle of motivation. For him, stimuli are motives and stimulation may be from within or without, as it arouses the learner and causes him to respond.

**Contribution and Educational Implications of Guthrie’s Theory of Contiguous Conditioning**

1. Guthries’ emphasis that learning is complete after only one pairing between the stimuli and the response makes us take care in the organization of stimulating conditions for eliciting the desired response.

2. The law of contiguity and the recency principle, which emerged from the law, requires that in case we want to revoke a learned response, we have to arrange for the occurrence of stimulating conditions
identical to the ones in which the response behaviour has been learned. It makes us exercise caution in learning things in the way in which these are going to be utilized by us in the future. For example, if a student teacher is required to teach in the class after becoming a teacher, he must be trained in the actual classroom set up. Similarly, if a student has to be examined in a classroom laboratory or particular examination set up, he can be expected to do better only if he has been taught in conditions in which he is required to demonstrate his performance later on. It enables us to introduce radical changes in the teaching-learning materials, processes, and conditions so that the associations made at the time of learning are utilized to the maximum at the time of utilization of the outcomes of learning. The school programme or the task of formal learning must be made so functionable and natural as to coincide with the real life settings, so that what is learned at school may prove useful to the learner in real life.

3. Guthrie’s theory lays stress on the need of drill and practice as this generates more
and more stimuli for eliciting the desired behaviour. According to Guthrie, since learning is complete in terms of the establishment of an association between a stimulus and response, every learning in itself is a unique experience and its transfer from one situation to another cannot properly take place until the two situations are identical. As it is very difficult for stimulating conditions to be identical, we must make the child practice a behaviour under different stimulating conditions. For example, for learning addition of numbers like two and two the child should not learn only from the blackboard or in his note-book but must also learn it through making various associations (in the form of two and two equals four), with the help of concrete objects like chalks, books, pens, apples, etc. in the school or outside the school.

4. Guthrie believes in the interference theory and the mechanism of retroactive inhibition to explain the causes of forgetting. We must, therefore, make sure that the interference caused to the past learning by the new learning is avoided.
For minimizing forgetting he advocates that what is being learned should be learned properly and the new learning should be so planned and associated that it may cause least interference to the past learning. A thing to be learned properly needs strengthening of the bond or association between stimuli and response when it is learned the first time. This may necessitate the following:

a. Since any behaviour is a complex movement in response to a complex of stimuli, for evoking a desired response or making the child learn a particular behaviour, we must have the support of as many stimuli as possible. The more the stimuli used for evoking a desired response, the less will be the likelihood of an interfering or distracting behaviour.

b. In order to evoke a desired response, we must look for all the ways and means, for evoking that particular response. All types of drives, motives and means like rewards and punishment, must be utilized for evoking and then intensifying the response.
Guthrie’s theory provided valuable cues and ways for breaking bad habits.

i. Threshold teaching
ii. Fatigue teaching
iii. Incompatible teaching.

Test Yourself
1. State the contiguity theory
2. What are the contributions of Guthrie to education?
Connectionism or S-R Bond Theory: E.L. Thorndike (1874–1945)

E. L. Thorndike was the first American psychologist in Stimulus-Response (S-R) theories, who conducted a series of experiment in animals (Chauhan, 2012). He introduced the concept of reward in learning.

Thorndike’s theory is called S-R Bond Theory or Connectionism. Thorndike maintained that specific responses come to be linked with specific stimuli through conditioning. The links, bonds or connections are products of biological or synaptic changes in the nervous system. Thorndike asserts that the principal ways through which the S-R connections are formed are through random trial and error or selecting and connecting responses (Ebenebe & Unachukwu, 1995).
Thorndike’s Experiment
E. L. Thorndike carried out several experiments with hungry cats. He placed a cat in a cage with food visible on the outside. On the inside of the cage was a release mechanism which the cat could operate. On seeing the food through the transparent part of the box, the cat would claw, bite and move widely about in the cage until it accidentally touched the button which operated the release mechanism. That allows the cat to get out and unto the food.

When the cat was replaced in the cage it still exhibited a trial and error approach to the solution of the problem. This time there were fewer random actions and the release mechanism was operated sooner. Eventually the cat learned to escape from the box without random activity. It was from such timed behaviour of the cat that Thorndike inferred that learning is a process of stamping in connections in the nervous system. This implied that the cat learnt to stamp in its nervous system those activities that led to its escape from the box and repeated them in subsequent trials, while those activities that were ineffective were dropped. Based on these experiments, Thorndike developed a number of laws which today have continued to influence classroom teaching and learning.
Thorndike’s Basic Laws of Learning

i. The Law of Effect. The law states that actions followed by a satisfying change were more likely to be repeated in similar situations on future occasions. The law of effect laid the groundwork for classroom practices.

Classroom Application
First and foremost, it points to the need for classroom experiences to be satisfying and pleasant to the learners. Secondly, learners have to be praised and encouraged to promote learning. Lastly, classroom experiences and other activities must be meaningful and understandable in terms of the personal life of the learners.

ii. The Law of Exercise. This law gives the impression that repeating a habit increases its strength since practice makes perfection. This second law is divided into two parts.
(a) The law of use and (b) The law of disuse.

a. The Law of Use. This law states that the more times a stimulus-induced response is repeated, the longer it will be retained. Exercise strengthens the bond between situation and response; other things being equal.
b. The Law of Disuse. This law states that, other things being equal, when a modifiable connection between Stimulus-Response (S-R) is not made use of over a period of time, the strength of that connection is weakened.

Classroom Application
1. More and more opportunities should be given to the students to use and repeat the knowledge they get in the classroom.
2. To maintain the connection for longer period, review of the learned material is necessary.
3. Drill strengthens the bond between S-R. This is most useful especially in the elementary school in the learning of multiplications, states and capitals, among others.

iii. The Law of Readiness
This law states that when a modifiable connection is ready to act, to do so is satisfying; but when it is not ready, to do so is unsatisfying. There are however circumstances such as fatigue, hunger etc. that tend to hinder the smooth actions of organisms.
Classroom Application
1. The teacher should be able to assess when a child is ready to perform a given task.
2. Aptitude tests in various subjects may be given to determine the thoroughness of learners.
3. Provision of rewards should be continuous.

Differences between Classical Conditioning and Operant Conditioning
Many psychology students find it difficult to distinguish between classical conditioning and operant conditioning. First and foremost classical conditioning involves a response that naturally and automatically triggers a response while operant conditioning requires reinforcement or punishment.

i. Classical conditioning forms associations between stimuli (a CS and the US it signals). It also involves respondent behaviour i.e. actions that are automatic responses to a stimulus (e.g. salivating in response to meat and later to the ringing of a bell).

ii. In operant conditioning organism associate their actions with consequences. Actions followed by reinforcers are
increased; those followed by punishers decrease.

iii. In classical conditioning the association between Stimulus-Response (S-R) is the basis of the law of contiguity while in operant it is based on the law of effect.

**Test yourself**

1. State Thorndike’s laws of learning and classroom applicatuions
2. Differentiate between classical conditioning and operant conditioning.
Hull’s Systematic Behaviour Theory/Need-Reduction Theory

Clark L. Hull (1884-1952), a teacher in the Universities of Wisconsin and Yale, is credited with putting forth a systematic mathematical and scientific theory of human behaviour based on conditioning and connectionism of the earlier behaviourists. He built his theory, on a logical structure of postulates and theorems. Hull’s theory is also referred to as Need-Reduction theory. To understand Hull’s theory some concepts need to be understood.

i. **Need.** A need is a lack of something that is required for survival. When a need arises, the organism acts in order to reduce the need. All human behaviours have their origin in the satisfaction of biological needs.

ii. **Drive.** A drive is a general condition of deprivation in the organism. It is a common denominator for all primary motivations, whether due to food, water,
sex or any other causes. Drive causes general restlessness until they are satisfied.

**Basic Concepts of the Theory**

1. **Change in the Traditional S-R Notion**

Hull rejected the Guthrie’s contiguity approach as well as the S-R formula given by Thorndike. Guthrie emphasized only the contiguity, i.e. togetherness of the stimuli and response, for the formation of an association, and Thorndike made it out to be mechanical, a trigger-like function of stimuli-response. Hull introduced the concept of intervening variables (the processes which are thought to be taking place within the organism but are not directly observable) between S and R accordingly. When a stimulus (S) impinges on the organism, it results in a sensory neutral impulse (s) a kind of stimulus trace. This stimulus trace ultimately causes a motor neutral reaction (R) that results in an overt response (r). Thus we may have the formula S-s-r-R instead of the traditional S-R.

However, there are so many other things within the inner mechanism of the organism like his interests, needs and drives and also the reinforcing mechanism that may influence his
response or behaviour. Consequently, the traditional S-R formula in Hull’s approach was extended to S-O-R, incorporating all intervening variables existing between environmental stimulation and overt response.

2. The concept of reinforcement and drive-stimuli reduction
Hull maintained that the establishment of a simple s-r connection is not enough for learning. In this regard, he refuted Guthrie’s claim that a learning is completed in a single trial. Instead, he maintained that it is stamped through a process of repeated reinforcement like getting food or avoiding pain, etc. However, Hull’s reinforcement was different from that of Thorndike or Skinner. Whereas Thorndike used the law of effect for stating his concept of reinforcement and Skinner called it anything that increases the probability of the re-occurrence of a response, Hull viewed it in terms of the reduction of one’s need, drive or drive stimuli. Drive, according to him may be referred to as a state of tension resulting from a need. For example, the thirst drive arises out of our body’s need to take in water for its maintenance. If the response or reaction of the organism
reduces the need or state of tension or drive, we then have a condition of reinforcement enabling the organism to repeat the S-R association and, thus, to habitually react in the same way in a particular situation. Drive stimuli are stimuli that characteristically accompany a certain drive, e.g. dryness of the mouth, lips and throat, accompanying the thirst drive, and hunger pangs accompanying the hunger drive.

**Hull's Theory**
Hull maintained that if you minutely observe the behaviour of an animal, you will find that the animal engages in solving its biological problems. For example an animal that is on heat (has desire for sex). This animal searches and finds it. This sexual satisfaction eliminates the animals’ biological need.

The world system would be perfect if the reduction in need were to serve as reinforcement and produce learning of lucky response. The animal would then be an automatic problem solving system. Need would produce behaviour and the particular behaviour that reduces the need would be gradually learned.
Hull’s Postulates
Hull’s theory is reinforcement theory of learning. He stated his theory in sixteen postulates or general rules (Chauhan, 2005). Two of the postulates are explained thus:

i. Postulate IV: The law of habit formation. He explained habit formation with this formula

$$\text{SHR} = 10 - .03 \text{Na}$$

When a stimulus (S) acts on an organism (O) there is natural impulse in the organism which leads to reaction (R).

This reaction of the organism reduces the drive present in the organism

$$\text{SHR} = 1 - 10 - \text{Na}$$

$\text{SHR} =$ Habit strength
$\text{N} =$ Number of trials to form a habit
$\text{a} =$ empirical constant which is equal to .03.
Habit strength is a function or reinforcement.

ii. Postulate V: Stimulus generalization. This means that where there are two or more alike stimuli, they can evoke exactly the same response from the organism as was evoked by the original stimuli. A child fearing snake fears rope or any other thing belonging to this category. In the case of qualitative stimuli $S_1$ and $S_2$, the effective habit strength (SHR) generates a
stimulus generalization gradient on the qualitative continuum from the simple learned attachment of S1 to R.

\[ S2HR = S1HR \times 10^{-0.0135d} \]

Where \( d \) represents the difference between S1 and S2 in SND. A stimulus intensity (S1) generalizes to a second stimulus intensity (S2) according to the following equation

\[ S2HR = S1HR \times 10^{-bd} \]

Contributions and Educational Implications of Hull’s System of Learning

Hull’s system of learning is acclaimed and remembered for putting forward a most systematic, scientific, and mathematical theory of learning. Hull was able to popularize a very innovative and objective behaviouristic approach to learning, which was more effective in comparison to the approach of his predecessors. The significant contributions and educational implications of his theory can be briefly summarized. (Mangal, 2012)

1. Hull’s theory rejected the trigger-like mechanism of stimuli-response advocated by Thorndike and introduced the concept of intervening variables between S and R. The things within the individual
definitely act and react with what is received in terms of stimuli from the external environment before emitting of an overt response. Hull provided the amended S-O-R formula in place of the traditional S-R approach. He termed the environmental influences upon the individual as ‘inputs’, and his responses as ‘outputs’, and what goes from the individual as ‘processes’. He asserted that ‘input’ and ‘output’ can be measured experimentally and, therefore, behaviour in its processes and products can be subjected to experimental verification.

2. Hull’s theory attached sufficient importance to the needs, drives, incentives, reinforcement and adequate motivation for achieving satisfactory results in the process of teaching and learning.

The greatest contribution of Hull’s theory lies in its emphasis on linking learning to the needs of the children. He says that it is the need, drive or drive stimuli that energize an individual to act, behave or learn. Therefore, he advocated the need-based goals of education, including need-based curricula and methods of teaching.

Whereas needs start the process of learning,
reinforcement and incentives act as catalytic agents for increasing one’s efforts towards achieving the goals of learning. Therefore, in any educational process, we must involve sufficient possibilities of proper motivation and reinforcement incentives.

3. Hull’s theory tried to extend the concept of reinforcement. Prior to this, reinforcement was considered only in terms of rewards and satisfaction, but Hull stated that to escape pain or punishment or to reduce need is also a kind of reward and helps in reinforcement.

4. Hull’s theory laid great emphasis on the formation of good habits as a means of learning desirable behaviour. In practice, Hull reduced the art of learning to mere habit formation and its proper reinforcement. It brought into prominence the role of adequate practice, drill and strengthening of reinforcement. However, he preferred an increase in the number of trials or reinforcement to an increase in the proper quantum of reinforcement and, thus, advocated continuous and gradual introduction of small doses of reinforcement rather than one, single heavy dose.
5. Hull's theory brought into focus the fact that different individuals have different capacities. It presented a systematic and mathematical treatment of individual differences. Hull attributed individual differences to the variation of the values of numerical constants in the equations in the postulates. He believed that some numerical constant varied from species to species, from individual to individual, and from one physiological states to the other in the same individual. If a group participates in a learning situation and everything else is kept constant through experimental controls, then the constant should change in a systematic way from different age groups of the learners. For any group of learners, the constant should not change when identical conditions are introduced. Such views propagated by Hull's theory emphasized the need for planning education according to the individual differences of the learners, keeping their respective ages in mind.

6. Hull's theory emphasized the need for proper rest and other measures to reduce the ill-effects of fatigue in any act of
Learning. The principle of work and appropriate rest, may thus be said to have evolved as a result of the experimental findings of this theory.

Hull’s theory stood against any inhibition-causing obstacle in the path of learning or emitting the desired response. It stressed the prime need of minimizing or removing all types of inhibitions, internal or physiological and external or learned, for achieving good results in the process of teaching and learning or obtaining the desired behaviour in an individual. In a practical classroom situation, therefore, a teacher has to be very careful in the proper distribution of the drill and practice work so as to avoid unnecessary fatigue and the resulting inhibition.

Similarly, the principle of change and variety in terms of subjects, teachers and classrooms etc. may be introduced for bringing down the ill effects of boredom and fatigue.

Hull’s system of learning advocated the following chain sequence for improved results in the teaching-learning process:
a. Drive: This is something which is needed by the learner in order to behave or respond.
b. Cue: There must be something to which the learner must respond.
c. Response: The learner must be made to respond or do something in order to learn some act.
d. Reward: The learner’s response must be reinforced or rewarded, thus enabling him to learn what he wants to learn.

Test yourself
1. What are the main characteristics of Hull’s theory.
2. Enumerate his contributions to education.
CHAPTER SEVEN


Burrhus Fredric Skinner was born in Quebanae Pennsylvania. He was a college English major and an aspiring writer who, seeking a new direction, entered graduate school to study Psychology. Skinner’s theory of learning is called Operant conditioning. In operant conditioning, an organism first makes a defined response, then a reinforcement is given. The reinforcer strengthens the response, that is, makes it more likely to occur in future. Operant, therefore, means behaviour that operates in the environment to produce rewarding or punishing stimuli. This theory is also called instrumental conditioning and it is based on Thorndike’s law of effect.

Skinner’s Experiment
Skinner designed an operant chamber popularly known as Skinner box. The box has a bar or a key that an animal presses or pecks to release
a reward of food or water and a device that records the responses. He commonly used pigeons and rats. In his experiment if the rat happened to press the bar it would receive a food pallet. Skinner observed that after a few accidental bar pressing the rat would start pressing the bar much more frequently. The rats’ operant action of pressing the bar produced its own reward of receiving a food pallet. Thus an original accidental behaviour became converted into an instrumental behaviour pattern. The rat’s behaviour has been conditioned to strengthen bar pressing, while all other behaviour such as wondering around the box were weakened. Once this was established Skinner introduced other dimensions. First the electronic controlling the bar and food dispenser, when each bar pressing received food, he called it continuous reinforcement. When the rat received food and sometimes did not it was described as intermittent reinforcement. In the early stages of conditioning, Skinner says that the continuous reinforcement is necessary. When hunger is satisfied intermittent reinforcement can be introduced with increasing intervals between the rewards.
Types of Reinforcement
A reinforcer is any event that strengthens (increases the frequency of) a proceeding response. A reinforcer may be praise, attention or even watching television after doing some homework (Myers, 2012).

Chauhan (2005) categorizes reinforcers into three categories:
1. Positive reinforcers
2. Negative reinforcers
3. Punishers

1. Positive Reinforcer. A positive reinforcer is any event or stimulus, or behaviour that strengthens a behaviour when presented, or weakens it when withdrawn. It strengthens the probability that a response it follows will be repeated and an individual works to obtain it. Positive reinforcer which an individual will look in order to obtain food, money etc. Positive reinforcers may be classified into primary and secondary. While primary reinforcers may satisfy basic human needs such as food, water, security, warmth and sex. Secondary reinforcers are those that require their value by being associated with primary or other established secondary reinforcers.
2. Negative Reinforcers. Negative reinforcers are those unpleasant stimuli which a learner will readily terminate if given the opportunity to do so. When negative reinforcement is used, the response to be learned serves to terminate or eliminate the aversive stimulation e.g. a quarrel by the teacher will cause the students to do their homework. Negative reinforcers force a behaviour to occur or escape from unpleasant situations.

3. Punishers. A punisher is an aversive stimulus which follows a response and frequently serves to suppress it. Negative reinforcers and punishers are often confused with each other.

Differences between Negative Reinforcers and Punishers
1. The goal of punishment is to reduce behaviour by imposing unwanted consequences. The goal of negative reinforcement is to strengthen behaviour.
2. In punishment a behaviour is weakened or reduced by imposing unpleasant consequences in negative reinforcement, a desirable behaviour is strengthened by
removing or withdrawing unpleasant consequences.

Disadvantages of Punishment
Seifert (1991) advances the following disadvantages of punishment:
1. Punishment suppresses behaviour instead of encouraging it
2. Punishment poses perennial problems for the teacher
3. Punishment teaches fear
4. It teaches discrimination.
5. Punishment can arouse anger in a child.

Schedule of Reinforcement
One important aspect of Skinner’s work is that conditioning does not require that reinforcement follow every occurrence of an operant behaviour. In scheduled, reinforcement is sometime provided and at others it is not, even though responses may be correct. These categories of reinforcement are:
1. Fixed Ratio (FR)
2. Variable Ratio (VR)
3. Fixed Interval (FI)
4. Variable Interval (VI)
**Fixed Ratio Schedule.** This is where behaviour is reinforced after a set number of responses. For example buy nine (9) get one free or one reinforcer for 30 responses. A teacher may also tell the students if you answer 5 questions you will be given 10 minutes break.

**Variable Ratio Schedule.** In this form of reinforcement the number of behaviour required for reinforcement is unpredicted even though it is certain that the behaviour will be eventually reinforced e.g. people who gamble are optimistic that they will win. Similarly a teacher may choose to occasionally reward students who answer questions in class. Like the fixed ratio schedule, the variable ratio schedule produces high rates of responses because reinforcers increase as the number of responses increase.

**Fixed Interval schedules.** In fixed interval schedule reinforcement is available at a fixed time period e.g. rewards presented at end of final examinations in schools and colleges.

**Variable Interval Schedule.** In variable interval schedule, variable amount of time
passes before reinforcement is available. The time could be very short to very long in an unpredictable pattern from one reinforcer to another. The main difference between variable interval and fixed interval is the non-specific and unpredictable duration for the provision of reinforcement. An example could be a teacher checking students neat appearance. The teacher may reward persistence in neatness.

**Operations in Skinner Operant Conditioning Theory**

Skinner discovered a number of techniques through his experiments which are used in behaviour modification of children with behavioural problems such as phobia, truancy, depression, hostility, drug addiction among others.

1. **Shaping.** B. F. Skinner used shaping to teach the rat to learn connection between bar pressing and food. Shaping refers to the judicious use of selective reinforcement to bring desirable changes in the behaviour of the organism. Shaping is also a behaviour modification technique which can be in enforcing training in children among other numerous applications.
2. **Premark Principle.** In Premark principle access to something desirable is made contingent with something less desirable. For example a father may tell his son if you finish your assignment you can play football.

3. **Extinction.** Reinforcement strengthens behaviour but when reinforcement are withdrawn the behaviour is weakened and ultimately it disappears. Extinction may not occur automatically but may persist when reinforcers are withdrawn.

4. **Discrimination.** It is the use of cues, signals or information to know when a behaviour is likely to be reinforced. Learning entails mastering more and completes discriminations. For example, all letters of the alphabets, numbers, words and mathematical symbols are discriminative stimuli and a child must learn to distinguish them.

**Application in School**

1. The whole atmosphere in schools is dominated by fear and unpleasant experiences. Though legally corporal punishment is prohibited teachers still use it and various other methods.
The school can use the principles of operant conditioning to eliminate fear by using positive reinforcement.

The delay of reinforcement (fixed interval) destroys the effect of reinforcing stimuli.

Objectives are vague. Most objectives in a lesson are not defined in operational terms.

Teachers should apply programmed instruction objectives which are more defined, observable and immeasurable (computer assisted learning).

**Conclusion**

B. F. Skinners’ operant conditioning can be used in schools sports and work to enhance productivity. Care should be ensured in the use of these principles to achieve good success.

**Test yourself**

1. What is operant conditioning and how does it differ from classical conditioning?

2. Define reinforcement. What are the various schedules of reinforcement? Explain with examples.

3. Spare the rod and spoil the child. Discuss.
Introduction
Behaviorist claims that people are motivated to do more by objective reinforcement contingencies. In contrast, cognitive psychologists hold that behavior is influenced more by subjective interpretations of reinforcement. While behaviorists emphasize observable learned actions and relationships among actions and consequences, cognitive theorists emphasize the relationship between an individual’s actions and other thoughts prior to knowledge and skills.

Cognition defined: Cognition can be defined as the ability to become acquainted with (M.W Collegiate Dictionary), cognition, could also mean intelligence. Omotsho (2014) view cognition as the processing of information about the enrolment that is received through the senses of smell, touch, taste, and hearing.

According to cognitive theorists, teaching is a process of developing insight or
understanding in the learner. Learning is the organization of precepts and purpose by the learner. Classroom experiences are related to the individual goals of the students. In cognition students are encouraged to discover relationships or form gestalts so that they might use it to create the consequences of their efforts (Chauhan, 2005).

In 1911 a group of German psychologists Wertheimer, Kohler and Kaffka initiated a new psychology emphasizing not parts but wholes in the study of experience. These psychologist instituted insightful learning known as gestalt. Gestalt is a German word which has no English equivalent which means shape, form, pattern or configuration. We learn not by associating bits of experience but by forming new gestalts. By seeing new patterns and by organizing them into meaningful whole in the total situation. When we struggle with a problem the solution may come to us all of sudden; this quick change in our perception is called insight.

**Basic Principles of Perceptual Organization**
The focus of Gestalt theory has been the idea of grouping i.e. characteristics of stimuli cause us to structure or interpret a visual field or
problem in a certain way. The primary factors also called the laws of organization are listed by Mangal (2012) as mentioned below:

i. **Proximity:** Elements tend to be grouped together according to their nearness

ii. **Similarity:** Items smaller in some respect tend to be grouped together

iii. **Closure:** Items are grouped together if they tend to complete some entity

iv. **Simplicity:** Items tend to be organized into simple figures according to symmetry, regularity and smoothness.

**Learning by Insight (Wolfgang Kohler, 1887–1967)**
The Gestalt Psychologist Kohler is associated with the insight theory. In a typical insight situation a problem is postulated which no apparent progress is made towards solving it. Suddenly a solution comes by quick insight.

**Kohler’s Experiment**
Kohler conducted his experiment on Chimpazees confined in a caged boxed. Kohler hung a bunch of bananas inside the cage but overhead out of the reach of the chimps. Boxes and sticks were left around the cage. He
observed the Chimps unsuccessful attempt to reach the bananas by jumping up or swinging sticks at them. Eventually the Chimps solved the problem by piling the box on top of one another and climbing on the boxes until they reached the bananas.

Kohler observed that the chimps sometimes appeared to give up in their attempts to get the bananas. However after an interval, they returned with the solution to the problem as if it had come to them in a flash of insight. Kohler concluded that insight rather than trial and error learning accounted for the Chimps success, because they could easily repeat the solution and transfer the learning to similar problems. In human terms a solution gained through insight is more easily learned, less likely to be forgotten and more easily transferred to new problems than a solution learned through rote memorization (Wood, Wood & Boyd, 2004).

Chauhan (2005) gave the following as characteristics of insightful learning.

i. Survey the problematic situation

ii. Hesitation, pause, attitude of concentrated attention to the problematic situation

iii. Trial of mode of responses
iv. Steady repetition of adaptive response
v. Notable ability to discover and attend to the essential aspect or relation in the problematic situation and to neglect relatively variations in non-essentials.

Classroom Implications
i. The teacher should present learning task from know to unknown. This will help to gain insight into the problem
ii. The teacher should arrange new situations in such a manner hat the learners will be stimulated to ask themselves the right questions and to find for themselves correct answers. This will help them view themselves as organizers of their environment and gain self-confidence.
iii. Teachers should provide drill work for successive repetition, which may bring practical insight and each of these may in turn provide opportunities for further acts of insight.

Conclusion
Gestalt Psychologists are of the opinion that when a learner is successively exposed to a
learning situation and is provided with repeated opportunities to notice new relationships that will enable him restructure a given task, only then will habits become permanent and subsequent task will be performed with much ease.

**Test yourself**

a. State the fundamental principles of gestalt psychology.

b. Differentiate the behaviorist theory from the Gestalts theory.

c. What are the classroom implication of Kohler’s theory of insightful learning?
Tolman (1932) believed that learning could take place without reinforcement. Secondly, he differentiates between learning and performance. He maintained that Latent Learning could occur without apparent reinforcement and not be demonstrated until the organism was motivated to do so (Wood, Wood & Boyd, 2004).

Tolman’s theory combined the advantages of Stimulus-Response (SR) theories with Cognitive Field Theories. Tolman has direct historical connections with Gestalt Theory which suggests that psychological field is always as well organized as possible.

**Tolman’s Experiment**
Three groups of rats were placed in a maze daily for 17 days. The first group always received food at the end of the maze. The second group never received a reward. The third group was rewarded on the 11th day.
Results
The first group showed a steady improvement in performance over the 17th day period. The second group showed a slight gradual improvement. The third group after being rewarded on the 11th day showed a marked improvement the next day and out performed the rats that had been rewarded daily. From these results Tolman concluded that latent learning had occurred and that the rats had developed cognitive maps. A cognitive map is a mental representation of a spatial arrangement such as a maze. Cognitive maps may be simple or comprehensive, depending upon the structure of the brain, motivation, relevant experience, practice and the nature of external stimuli (Lovel, 1988). The more likely will that transfer of learning take place. Tolman questioned the whole notion of trial and error learning while it appears to operate without meaning.

Edward Tolman’s Sign Gestalt Theory of Learning
Tolman’s theory is directly rooted in behaviourism, but he was strongly opposed to S-R Associates (Nwachukwu, 1995). His system
stands in between S-R theories and cognitive field theories. This led him to publish his major work “purposive behaviour in animals and men” in 1932. His own system is known as “purposive behaviourism which paid attention to the cognitive aspect of behaviour.

Tolman therefore developed a theory which recognizes the cognitive aspect of behaviour without sacrificing the objectivity of behaviourism. He introduced the concept of variables namely independent, dependent and intervening variables.

1. Independent Variables
Tolman conceived that the behaviour of an organism is initiated by five factors which include:
(i) The environmental stimuli
(ii) Psychological drives
(iii) Heredity
(iv) Previous training
(v) Maturity or age

In 1937 Tolman revised his list of independent variables and divided into two broad categories.
i. Individual differences
ii. The Experimental independent variable (Chauhan, 2004)
2. Dependent Variables
The dependent variables include the observable behaviour of the organism. This he discovered are based on the experiments he carried out on rats. He concluded that an organism is:

i. Active and selective
ii. Purposeful and goal directed
iii. Behaviour is no doubt a stimulus-response affair but it is not mechanistic
iv. Behaviour is molar and teachable and the organism acts as a whole.

The sign Gestalt expectation in a simple language represents a combination of perception and motivation of the individual. The main idea underlying his system is that behaviour is not a sequence of causes and effects but a chain of goals and actions towards the goal.

3. Intervening Variables
Tolman’s theory for the first time in the history of psychology introduced and highlighted the role of intervening variables. These variables he divided into two categories namely purposive and cognitive determinants, between the independent variables (stimulus) and the
dependent variables (response) heredity, capacity and behavior adjustment, previous knowledge, age, drugs, endocrine, vitamin conditions, environment etc. These are all examples of intervening variables which if effectively observed will have effect on behaviour. Sometimes other tendencies such as curiosity, exploration and manipulations prove even stronger than physiological drives like hunger (Mangal, 2012). However, in (1952), Tolman revised the intervening variables and grouped them into three groups which include:

i. Need system – physiological needs
ii. Belief value
iii. Motives – preferences for certain goals.

In (1949), Tolman revised his theory and distinguish six types of learning. These include:

i. **Cathexis**. Cathexis is a connection between a given type of food and hunger drive. It explains the final type of positive or negative objects to basic drives.

ii. **Equivalence beliefs**. This is the connection between a positively cathacted object and a kind of sub-disturbance of objects.

iii. **Field expectancy**. This develops in the
organism when a certain environmental set up (behaviour space) is repeatedly presented to him.

iv. **Field cognition.** This refers to new modes of remembering and piecing.

v. **Drive discrimination.** There is a definite relationship between type of drive and mode of response.

vi. **Motor patterns.** Motor patterns are associated with or conditioned by behaviour in learning.

**Classroom Implication of Tolman’s Sign-Gestalt Theories**

Omotosho (2014) and Mangal (2012) outline the following classroom implications:

i. The teacher should teach the child what is purposeful because purpose is very important in learning. What the child is taught should lead him towards some clear cut goals and objectives.

ii. Teachers must not force the learners to follow routine or obvious paths while engaging in learning task. They should be encouraged to explore as many paths as possible.

iii. Since intervening variables like
environmental surroundings, drives, previous learning, age etc. play major role in influencing the learning process, every effort should be made to take proper note of such variables.

iv. Teachers should emphasize intrinsic motivation in the process of teaching and learning rather than extrinsic rewards, because rewards or reinforcement is not essential for every step taken towards reaching a goal or learning a particular behaviour.

Conclusion
Tolman concluded that learning is purposive and goal directed and that a learning organism is a striving organism, striving to give meaning to behaviour. He insisted that behaviour is far from being random and chaotic and did not emphasize S-R as the basic unit of analysis.

Test yourself
1. What are the main features of Tolman’s theory of learning?
2. How is Tolman’s theory different from Thorndike’s theory of learning?
3. Write short notes on
(a) Dependent variables
(b) Independent variables
(c) Intervening variables
Piaget’s Cognitive Development Theory

Piaget: Pronounced as pee-ah-Zhay
Piaget’s theory rests on the assumption that as children get older, they advance through a series of chronological cognitive stages each distinguished by a specific kind of thinking. For Piaget the child’s cognitive development is like climbing a staircase, one step at a time. This view has two implications. First, some children advance more quickly than others. Secondly, the cognitive stages are built on one upon another. Cognitive development is also viewed as an adaptive process in which thinking achieves a better fit with external reality. This theory is often referred to as constructivist approach to cognitive development because, virtually all knowledge about the world is gained through the child’s activity. Cognitive development assumes that by acting on the environment children move through four invariant and universal stages in which all aspects of cognition undergo similar changes.
According to Piaget little infants begin life with little in-built structures only at the end of the second year are they capable of a cognitive approach to the world through mental representation. Thus Piaget observes that, the child passes through distinct stages of mental growth in the process of growing to maturity and these stages are:-

- The sensory-motor stage (birth-2 years)
- The pre-operational stage (2-7 years)
- The concrete operational stage (7-11 years)
- The formal operational stage (11-15 years)

During each of these stages the child is capable of processing information along certain specific dimensions.

The Sensory-Motor Stage (birth-2 years)
The term sensory refers to the information the child receives, through the sense organs while the term motor refers to the child’s bodily activity such as, grasping, kicking, and manipulating etc. Since this stage is lengthy it covers the following sub-stages:

Sensory Motor Sub-stage and Adaptive Behaviour
1. Reflexive schemes birth to 1 month new
born reflexes: Reflexes are in their use and combined into complex patterns of behavior. It is associated with development of habits.

2. Primary Circular Reactions (1-4 months). The child seems to be increasingly aware of his environment but seems unable to maintain a representation of that environment in memory. He is unable to encode information or memory on a physical level.

3. Secondary Circular Reactions (1-4 months). Patterns of stimuli remain stable as the baby gradually comes to accept them as permanent. This stage is associated primarily with the development of coordination between vision and comprehension.


5. Tertiary Circular Reactions (12-18 months). Exploration of properties of objects by acting on them in novel ways. Ability to search in several directions. This stage is associated with the discovery of new means to meet goals.
6. Mental Representation (18 months– 2 years). Ability to find objects that have moved out of sight. This stage is associated with insight or creativity.

The major achievement of the Sensory Motor Stage is the development of object permanence which is the realization that objects (including people) continue to exist even when they are out of sight. This concept develops gradually and is completed when the child is able to represent objects mentally in their absence. The attainment of this ability marks the end of the sensory motor stage.

(2) Pre-operational Stage (2– 7 years)
The ability to mentally represent objects at the end of the sensory motor stage makes it possible for the infant to construct a scheme for symbolic representation. For example the word ball can mean any round thing. The word pre-operational means mental activities. Children are not capable of performing mental operations, manipulations, and following logical rules for example show a pre- scholar two glasses of the same amount of juice. After the child agrees they are the same, pour the juice into a taller glass. Place them
side by side and ask them which is more. Surely he will tell you that the taller narrow glass has more. Other Characteristics of this stage include:

i. Mental representation in drawings, painting make-believe-play.

ii. There is speech imitation

iii. Egocentric and animistic thinking: -
    Egocentrism is believed to be responsible for animistic thinking.

iv. Inability to conserve.

v. Lack of hierarchical classification

vi. Can categorize.

vii. They ask a lot of questions

What a Teacher Should Do
1. Reduce egocentrism by making students have social interactions
2. Ask them to justify their answers.
3. Have them manipulate groups of objects

The Concrete Operational Stage (7-11 years)
The word concrete and operations distinguish this stage from the one preceding it. Operation means mental action that can be reversed. Piaget defines ‘Operation’ as an action which
can return to its starting point and which can be integrated with other actions also possessing this feature of reversibility. This stage is divided into two logical and infra-logical. Logical operations synchronise with one to one correspondence that is, adding and subtracting which are not tied to specific quantities like space and time while infralogical deals with classes and relations. Concrete operations are noticed and encoded in the following ways:

1. **Conservation.** They develop ability to pass conservation task.
2. **Hierarchical Classification.** They are aware of hierarchies and can classify.
3. **Seriation:** Can order items along quantitative dimensions.
4. **Cognitive maps.** Can make drawings of familiar large scale spaces such as neighbourhood.

**What the teacher should do**

1. Involve children in operational task such as addition and subtraction.
2. Encourage students to walk in groups
3. Use visuals to teach.
Formal Operational Stage (11 years and older)
This period is normally referred to as the adolescent stage. Adolescence originates from the Greek word “Adolescere” meaning to grow to maturity. It is a transitional period from childhood to adulthood or the teenage stage. It is a developmental period between 12 and 19 years of age. It represents a period when the girls experience their first menstruation and for the boys a transition to manhood. At this stage, the individual is capable of begetting offspring because of his/her sexual maturity. During this stage, the child becomes capable of dealing with abstract. There is increased ability to encode and retrieve information. The term formal reflects the development of formal structure of thinking. It also emphasizes the ability of the young one to form hypothesis.

Characteristics of Adolescents
It must be noted that each developmental stage has its own characteristics. For adolescents the following characteristics are notable:-
1 Physical characteristics
2 Mental characteristics
3 Social characteristics
4 Emotional characteristics
5 Moral development

Physical Development: Physical development has to do with the physical growth of the body known as “growth spurt”. Changes in boys seem faster than girls. Girls acquire physical features such as enlargement of breast, widening of hips. Other characteristics include:
- the development of sexual characteristics such as the uterus, vagina and pubic hair
- secretion of oil from the sebaeaceous gland which makes them attractive.
- rounding of the shoulders and increase in the buttocks.

For boys there is:
1. growth of the testes and scrotal sac
2. accelerated growth of bones and muscles
3. expansion of chest
4. ejaculatory feeling (dream about sex and discharge of sperms)
5. enlargement of Laryngeal cartilage which increases vocal sound and voice.
Social Development

Social Development. Social development is viewed by Ortese (2001) as the process of acquiring social and interpersonal skills, norms, values, beliefs, attitudes etc necessary to enable the child or individual live successfully in his chosen profession. Social development is achieved by certain agents in the society which include: the home/family, peer group and the society. Parents through informal teaching impact in children social skills such as respect for elders, greetings, and social roles. The style of raising children (autocratic, permissive, and laize affaire) develops different behaviour patterns in children.

The Peer Groups

Peers are children of the about the same age or maturity level (Santrock, 2004). It is worthy to note that parents play an important role in child upbringing but peers also are an important source of emotional support and approval. They influence learning in a number of ways which include: establishing values, intimacy, attitudes, self-esteem and peer tutoring. Friendship at this stage could be fairly permanent with the opposite sex, Adolescent
also select their friends based on their own interest in school.

**Moral Development**

Moral development in adolescents is characterized by inclination towards moral principles which is acceptable and not tied to any social group. They think of moral development in terms of general rights and standards.

**Piaget and Educational Implication**

1. Discovery Learning: In a Piagetian classroom children are encouraged to discover for themselves through spontaneous interaction with the environment. Instead of presenting ready made knowledge verbally, designed to promote exploration, arts, and craft material.

2. Acceptance of individual differences: Piaget believes that individuals go through the same sequence of development but at different rates. This implies that teachers must plan activities to meet the needs of individuals as well as small groups rather than for the total class.
3. Sensitivity to children’s Readiness: A Piagean classroom does not speed up development, instead, Piaget believed that, appropriate learning experiences built on children’s current level of thinking. Teachers should not impose new skills before children indicate their interest and readiness.

Counselling adolescents on developmental characteristics will help to reduce problem of indiscipline.

**Important concepts in Piaget’s Theory**

1. **Organization.** Through organization, specific experiences can be used to make inferences that can be generalized to new experience.

2. **Scheme.** A plan of action based on previous experiences, to be used in similar situation.

3. **Assimilation:** The mental process by which new objects, events, experiences and information are incorporated into existing schemes.
4. **Equilibration**: The mental process that motivate humans to keep schemes in balance with real environment.

5. **Accommodation**: the mental process of modifying existing schemes and creating new ones.

### Summary

**Sensory motor stage**

0-2 years

Infants experience the world through their senses, actions, and body movement. At the end of this stage, toddlers develop the concept of object permanence and can mentally represent objects in their absence.

**Pre-operational Stage**

2-7 years

Children are able to represent objects and events mentally with words and images. They can engage in play (pretend) using one object to represent another, their thinking is egocentric and fail to consider the perspective of others.

**Concrete Operational Stage**

7-11 years

Children at this stage become able to think logical in concrete situations, they acquire the concept of conservation and reversibility, can order and classify.

**Formal Operations**

11 years and above

At this stage adolescence are logical in abstract situations. They learn to test hypothesis and become interested in the world of ideas.
Test yourself

1. Match the stage with the relevant concept:

1. Abstract thought   a. Sensory motor stage
2. Conservation reversibility   b. Pre-operational stage
3. Object permanence   c. Concrete operational stage
4. Egocentrism   d. Formal operations stage

2. What are the major stages of mental development advanced by Piaget? Indicate how the classroom teacher can help the learner at each stage.
Bruner and the Process of Thought

Jerome Bruner was born in 1915 in New York, USA. Bruner’s approach to the problem of educational psychology was this:

“If you want to study how children go about the business of learning in the school situation, then study children in the classroom and not rats and pigeons in cages.” He said this to criticize psychologist like Thorndike and Skinner who studied animal behaviour and related it to learning.

Bruner’s theory therefore has four major principles;

1. **Motivation:** The first principle that specifies the condition that predisposes an individual towards learning is motivation. There are two types of motivation; Intrinsic and extrinsic. Intrinsic motivation occurs when activities are pursued simply because they are enjoyable and satisfying, not because any external reward is
attached. Extrinsic motivation on the other hand is based on external reward or avoiding the consequence of some undesirable nature.

The first kind of motivation Bruner is referring to is the intrinsic motivation which according to him is more important. He cited curiosity as the driving force in intrinsic motivation which he believes is inherited.

i. The second motivation Bruner talks about is the drive to achieve competence. Children become interested in what they are competent in. It is virtually impossible to motivate children to engage in activities in which they have no degree of competence.

ii. The third motivation is reciprocity. Reciprocity is another motivation that is built into species. That is the need to work with others co-operatively. He believes that the society itself developed as a result of this basic motivation.

He summed these three aspects of intrinsic motivation—curiosity, drive for competence, and reciprocity as rewarding and self-sustaining. To take advantage of intrinsic motivation in the
classroom, teachers must facilitate and regulate their children’s exploration of alternatives through problem solving approach to learning, which can be achieved through: -

(a) Arousing curiosity
(b) Maintenance through assurance of enhancement efforts.
(c) Direction through providing knowledge of the goal and knowledge of relevance exploration and activities to goal achievement.

2. Bruner’s Second Principle

Structure: Structure according to Bruner is any body of knowledge that can be characterized in three ways;

i. Mode of Presentation: This refers to the technique, the method where by information is communicated. One reason why children fail to understand the lesson could be the teacher’s mode of presentation which may seem difficult for the child to comprehend. Bruner proposed three method of presentation to achieve understanding. These are; Enactive, Iconic and Symbolic representation.
Enactive Representation: The first cognitive stage is called enactive representation (basically sensory motor and active)- this period corresponds with the age of 1-2 years when objects are lived rather than thought about. When a child is in the enactive stage, the best and most comprehensible messages are wordless ones.

Iconic Representation: The iconic stage is a primitive, pre-symbolic mode of representation with picture of objects, actions and events instead of genuine symbols of them. During this stage, the child learns through imagination, i.e. mental picture of objects. The use of pictures and diagrams allows children at stage to be tutored in simpler ways.

Symbolic Representation: - From the Iconic stage the child moves to symbolic representation or verbalization stage during which he/she employs abstract and symbolic representation of the stimuli in order to learn and retain them. At this stage, things are represented in words or language. This implies that actions are represented through words or by talking them. Also at this stage the child is able to develop
images that have an autonomous status. These powerful representation of the world of possible and actual experiences are constructed and used as search models in problem solving.

ii. **Economy:** This deals with the number of items that must be held in mind and processed to achieve comprehension. Few items mean fewer processing steps resulting in greater economy. E.g. encoding cities alphabetically in laying them down in a diagram increases economy – list requires memorization – while diagrams increase economy.

iii. **Power:** Power deals with the degree to which a learner is stimulated to make connections between topics that seem separate. The only possible way in which individual knowledge can keep proportional pace with the surge of available knowledge is through grasp of the relatedness of knowledge for example relating capital cities with their geographical location.

3. **Bruner’s Third Principle**
   **Sequence**
   Bruner believes that intellectual development
is innately sequential moving from enactive to iconic to symbolic representation. It is also logical to move from wordless messages through the use of pictures and diagrams and finally symbolic communication. Sequencing is important during exploration and significant in motivation.

4. **Bruner’s Fourth Principle**

**Reinforcement**

To achieve mastery of a problem, students must receive feedback and knowledge of how they are doing. Timing of reinforcement is crucial, being required at the very time the pupil is evaluating his own performance. Results should not be known too soon or too late for maximum effectiveness.

**Educational Implications**

The teacher should endeavour to provide materials in any lesson to meet the three modes of presentation of ideas. i.e. enactive, iconic and symbolic representation. For example in enactive presentation the child should be allowed to have direct experience with the learning material as in a science laboratory. In iconic presentation there should be pictures, cards and models to facilitate learning and in symbolic representation
there should be extensive discussion through verbalization which will enhance analysis and verification of ideas.

Instructions should be designed so that it can be easily grasped by students.

Instructions should be designed to facilitate extrapolation and or fill in gaps.

Instruction must be concerned with the experiences and context that make the students willing and able to learn (Willingness).

**Test yourself**
1. What are the major tenets of Bruner’s theory.
2. State the educational implications.
Introduction
The idea of creation started by Almighty God. He possesses the finest creative ability and we are called His creatures. Every one of us is a unique creation, that is, no one possess the same ability as another. Some are endowed with high creative ability and can contribute to advancement in the field of arts, literature, science, business, teaching and other spheres of human activity.

Over the years, there have been many approaches adopted in the study of creativity. Some researchers have adopted a psychoanalytic perspective, some cognitive, others social-psychological, and latterly neurobiological efforts to study creativity. (Mumford, 2003 and Runco, 2004). Given that there is such diversity in the study of the field of creativity, it has made its definition difficult. The most significant issues that affect creativity definitions concern Western and Eastern perspectives. Creativity as the
original product of an individual is a Western perspective. The earliest perception of creativity was dominated by the story of the creation in Genesis. From here, the concept of creation as originality and utility arose and influenced subsequent interpretations of the properties of the creative products. The Easterners view creativity as the expression of personal truth or as self-worth (Lubart, 1999).

Similarly, the Greeks reduced the emphasis of divine intervention by the highest gods, instead considering creativity to be related to each individual’s guarding spirit. In Aristotle’s time, creativity was seen as a natural event that conformed to natural law. Little by little, creative acts became associated with the abilities and dispositions of the person. This indicates that the person who produces the novel and useful product will be deemed creative. According to Mumford, (2003), a creative product is that which is deemed to be novel or original and useful or adaptive.

Rhodes, (1987) suggests that creativity may refer to a person, processes, products, and also press, that is environmental. The 4Ps approach appears to have gained relatively wide consensus, that the assessment of creativity
Creativity may be broad, incorporating not only an assessment of product, but also the characteristics of the person, the press and processes required for creativity. Thus, how researchers interpret the new and useful definition of creativity will determine how they assess the construct.

Most contemporary definitions of creativity tend to focus on originality and usefulness. For instance, Amabile (1987) defines creativity as a novel and appropriate solution to an open-ended task. According to Torrance (1970), creativity is defined as traits which lead us to respond constructively to new situations, rather than merely to adapt or adjust. The true value of creativity is to be found in daily living, not just in the creation of new products. He stresses that the creative’s needs include curiosity, the need to meet challenge and attempt difficult tasks, the need to become fully absorbed in a task, and need for individuality. Similarly, Boulden (2002) defines creativity as a process of challenging accepted ideas and ways of doing things in order to find new solutions or concept, be aware of obstacles that stand in the way of the creative impulse and understand the benefits that creative thinking can bring.
According to Akinboye (1976), creativity is defined as a process by which known elements are arranged to produce more useful ideas that previously conceived. It is also defined as bringing into being of something which did not exist before, either as a product, a process or a thought. To Sternberg (1995), creativity can be broadly defined as the process of producing something that is both original and worthwhile. That is, creativity is all about finding new ways of solving problems and approaching new situations. It is not a skill that is restricted to artists, musicians or writers; it is a useful skill for people from all works of life.

**Nature and Characteristics of Creativity**

For the concept of creativity to be well understood, its nature and characteristics must be considered. Creativity is a means as well as an end in itself. That is, it urges, inspires and persuades the individual to create something unique and thus acts as an impetus for expression. This creative expression proves to be a source of joy and satisfaction to the creator. No one other than the creator can experience the warmth, happiness and satisfaction which he or she receives through his or her creation.
In other words, creation is a source of happiness and a reward itself. The creator expresses himself or herself as fully as possible through his or her creation and has his or her own perceptions about his or her Creation. It is therefore, not essential that a creative work would arouse the same feelings or give the same joy and satisfaction in others as is experienced by the creator himself or herself.

Creativity has a wide scope. This implies that creative expression is not restricted by any limits or boundaries. It covers all fields and activities of human life. It is not also restricted to scientific inventions and discoveries or the production of works of art, but covers multiple human accomplishments like the composition of poems; writing of stories and plays, performance in the fields of dance, music, painting, sculpture, political and social leadership, business teaching and other professions (Piirto, 1992).

Creativity also rests more on divergent thinking than a convergent thinking. Divergent thinking according to Guilford (1959) is a process of creating multiple unique ideas or solutions in an effort to find one that works. It is similar to brainstorming in that it involves
coming up with many different ideas to solve a single problem. Divergent thinking has been considered to be a characteristic of highly creative individuals rather than of those not rated as being highly creative. This is why, in the tests designed to test creativity one is required to list as many uses as possible for some common articles such as a knife, a brick, and a tree, when an individual is asked to provide their uses as many as possible, and also give as many innovative combinations as possible, etc. Tests of this kind depend on diversity and uniqueness of the responses and not for the convergent outcomes in the form of one single correct answer as is usually done in tests of intelligence.

Convergent thinking on the other hand, requires a narrowing process leading the individual to pinpoint one most appropriate solution or response. It is involved with situation, which require the production of only one correct solution or answer. For example, a multiple-choice test.

Creative people share a number of characteristics that distinguish them from less creative individuals. Researchers such as Cattell (1968), Torrance (1962), and Mackinnon
(1961), have presented different lists of personality traits attributed to creative persons. They include:

1. **Openness.** Creative individuals are open to experiences with no effort to give order or to judge. He or she entertains even seemingly irrational thoughts that uncreative people might dismiss. Similarly, Sternberg (1988) asserts that creative people are typically less close-minded and less inhibited than others in their feelings and fantasies. Moreover, they seem to be inherently curious and inquisitive. They are comfortable with contradictory ideas. During the early stages of creative work, these individuals are not on a quest for certainty, but rather a journey of discovery, they are not bothered by loose or dead ends. Rather, they work their way through failures and out of blind alleys, persisting until they succeed.

2. **Focusing.** He or she uses back and forth mental efforts to give order and meaning to the data and experiences,

3. **Flexibility.** This is the ability to go beyond tradition, habits, and the obvious.
That is, to turn ideas and materials to new, different, and unusual uses.

4. **Fluency.** This is the ability to think of many ideas; many possible solutions to a problem.

5. **Elaboration.** This is the ability to work out the details of an idea or solution.

6. **Tolerance of ambiguity.** This is the ability to hold conflicting ideas and values and to bring about a reconciliation without undue tension. The values of creative persons, for example, seem to be both aesthetic and theoretical. The creative person appears to be interested not only in solutions to problems, his or her goal seems to be both truth and beauty.

7. **Originality.** This is referring to divergent rather than convergent thinking, going beyond commonly accepted ideas in unusual forms, ideas, approaches, and solutions.

8. **Sensitivity.** This is the ability to sense problems, to see deficiencies and needs in life, the challenge to find solutions and fill these needs. Sensitivity is to our own inner life and feelings, thoughts and feelings of others.
9. **Reflection.** The ability to consider and reconsider, to evaluate our ideas as well as the ideas of others; to take time to achieve understanding and insight, to look ahead and plan, to visualize the complete picture of what is going to happen.

10. **Independent Mind.** Creative people tend to be independent thinkers. They cherish this independence and, especially in their area of creative expertise, and prefer to go their own way. They can easily spend long periods alone and not influenced by the opinions of others as much as their less creative counterparts are. They take unpopular stands and are often seen as nonconformists.

11. **Sense of humor.** This is the ability to see and express the humor in the contradictions and ambiguities of life. To maintain without losing commitment.

12. **Concentration and persistence.** This is the ability to work hard, long, consistently, and persistently with extraordinary concentration.

13. **Action.** The ability to put ideas in action; to begin, help, shape, with high ideas.
Furthermore, Harris (2002) identifies factors that are influential in creative thinking including:

1. **Curiosity.** Creative people are curious. That is, they want to know all kinds of things just to know them. According to them, knowledge does not require a reason. In other words, the question of why do you want to know seems strange to creative people. Knowledge is enjoyable and often useful in strange and unexpected ways. Knowledge in fact, strengthens our ability to understand the world, and makes learning easier.

2. **Constructive discontent.** This is the ability to see a need for improvement and to propose a method of making that improvement. Constructive discontent is necessary for creative problem solving. For example, if you are happy with everything the way it is, you will not want to change anything. It is only when you become discontent with something that you will see the problem, and want to solve the problem and improve on the situation.
3. **Perseverance.** Creative problem solving is hard work and requires fierce application of time and energy. That is, there is no quick and easy secret. Knowledge gained by study and research must be combined with high thinking, new ideas, and protracted experimentation. In other words, it is the ability to stick to a task, to approach a problem from many angles, and continue striving after each dead end.

4. **Mistakes are welcome.** Making a mistake is often seen as something to be avoided at all cost. However, in creativity, making mistakes provide an opportunity to learn, and it shows that something is being done. Therefore, creative thinkers realize and accept making mistake as an expected part of problem-solving process. They conclude that mistakes are educational and can lead to success.

   Additionally, creative people like to investigate the nature of things. They are not please with raw conclusions but like to question available data and information. Thus, they are always in search for learning of things. This search often carries them into inquires, and
unknown qualities. By so doing they discover new relationships and uncover new things and meanings.

Criteria for Creativity
For a response to be considered creative, it must meet certain criteria. Morgan & Averil (1992) have identified three of them as:

i. Novelty. This is the most commonly used criterion for creativity. A response may be novel in comparison to an individual’s past behaviour, or it may be novel in comparts to typical behaviour in the society as a whole. The latter comparison is more relevant for our present purposed. However, it should be kept in mind that creativity is not unique to only a few individuals. All learning and development involves the acquisition of novel behaviour, and also some degree of creativity.

ii. Effectiveness. Not all novel response is creative; some are simply egocentric. To consider any response as creative, it must be of potential benefit to the individual or group. Most emotions are ways of dealing with problem, such as correcting wrong especially from danger, protecting
a relationship. So effectiveness depends on achieving the aim inherent to the emotion. But even emotions that have not aim or purpose beyond themselves, such as joy or grief, can be expressed well or poorly.

iii. **Authenticity.** This refers to a creative response that reflects in some fashion the individual’s values and beliefs about the world. An authentic response is alive with new possibilities.

Creativity is more likely to occur when the person possesses traits such as curiosity, flexibility, fluency, originality, elaboration, and interest in investigation and exploration. Thus, a person will be demonstrating creativity if he or she is doing the following:

i. Inventing something which has never existed before;

ii. Inventing something that existed somewhere but you are not aware of;

iii. Invent a new process for doing things;

iv. Reapplying an existing process of product into a new or different market;

v. Develop a new way of looking at something and bringing a new thing into existence.
Creative Process
Creativity does not just happen. It is a cognitive process that produces new ideas or transforms old ideas into updated concepts. A number of scholars have identified different stages of creative process including: Wallas (1926) describes creative process as consisting of four stages. These are:

1. **Preparation.** This is the first stage, the conscious work on the problem is initiated and continued as long as possible. Initially, the problem is defined or analyzed and the stage is set for its solution. The facts and material relevant to the solution are then collected and examined and the plan of action is formulated. Then, the need to set plan begins. In between, if the plan of action is modified, it is switch over to another method or take the help of other relevant data if those in hand fail to work. In this way, a continuous and persistent effort is made. In case, it appears at some point that the problem cannot be solved, then frustration sets in. Frustration leads us to set the problem aside for the time being.

2. **Incubation Stage.** This is characterized by the absence of activity, or in many instances,
even of thinking about the problem. We may rest, sleep or engage in other activities. If this is done, ideas which were interfering with the solution of the problem tend to fade. In the absence of such interference, our unconscious begins to work towards finding a solution. Sometimes the things we experience or learn in the meantime, may provide a clue to the solution.

3. **Inspiration or illumination Stage.** During this stage the thinker is often presented with a sudden appearance of the solution of his problem. Such illumination may occur at any time, sometime even why the thinker is dreaming.

4. **Verification Stage.** This is the last stage of Wallas’ creative process. During this stage the illumination or inspiration is checked out to determine whether the solution or ideas which appeared through insight is the correct one. In case it does not work out, fresh attempts are made to solve the problem. Sometimes, the earlier solution needs slight modification or change to become workable. The creative thinker dose not, at any stage, accept a solution
as perfect and holds it open to modification in line with subsequent finding.

Rosman (1933) proposes seven stages of creative process as;
1. Observation of need or difficulty;
2. Analysis of the need;
3. Survey of all the available information;
4. Formation of all the objective solutions;
5. Critical analysis of these solution;
6. Birth of the new idea. That is the invention and;
7. Experimentation to test the most promising solution, and selection and perfection of the final embodiment by some or all of the previous steps.

Osborn (1998) develops 7 steps of creative process including:
1. Orientation-identifying the problem;
2. Preparation-gathering information;
3. Analysis-breaking the relevant materials;
4. Ideation-searching for alternative ideas;
5. Incubation-unconscious thinking that gives room for illumination and insight into the problem;
6. Synthesis-putting ideas together to form a concept;
7. Evaluation-judging the idea produced.
Torrance (1970) has defined creative process as consisting of the following stages:
1. Becoming sensitive to or aware of problem;
2. Bringing together available information;
3. Searching for solution and;
4. Communication of result.

Akinboye (1999) develops ten steps of practical creativity process as:
1. Creative pause-this is the step the mind can stop to observe the phenomena in details;
2. Awareness and management of barriers to creativity;
3. Definition of broad problem areas;
4. Focus on appropriate domain of oppression;
5. Set criteria for success;
6. Use appropriate creativity techniques to generate ideas;
7. Run creativity sessions to explore opportunity areas;
8. Harvest acceptable ideas and new concepts;
9. Evaluate actionable ideas, concepts and precepts for risks, feasibility, resources and effectiveness;
10. Sell, commercialize, innovate actionable ideas, concepts and precepts for profit, success and value, develop values, monopolies through value facture and integrated values.

The stages mentioned by each of the scholars should not be considered to be rigid and fixed that should be followed every time by every creative thinker. One person may arrive at the solution of the problem before experiencing all the previous stages. Another person, on the other hand, may not find the solution even after passing through all the stages of the creative process and may need to repeat the cycle several times before producing anything creative or arriving at an acceptable solution of the problem.

**Importance of Creativity**
The world is facing complex and dynamic problems such as HIV/AIDS, poverty, hunger, economic recession, insurgency, corruption, environmental pollution, etc. In times of change and uncertainty, a major challenge is to confront situations in novel, open and different ways. This is because life can no longer base
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on well-established, habitual ways of working, coping and learning. Therefore, the ability to learn, to process novel information and find new ways of working requires different skills and new mindset. It is on this note that creativity becomes inevitable in our generation.

For creativity to be developed and sustained, there is the need to include creativity in the school curriculum where children will be properly trained to think creatively and critically. Children who are encouraged to think creatively can do the following:

i. Become more interested in discovering things for themselves;

ii. Are more open to new ideas and challenges, and are more willing to solve problems;

iii. They are willing to work with others;

iv. They have greater ownership over their learning.

Generally, creativity enables man to get most out of experiences and resources. Without creativity, man is not able to make full use of information and resources available, but lock up in old habits, structures, patterns, concepts and perceptions. It is also used to make products and process services better. Effort to increase
Creativity will help an individual, his or her organization and customers become happier. This will bring improvement in an organization’s quality and quantity. This is why Akinboye (2003) describes creativity as ‘the currency of contemporary economy.’

Creativity is not only important to organizations but also to personal issues. Thus, Boulden (2002) notes that creativity helps one to improve on his or her personal life in the following ways:

i. It helps in interpersonal relation. That is, creative thinking generates ideas that could be used in dealing with persons of different social status or age;

ii. It helps in solving one’s personal problems; such as overcoming one’s shyness;

iii. It helps in finding ways to improve one’s mental and social development;

iv. It can also be used for tackling problems in civil life, international affairs, salesmanship, public relations, communication, transport, and administration of any kind and job. In fact, all professions need creativity for survival.
Test yourself

1. How relevant is divergent thinking to teaching and learning?
2. What is the nature of creativity?
3. Explain why creativity is a process?
Theories and Measurement of Creativity

Theories
A number of theories have been put forward to explain the nature of creativity. Some of the theories are:

1. **Theory of Environmentally Acquired Creativity**
   According to this theory, creativity does not only occur as a result of one’s heredity, inborn capacity of God’s gift. It is also acquired and nurtured like other human traits. A positive environment or situation that is open, democratic and free may be said to contribute positively to the release and development of creative potential. On the other hand, a closed society, culture or situation may act as a strong deterrent to the development of initiative within the individual.

   Arieti (1976) proposes the concept of creativorgenic society to explain the influence
of culture and environment on the development of creativity. According to him, the creativogenic society or environment is distinguished by its lack of emphasis on immediate gratification, its tolerance for and interest in divergent points of view, and its use of incentives and rewards for creativity. As a result of such favourable environment creativity may get full nourishment and creative build up.

2. **Taylor’s Level Theory of Creativity**

This theory was propounded by Taylor (1959). According to him, creativity may be described as existing at five levels in an ascending hierarchy. The levels are as follows:

i. Expressive Creativity. This stands for spontaneous expression without reference to originality and quality of the product.

ii. Productive Creativity. At this level, a person is able to produce something innovative.

iii. Inventive Creativity. This level is marked by the presence of ingenuity with a clear emphasis on novel use of old things.

iv. Innovative Creativity. At this level, one is able to develop new ideas or principles with the help of highly developed abstract conceptualizing skills.
v. **Emergentive Creativity.** This fifth and highest level of creativity is rarely achieved. The most abstract ideational principles or assumptions underlying a body of art or science make use of this level.

3. **Psychoanalytic Theory of Creativity**  
The school of psychoanalysis considers creativity as a means and product of one’s emotional purging, an opportunity for sublimation and catharsis. Freud, the father of this school, considers the creations of the creators as nothing but attempts for the expression of their repressed desires, mostly sexual in nature. Accordingly, most creative works of art, particularly ones portraying beauty figures of men and women can be interpreted by Freudians as expressions of repressed sexual desires. Similarly, the compositions of many writers and poets like Tulsidas, Therabai, Raskhan, would be viewed by them as attempts at sublimation, that is, conversion of libidinal energy into a socially desirable and personally gratifying channels. Besides the role of libidinal or sexual energy, the unconscious, were also described by the
Freudians, to play a significant role in one’s creative expression and output.

Psychoanalysts like Kubie (1958) and Jung (1933) adopted another way of explaining creative expression. They opposed the unconscious seated and sex dominated approach of Freud and advocated the use of preconscious rather than unconscious mental mechanisms in a creative act. Jung through his analytic or debt psychology brought out the concept of the collective unconscious, formation of the collective unconscious, the archetypes, to explain the mechanism of the creative process. However, the views of these psychoanalysts have been under constant attack chiefly on account of their being over-generalize.

4. **Carl Rogers Theory of Creativity**
Rogers, one of the humanistic psychologist (1954) proposes that creativity arises from individual’s exploration of his or her personal attitudes and interest. Therefore, we must face the fact that the individual creates primarily because it is satisfying to him or her, because his or her behaviour is felt to be self-actualizing. Rogers believes that the society can promote creativity by encouraging the perception of
freedom to pursue one’s own uniqueness. Furthermore, people would feel safe to be creative if they believe others accepted their worth unconditionally and are empathic and nonjudgmental concerning their needs and desires. This is because creativity is a biologically based life force that required self-determination for fulfilment. Therefore, creativity could be fostered only by eliminating societal restrains on freedom.

5. **Investment Theory of Creativity**
This theory was developed by Sternberg and Lubart (1996). They placed this theory in a category called “economy theory of creativity”. They assert that the creators buy low and sell high in ideas, meaning that they generate and pursue ideas and concepts that seem too unusual or out of the mainstream. However, these are ideas that have the potential for most growth. Even if the novel ideas receive a great amount of resistance from the field, the creative individual pursues and persist, eventually, persuading others of its merit and sells the ideas high. Then the creative individual moves on to the next uncommon and novel ideas. Buying low and selling high also means ignoring the
critics and standing up against conventions. The theory also stresses that; creative thinking requires a confluence of six distinct but related resources. They include:

**a. Intellectual Abilities.** According to Sternberg and Lubart. (1996), three intellectual abilities are particularly important to creative thinking.

i. Synthetic ability. This is the ability to see problems in new ways and to escape the bound of conventional thinking;

ii. Analytical ability. This refers to the ability to recognize which one’s ideas are worth pursuing and which are not; and

iii. Practical contextual ability. This is the ability to know how to persuade others of the value of one’s ideas.

The confluence of all these three is very important in creative thinking because using analytical ability in the absence of the other two abilities result in powerful critic, but not creative thinking. Synthetic ability in the absence of the other two abilities result in new ideas that are not subjected to the scrutiny required; first to evaluate their promise, and
second, to make their work creative. And finally, practical contextual in the absence of the other two results in the transmitter of ideas not because the ideas are good, but because the ideas have been well and powerfully presented.

**b. Knowledge.** One needs to know enough about a field to move it forward. In other words, one cannot move beyond what he or she knows. At the same time, care must be taken on redundancy, especially if one’s knowledge results in an entrenched perspective leading to a person’s not moving beyond the way in which one has seen problem in the past.

**c. Style of thinking.** A style of thinking is a way of processing information. It involves how one acquires, organizes thoughts, forms views and opinions, applies personal values, solve problems, makes decision, plans and expresses one’s self to others. Researchers such as Guilford (1950) identifies two styles of thinking; convergent and divergent thinking. The latter deals with mainly with creativity, De Bono (2001) advocates lateral thinking, which is kin to Guilford’s divergent thinking. It is this lateral or divergent thinking that Harris (1988) refers to as creative thinking.
d. Personality. Numerous research investigations have supported the importance of certain personality attributes for creative thinking. Sternberg and Lubart (1995) list those attributes as:

i. willingness to overcome obstacles;
ii. willingness to take sensible risk;
iii. willingness to tolerate ambiguity; and
iv. self-efficacy.

e. Motivation. The importance of motivation for creative work is that people rarely do truly creative work in an area unless they really love what they are doing and focus on it rather than the external rewards.

f. Environment. Environment according to Mader (2000), refers to all of the surrounding conditions and influences that affect the development of living things. It includes the food we eat; the air we breathe. etc. It is a supportive and rewarding environment that is advocated for creative ideas. If one could have all of the internal resources needed to think creatively, without some environmental support, the creative potential the person has within him or her, may never be displayed. The theory expects all the components to interrelate in an individual for creativity to take place.
6. Componential Theory of Creativity

The componential theory of creativity is a comprehensive model of the social and psychological components necessary for an individual to produce creative work. The theory was articulated by Theresa Amabile in 1983. It describes the creative process and the various influences on the process and its outcome. The theory has two main assumptions. First, there is continuum from how, ordinary levels of creativity found in everyday life to the highest levels of creativity found in historically significant inventions, performances, scientific discoveries, and works of arts,. The second assumption is that there are degrees of creativity in the work of any single individual, even within one domain. The level of creativity that a person produces at a given point in time is a function of the creativity components operating at that time within and around that person.

The componential component theory of creativity specifies that creativity requires a confluence of all components; creativity is highest when an intrinsically motivated person with high domain expertise and high skills in creative thinking works in an environment high
in support for creativity. These components are explained below:

i. **Domain-relevant skills.** Domain-relevant skills include knowledge, expertise, technical skills, intelligence, and talent in the particular domain where the problem-solver is working, such as product design or electrical engineering. These skills include raw materials upon which the individual can draw throughout the creative process the elements that can combine to create possible responses, and the expertise against which the individual will judge the validity of response possibilities.

ii. **Creativity-relevant Processes.** Creativity-relevant processes (originally called creativity-relevant skills) include a cognitive style and personality characteristics that are conducive to independence, risk-taking, and taking new perspectives on problems, as well as a disciplined work and skills in generating ideas. These cognitive processes include the ability to use wide, flexible categories for synthesizing information and the ability to break out of perception and performance.
iii. **Task Motivation.** Intrinsic task motivation is passion to undertake a task or solve a problem because it is interesting, involving, personally challenging, or satisfying rather than undertaking it out of extrinsic motivation arising from contracted for rewards, competition, evaluation or requirement to do something in a certain way. A central tenet of the componential theory is the intrinsic motivation principle of creativity. That is, people are most creative when they feel motivated primarily by the interest, enjoyment, satisfaction, and challenge of the work itself, and not by extrinsic motivation. This does not mean that extrinsic motivation is not important to creativity. It can support intrinsic motivation.

4. **The Social Environment.** The outside component or more generally, the social environment. This includes extrinsic motivation, as well as a number of other factors in the environment that can serve as obstacles to intrinsic motivation and creativity. Factors such as norms harshly criticizing new ideas, political problems within the organization, an emphasis on the status quo; conservative, low-risk attitude among top management, and excessive time pressure can block creativity.
Measurement of Creative Potential
Every one of us is endowed with some form of creativity, but its distribution is not equal or universal. So, how can an individual’s creative ability be assessed or recognized? The measurement of creativity started by Guilford J.P during the second world war 11, He developed tests that helped in selecting certain individuals to enter pilot’s training programme. His interest on isolating different types of thinking for different tasks continued even after the war. He developed a psychological model called structure of intellect.

Guilford used a factor analytic technique to separate creative thinking skills from others. As part of this model, Guilford identifies two distinct forms of thinking; divergent and convergent thinking. Divergent thinking is that which associated with creative thoughts, or the ability to access memory to derive unique, multiple, and numerous answers to open-ended questions. Convergent thinking means coming out with one right answer for each question commonly associated with IQ tests.

In 1967, Guilford used the following indices to assess creative responses. They include:
1. **Fluency.** It refers to the number of unique responses to some questions. Usually, for each participant, two or more researchers count the number of answers, excluding responses that are virtually equivalent to a previous suggestion that person proposed.

2. **Originality.** It is the extent to which the responses are novel, infrequent, and unconventional.

3. **Flexibility.** It refers to the degree to which the responses relate to a diverse range of categories.

4. **Elaboration:** It is based on the amount of the detail given in the response.

Guildford’s work led others into the field of trying to identify and measure creative thinking. For instance, Paul Torrance built on Guildford’s research, and developed Torrance Test of Creative Thinking (TTCT), that attempted to psychologically measure divergent thinking and problem-solving skills. The reliability and validity of the TTCT has made Torrance internationally known, and in psychological
literature, he is normally addressed as the father of creativity research. Torrance’s goals for the test are as follows:

1. To understand the human mind and its functioning and development;
2. To discover the effective bases for individualizing instruction;
3. To provide clues for remedial and psychotherapeutic programmes;
4. To evaluate the effect of educational programmes, materials, curricular, and teaching procedures.

The test covered both verbal and non-verbal activities performed by the subjects and are claimed to be successfully used from kindergarten to graduate school. The activities required in the non-verbal sub-test are of the following nature:

i. Picture Completion Test. In this sub-test there are some incomplete figures. The subject is asked to complete these figures by adding new dimensions or lines for providing new ideas. He or she is also asked to give suitable titles for the completed figures or pictures.
ii. Picture or Figural Construction Test. In this sub-test, the subject is provided with a piece of coloured paper cut in a curved shape and asked to think of a figure or picture of which this piece of paper may be a part. He is allowed to add new ideas to make this figure as interesting and meaningful as possible. He or she is also asked to provide a suitable title for this figure or picture.

iii. Parallel Lines Test. In this sub-test, there are several pairs of straight lines. The subject is required to draw objects or pictures by using each pair. He or she is also asked to provide a title for each of his or her drawings.

The verbal forms (employed as a verbal testing device) incorporate tasks which require the use of language. The subject is required to provide written responses to the questions put to him or her. The sub-test under verbal forms are as follows:

i. Asking Type. In asking type of activity, the subject is encouraged to reveal his or her ability to perceive all things which are not normally perceived by others. The help of some pictures
may be taken for this purpose. In these activities, the subject may also be asked questions that would enable him or her to fill in the gaps in his knowledge.

**ii. Guess Causes and Guess Consequences Type.** Both guessing type activities are aimed at revealing the subject’s ability to formulate hypotheses concerning cause and effect. While being presented with a picture, the subject may be asked to guess what lies behind the situation in the picture and what its consequences may be.

**iii. Product-improvement Type.** Here, the subject is asked to suggest ways and means of improving a toy, a machine or some other product to make it as interesting and useful as possible.

These tests are given today to determine placement into gifted and talented programs. He also saw the tests as tool for individualizing instruction for all students based on other scores. Similarly, Torrance and his colleagues, and students have conducted longitudinal, lifelong studies on those who first took the tests in 1950s and 1960s. Several of these tests have
shown that those children who scored well on the tests went on to significant creative achievement late in their lives. This shows that Torrance Tests of Creative Thinking score exceedingly well, not only do they identify creative abilities, they have proven to have predictive validity.

Other psychologists also became interested in designing and developing tests and scales to identify, rate and predict creativity. Some of the tests are:

1. **Self-assessment Tests.** Torrance with his colleague developed a self-assessment test called ‘The Khatena-Torrance Creative Perception Inventory (KTCPI).’ These tests fall within the category of personality tests of creativity, and many of these tests involve self-assessments or self-reporting of creativity. Individuals respond to questions about how they feel or whether they possess certain creative traits or attributes. It has the following subheadings.

   i. **Something About Myself (SAM).** This measures artistic inclination, intelligence, individuality, sensitivity, initiative and self-strength.
ii. **What Kind of Person Are You (WKOPAY)?** It measures imagination, self-confidence, inquisitiveness, and awareness of others.

iv. **NED.** is developed by Paul Coster and Robert McCree for use with adult men and women. It consists of 240 questions about the following five traits; neuroticism, introversion and extroversion, openness to experience, agreeableness, and conscientiousness.

Artistic Assessment Tests were also developed for assessment of an artistic product, such as a short story, a school boy drawing, and musical completion. Individuals who are considered experts rate and judge the products. Researchers in this regard have established that creativity is not necessarily accompanied by a high level of intelligence. Guilford (1959) has clearly made the distinction by proposing the concept of convergent and divergent thinking, the latter being closely associated with creative thinking.

According to Amabile, (1996), there are three assessment techniques for creativity measurement:
i. **Creativity Tests.** Creativity tests are considered to fall into three broad categories: Personality tests, for example, Creative Personality Scale; Gough, 1979). The biographical inventories. For example, Creative Achievement Questionnaire; Carson, Peterson, & Higgins, 2005), and behavioural assessments for example, Tests.

ii. **Objective Analysis of Product.** The objective analysis of products is rarely involving an objective method for identifying the creativity or originality of a product. An example of this is the analysis of the relationship between the fame of a melody and the level of originality of the opening six notes of each melody.

iii. **Subjective Judgment.** This was further subdivided into the judgment of people or products.

Other standardized tests available for creativity testing are:
1. Minnesota tests of creative thinking.
2. Guilford's divergent thinking instruments.
3. Remote association tests.
4. Wallach and Kogan creativity instruments.
5. A.C. test of creative ability.

For a total assessment of creative behaviour, there is need to apply a multi-dimensional approach involving the use of available creative tests and the multiple non-testing devices like observation, interview, rating scales, personality inventory, situational tests interest inventories, aptitude scales, aptitude tests. Value schedules and objective techniques etc. The characteristics and personality traits of the creative person may also serve the purpose by providing reliable indications for the identification of creative potential which may be further verified by comparing the performance with standardized creativity tests. The facet of creativity to be assessed is also concerned with what is to be analyzed. This is broken down into four categories approximately corresponding to the 4Ps approach; the trait (person) process, press, and product. The trait approach involves the analysis of the characteristics of the focus for the study. For example, what are the characteristics of the person or team being investigated? or are they intelligent, extraverted, aggressive, conscientious? The
process approach involves the analysis of the means by which creativity is produced. For example, how does the team interact and share knowledge? or how much time the team spend on different aspects of decision-making. The press approach involves the analysis of the environment in which the focal point of analysis operates. For example, what is the climate in the organization is like for team creativity? The last is the product. The product approach involves an analysis of the product to emanate from the efforts of the focus of the study. For example, how creative is the product and idea created by the team? (Albert & Runco, 1999).

Test Yourself
1. List and explain the indices that are used to assess creativity responses.
2. What is the focus of Investment theory of Creativity?
Chapter Fourteen

Enhancement and Blocks to Creativity

Creativity is becoming increasingly important for development in the 21st century. It contributes to economic prosperity as well as social and individual well-being. Thus, there are many ways it can be enhanced. On the other hand, creativity can be blocked. That is, its growth and development can be affected negatively.

Enhancement of Creativity. Creativity as a natural endowment, needs stimulation and nourishment. Most natural talents, unless they are given proper training, education and opportunities for stimulation, if not they are wasted. This becomes essential, therefore, for teachers as well as parents to realize the use of creating an environment conducive to full growth and development of the creative abilities of children. The ability to see relationship and
make associations. are essential for this and may be achieved through the following practices:

1. **Freedom to Respond.** Most often teachers and parents expect routine, fixed responses from children and thus kill the creative spark by breeding conformity and passivity. We should allow adequate freedom to our children in responding to a situation. They should be encouraged to think out as many ideas as they can for the solution of a problem. We must also let them have their own way when they need a particular kind of novel expression strongly enough.

2. **Opportunity for Ego Involvement.** This is the feeling of an individual about what he or she has done. For example, ‘I have solved it’, this gives much satisfaction to children. Actually, a child can be expected to put in determined efforts into creative activities only when his or her ego is involved. That is, when he or she feels that a particular creative work is the outcome of his or her effort. Therefore, there is need to provide opportunities to children to derive satisfaction from identifying themselves as the cause of a product.
3. Encouraging Originality and Flexibility. Originality is the ability to generate novel ideas that could be used to solve problem or enhance development. So originality on the part of children in any form should be encouraged. Passive permission to facts, and memorization by rote discourage creative expression and should, therefore, be checked as much as possible. If children seek to change their methods of learning a task or solving a problem, they should be encouraged to do so. Furthermore, adequate training can be given by making them answer questions like, how would you dig the earth if you do not have a spade? or, how would you draw an angle if you do not have a proper instrument for drawing it?

4. Provision of Appropriate Atmosphere for Creative Expression
A healthy atmosphere, favourable for creative thinking and expression is essential for enhancing and nourishment of creativity among children. This implies that, there is need for a sympathetic atmosphere in school and at home. Both parents and teachers must avoid negative behaviour management that tend to
be highly controlled with too many prohibitions as this is destructive to thinking habits as well as children’s natural tendency to experiment and be creative (Averill, 2001).

Co-curricular activities in school can be used for providing opportunities for creative expression. Religious festivals, and social get-togethers, exhibitions, etc. can also provide the opportunity for creative expression. Even regular class-work can be arranged in such a way as to stimulate and develop creative thinking among children.

5. Using the Creative Resources of the Community
Children should be made to visit the centre of art, scientific, and industrial creative work. This may stimulate and inspire them for creative work. Creative artists, scientists and creative persons from different fields may also be occasionally invited to the school to interact with the children in an effort to enhance the scope of knowledge of our children and kindle the spark of creativity in them.

6. Proper Organization of the Curriculum
Learning experiences in the form of curricula
should be so designed mainly to foster creativity among children. For this purpose, the school curriculum should be organized primarily on the basis of concepts rather than facts. It should also cater for individual differences of students. It should also follow the general philosophy that truth is something to be sought after rather than something to be revealed. It should be quite flexible and make provision for studying and working without the threat of evaluation. In a nutshell, the curriculum should reflect what is expected from the creative children in terms of fluency, flexibility, originality, divergent thinking, inventiveness and elaboration.

7. Reform in the Evaluation System
Our education system is totally examination-oriented and appropriate reform must, therefore, be made in our evaluation system if creativity is to be nurtured. The emphasis on memorization by rote, fixed and rigid single responses, and convergent thinking etc. which kill creativity of the children should be abandoned and a proper evaluation system adopted for encouraging creativity.
8. Overcoming Barriers
In order to succeed in developing one’s innate creativity, there is the need to overcome the natural barriers in the mind. This is because a big problem to creative thinking is the tendency to seek quick solution to a problem. This may help you in the short term, but you will not excel in the long run. Some situations require a different, more creative approach. Therefore, divergent thinking is needed. Divergent thinking focuses on generating many ideas as possible and opening new opportunities in order to find out the best fit solution. (Boulden, 2002)

Techniques for Fostering Creativity
Scholars in the field of creativity have identified different techniques and methods for fostering creativity among children. A few of these are:

1. Brainstorming
Brainstorming is a strategy or technique for allowing a group to explore ideas without judgment or censure. According to Osborn (1967), brainstorming is the best known technique in idea generation. Its main goals are to break out of our habit bound thinking and to produce a set of ideas from which we can choose.
Brainstorming is useful for attacking specific problems rather than general problems and where a collection of good, fresh, new ideas or decisions are needed.

In practice, the children may be asked to sit in a group for solving a problem and attacking it without any inhibition from many angles. To start with, the students may be provided with a focus. For example, a particular problem like ‘students unrest’, or the growing hardship in Nigeria. The students are then asked to suggest ideas as rapidly as possible. Brainstorming can take place either individually or in a group of two or ten with four to seven being ideal. The best results are obtained in brainstorming when the following guidelines are observed:

i. All ideas are encouraged and appreciated, therefore, no criticism is allowed during the brainstorming session.

ii. Students are encouraged to come out with as many ideas as possible, even unusual and unorthodox ones.

iii. They are not restricted to new ideas only but are also encouraged to enlarge upon ideas put forward by fellow students.

iv. No evaluation or comment of any sort is
to be made until the session is over. At the end of the session, all the ideas received (preferably written on the blackboard) should be discussed in a free, frank and open environment and the most viable ideas accepted for solution of the problem in hand.

v. Tag on. Improve, modify, build on the ideas of others. For example, what is good about the idea just suggested? How can it be made to work? What changes can make it better?

vi. Quantity of idea is important. That is the need to concentrate on generating a large stock of ideas so that later on they can be sifted through. There are two reasons for desiring a large quantity of ideas. First, the obvious, usual, stable, unworkable seem to come to mind first. However, most ideas are probably not going to be fresh and creative. Second, the larger the ideas, the more the opportunities to choose or adapt or combine.

2. Use of Teaching Models
Some of the teaching models developed by educationists may prove quite beneficial in
developing creativity among children. For example, Bruner’s concept of attainment model helps in developing creativity in children for the attainment of various concepts. Similarly, Schuman’s inquiry training model is very helpful in developing creativity among children in addition to imparting training in the acquisition of scientific inquiry skills.

3. **Use of Gaming Technique**

Gaming techniques is a playful spirit that help the children in the development of creative traits. These techniques provide valuable learning experiences in a relaxed, spontaneous and evaluative situation. Both verbal and non-verbal stimulus material are used in each technique. For instance, in verbal transaction of ideas, children may be asked to name all the round things they can think of, tell all the different ways a knife may be used, or all the ways in which a cat and a dog are alike. In non-verbal transactions, the children may be asked to build a cube, construct or complete a picture, draw and build patterns, interpret the patterns of drawings and sketches, and build or construct something or anything out of the raw material given to them.
Teachers and parents can help children learn to think and solve problems in creative ways by giving them the freedom to make mistakes and by respecting their ideas. To solve a problem creatively, children need to be able to see a variety of perspectives and to generate several solutions. When working on a problem, teach the children to examine their surroundings for cues that will help them generate a pool of solutions. Specifically, teachers and parents can encourage creative thoughts by doing the following:

i. Choices. Children who are given choices show more creativity than do children who do not have the opportunity;

ii. Independence. Parents and teachers should encourage children to think and act freely without adult direction, yet within the limits of rules;

iii. Resistance of perfectionism. Teachers and parents should not take over a child’s project because he or she can do it better or faster. Also, resist putting finishing touches on a child’s project to make it perfect. Respect the learning that takes place while a project is made, the reason being that the process is more important
than the final project. With practice, product is improved.

iv. Time. Creativity does not follow the clock. Thus, children need extended, unhurried time to explore and do their best. They should not be artificially rotated, that is, asked to move to a different task or learning centre when they are still productively engaged and motivated by a piece of creative work.

v. Space. Children need a place to keep unfinished work to continue the next day, and a space that inspires them to do their best. This is because an unconducive environment is not good for creative work. Instead, children’s work is fostered by a space that has natural light, harmonious colour, comfortable and child-size areas.

vi. Material. Without spending great amount of money, teachers can organize wonderful collections of resource materials that might be bought, found, or recycled. These materials can include paper goods of all kinds, writing and drawing tools; materials for construction, stones, beads, seeds, and sculpting materials. These materials are used productively and imaginatively by
children when they are helped to select, organize, sort, and arrange them.

vii. Climate. The classroom atmosphere should reflect the adults encouragement and acceptance of mistakes, task-risking, and uniqueness, along with a certain amount of mess, noise, and freedom. In order to create such a climate, teachers must give themselves permission to try artistic activity themselves, even when they have not been so fortunate to have had formal art training or to feel they are naturally good at art.

**Blocks to Creativity Development**
We have all experienced failures at one time or another. Unfortunately, these failures have given us a feeling of defeat and tend to hinder us from being creative. Notable psychologists such as Harris (1988) and Tucker (1996) have identified those hinderances to creativity development as:

1. **Emotional block.** Emotions are positive or negative personal feelings or temperament. They can either aid or inhibit creativity. The negative emotions succeed in promoting
maladaptive behaviour and poor self-concept. The negative emotions hinder creativity development in the following ways: people are afraid to try out new methods, new solutions. They prefer to stick to established pattern. They are also afraid of feelings of negative evaluations of their creative efforts. Thus, they withdraw or fail to express a novel idea.

Similarly, some people give up too soon in trying to find out new ideas or in solving problems, simply because they are used to convergent thinking. Others fail to observe details of an object or a problem.

2. Conceptual blocks. Many people fail to be creative especially in problem solving activities because of conceptual blocks they have developed. Conceptual blocks are mental obstacles that constrain the way problems are defined, thus limiting the number of alternative solutions. These blocks result largely from the thinking process the individuals use when facing problems. They are constant in their thinking. That is, the individual seems to be constant or consistent in life in terms of maturity, honesty, and intelligence. Once such an individual takes a stand, he or she does not
bend, even when it is obvious that his stand is not correct. Such a person cannot be creative.

They are others that depend solely on personal experience for solving problems. That is, the present problem is defined based on experience. Only alternatives that have been used previously to solve problem in the past are accepted. New solutions are never considered. Some are complacent, that is mental laziness.

3. Environmental Blocks. Environment according to Mader (2002), is all the surrounding conditions and influences that affect the development of living things, which include the food that we eat, the air we breathe, the physical and social context we experience. An environment full of stress, lack of freedom, noise and dirt, full of unfavourable attitudes toward creative people cannot enhance creativity development. For example, in a school where there is a strong memorization and imitation, discourages divergent thinking. Additionally, lack of space and learning materials to students to freely explore, and lack of information technology will not foster creativity in children.
Another block to creativity development is that every problem has one solution. Yet the goal of creativity is problem solving, and most problems can be solved in a number of ways. If an individual discovers a solution, it might be good, but it might not be the best one. The reason being that as time passes, what was the best solution may no longer be so as a result in advance in knowledge or technology.

Furthermore, functional fixity also blocks creativity development. Functional fixity arises when someone is unable to see beyond the historical or accepted use for an item often identified by its name or label. For example, a screwdriver is a tool for tightening or loosening, just as the name implies. A person who is suffering from functional fixity would be unable to see any other uses for it (Harris, 1988).

Additionally, Mayer (1992) identifies one of the blocks to creativity as problems are bad. Those who view problems as being bad inhibit their problems solving ability by refusing to spend time with the problem.

Another block to creativity development occurs when people are involved in too soon judgment. This discourages our creative process in producing something new. Some people even
collect lists of reasons why a new idea should be immediately rejected. For instance, 

i. That has never been tried before,  
ii. We have never done it that way,  
iii. That is not really necessary,  
iv. That would be too much trouble,  
v. The current system works well,  
vi. No one else is doing it that way.

**Test yourself**

1. Explain how brainstorming can enhance creativity development in children.  
2. How does environment enhance and discourage creativity?
CHAPTER FIFTEEN

Creativity and Education

Education throughout the world faces challenges, and they may be economic, technological, social, and personal. This requires a high degree of flexibility and adaptability of the educational system to these challenges. This is a clear indication that creativity is not just for artists and musicians, it is a crucial skill for everyone to embrace, since knowledge as outcome of education is said to be no longer sufficient to tell what is needed in the future. Thus, fostering creativity in education is intended to address many concerns including dealing with ambiguous problems, coping with the fast changing world and facing an uncertain future.

To prepare to face those changes, education should provide knowledge and practical skills for students who are to be trained for managements and entrepreneurship. When this is done, the students will be encouraged to pursue creative and logical thinking. This shows
that creativity has to be valued by teachers throughout the whole educational process, from informal judgment to written assessments. According to Beghetto (2005), assessments provide useful feedback on students’ progress and enhances development of creativity. It also monitors students’ progress and help them to reach their full potentials. Therefore, teachers should see that they appreciate creative efforts and welcome uniqueness of responses.

Creativity as a form of knowledge; has an effect on learning. That is, Creative learning requires innovative teaching. Both aspects call for an educational culture which values creativity and sees it as an asset in the classroom. The teacher is regarded as the key figure in preparing a creative climate, however, he or she needs support from policy makers and institutions. It is for this reason that creativity cannot be ignored through schooling. Thus, there is the need for its inclusion in education as a fundamental skill (Craft, 1999).

Inclusion of creativity into educational policy documents is important and evidence for the fact that creativity is not only a matter of paying lip service to the concept, but action is being taken. For example, there was a review of
curriculum documents of sixteen developed countries, it was found that creativity was included at all various educational levels at least from early years through primary education for most countries and others up to higher education. In Canada, creative thinking is seen as one of the common important learning. In Kentucky, United States of America, one of the learning goals is to enable students to use creative thinking skills to develop novel, constructive ideas or products. In Sweden, the Government’s National Plan for Pre-school and Adult (1997) stated that education should provide conducive atmosphere for developing creative skills. In Nigeria, Akinboye introduced psychology of creativity as a course in the department of guidance and counselling, University of Ibadan to improve on counselling skills.

Hence Creativity and education cannot be separated; educational process needs to set a target on new thinking, for it makes education have real effect on the society. As result, Scoffham (2003), advances five ways to bring creativity into the classroom. These are:

1. Do not limit assignments to one format: The teacher can provide the students with
larger area to cover, but gives them some freedom on how they complete it. If the teacher begins to allow more formats in the way students create and learn, they will have more opportunities to engage in the work they do and will become more interested in it.

2. Set time aside for creativity: Here, the teacher can provide students with quality time to enable them explore new ideas. He or she can also provide students with some tools to aid their creativity development. When this is done, the students can choose to create or create something that is of interest to them. The teacher also needs to encourage collaboration during these time, but not to impose anything on them.

3. Broaden your idea of assignment: The teacher can teach the students to make new contact, conduct interviews, and turn what they learned from their interview into a well-researched paper. They can be taught skills that will benefit them in finding jobs later in life, assist to become better learners and better thinkers.
4. Introduce unconventional materials in the class: Teachers have a lot of options for bringing more interesting and explanation of education subjects. So emphasis should not be laid on conventional way of teaching.

5. Encourage Discussion: Teachers can do a lot to cultivate creativity among students. That is, they can discuss with their students the attributes of being a creative person through the lives of great names in the field of creative field Such as Akinboye Julius, Guilford J.P. Torrance, Alex Osborn. This should include how they used to generate ideas or how they dealt with all kinds of reactions from everyone around them. There should also be emphasis on discussion on how important it is for everyone to be curious to learn new things and also how to deal with failure. Discussion brings a lot of benefits including the following:

i. It helps students to think more critically about the material,

ii. it helps them learn better in communication of their ideas and options,
iii. it challenges them to listen to other students’ opinions and think critically about their contribution and ideas and

iv. it gives them the opportunity to challenge others intelligently.

Furthermore, there is need for the teacher to develop a creativity friendly classroom where great ideas and views can be shared freely. A proper driven classroom is characterized by encouragement to questions and answers sessions, assessment of performance and feedback. The teacher also needs to be creative to some extent. It is only a teacher who is creative enough that can be a part of the innovative classroom, can design exciting lessons, motivate the right classroom environment required for students to showcase their innovative minds.

Several aspects of young children’s learning are also important to consider when thinking about art and creative abilities. Edward & Hiler (1993) stressed that young children are developmentally capable of the classroom experiences which call for higher level of thinking skills including analysis, that is
breaking down material into component parts to understand the structure, differences and similarities; synthesis, that is, putting parts together to form a new whole, rearranging, reorganizing, and evaluation, that is, judging the value of the material based on the definite criteria. They also express ideas and messages through many different expressive avenues and symbolic media. In other words, children have the ability to form mental images, represent their ideas and communicate with the world in a combination of ways. They need increasing competence and integration across formats including words, drawing, paintings, sculpture, construction, music, dramatic play, movement, and dance (Edward & Springate, 1993).

In sharing and gaining others perspectives, and then revising their work, children move to new levels of awareness. Teachers only act as guides. Therefore, they should be careful not to impose adult ideas and beliefs upon the children.

External factors, such as learning circumstances and teacher also affect students’ creativity. That can be seen in Sternberg’s study (1999), which proves that it is the community that stimulates one’s creativity.
This finding made some teachers to become more optimistic in applying creative teaching strategies and designing learning circumstances which improve students’ creativity. Various research findings also proved that teachers are capable of giving more positive influence by supporting children or students to become creative.

Useful Ideas for Motivating Students
There are some useful ideas that can motivate students’ creativity. Harris (1999) identifies them as follows:

1. **Explain.** There are some students who perform poorly on assignment simply because they do not understand what to do or why they should do it. Therefore, teachers are encouraged to spend more time explaining why they teach and what they do or what an activity is important and interesting and worthwhile. In the course of doing this, some of the teacher’s enthusiasm will be translated to the students, who will be more likely to become interested. Similarly, teachers should spend more time explaining exactly what is expected of the assignment.
2. **Reward.** The students who do not have powerful intrinsic motivation to learn can be helped by extrinsic motivation in the form of reward. Instead of criticizing unwanted behaviour or answer, reward correct behaviour and answers. Reward is useful here because adults and children alike continue to repeat behaviour that is rewarded. In other words, extrinsic motivation can over a brief period of time produce intrinsic motivation. Everyone likes the feelings of accomplishment and recognition, reward for good work produce those good feelings.

3. **Care.** Students respond with interest and motivation to teachers who appear to be friendly and caring. Teachers can help produce these feelings by sharing parts of themselves with students, especially little stories of problems and mistakes they made, either as children or even recently. That is, students will only attend to an adult who appears to be a real person who has problems as a youth and survived them.

4. **Students participation.** One of the major keys to motivation is the active involvement of
students in their own learning. Standing in front of them lecturing to them is thus a relatively poor method of teaching.

5. Satisfy Student’s Needs. Attending to student’s needs is a primary method of keeping students motivated and happy. Some of these needs are: survival, love, power, fun, and freedom. When these needs are met, the students will be much more committed to a learning activity that has value for them. In fact, they can do an amazing amount of hard work, if they are convinced that what they are learning ultimately meet their needs.

6. Making learning visual. It is very important to begin a class session with a conceptual diagram of the relationship of all the components in the class so that at a glance students can apprehend a context for all the learning they will be doing. This will enable them to develop a mental framework that will help them to learn better and remember easily.
Test yourself
1. Creativity and education cannot be separated. Discuss.
2. Explain how learning condition and the teacher influence creativity development.
Motivation is a personal drive to achieve, the process of instigation and sustaining goal-directed behaviour. Motivational orientation is both a trait and a state. According to Amabile (1987), as a trait motivation encompasses one’s innate like or dislike of certain activities, due to temperament, personality, and previous experiences people tend to be more creative on the things they enjoy. As a state, motivation can be intrinsic or extrinsic.

Motivation is extremely important to creativity because it drives an individual to persist at problem solving. That is, creative potential is not fulfilled unless the individual is motivated to do so, and creative solutions are not found unless the individual is motivated to apply his or her skills (Runco, 2005). Prabhu, Sauser, and Sutton (2008) saw intrinsic and extrinsic motivation as mediators of the relationship between creativity and three
personality traits: openness of experience, self-efficacy, and perseverance. This shows that creative ability does not automatically make someone do an activity which results in creative output if there are no willingness and motivations in doing something. So qualifying high in academic and intelligent will be nothing if there is no willingness in creating something new or original.

**Types of Motivation**

Basically, there are two types of motivation, including intrinsic and extrinsic.

1. **Intrinsic motivation** is the motivation to work on something primarily for its own sake, because it is enjoyable and satisfying. In other words, it is a motivation that originates within an individual. It does not depend on reward to be received; rather it involves doing something or carrying out an action with self-conviction, self-determination, and self-willingness. A student who worked hard and excel in all subjects or courses without being motivated by parents or teacher’s reward can be said to have exhibited intrinsic motivation.

   According to Adepoju (2002), there are a number of factors that enhance intrinsic
motivation, including curiosity, goals set by an
individual, interest, and mental stimulation.
Unlike people who are readily influenced by
the opinions of others and motivated by
extrinsic (external) rewards, creative
individuals are more likely to be intrinsically
(Internally) motivated. That is, creative people
are sometimes carried away by the anticipation,
excitement, and enjoyment associated with
their work, whether it is inventing, producing
works of art, or advancing scientific knowledge.
For these people, the sheer joy of creative
activity itself carries its own reward. In short,
they enjoy the process of creation for its own
sake (Csikszentmihalyi, 1996).

2. **Extrinsic motivation.** Extrinsic motivation
is an external reward, the motivation to work
on something simply because it is a means to
an end. Similarly, extrinsic motivation occurs
when an individual is aroused to do a particular
thing or behave in a particular way as a result
of external forces. It stresses the importance of
external condition as the source of extrinsic
motivation. The factors that enhance extrinsic
motivation include, incentive or reward, praises,
competition, counselling, punishment, parental
expectation, availability of materials, interesting apparatus, challenges from friends, and previous performance. This is similar to the Behaviourists view about creativity. They believe that the social environment conditions personality and its behaviour. That is, creativity is a behaviour that is learned through environmental factors such as reinforcement.

The effect of reward on creativity depends on the recipient’s understanding of the task. That is, creativity increases when creative performance is rewarded and decreases when conventional performance is rewarded. Eisenberger & Shanock (2003) noted that reward for high performance increase intrinsic motivation. Subjects learn what conditions are rewarded and utilize this knowledge in future activities.

Creativity and motivation are important to teaching and learning because motivation encourages the students to understand what they are being taught with less stress. Both of them are essential in learning process that encourages acquisition of ideas, skills, and concepts for total development. Creativity helps the teacher to introduce novelty in teaching. That is, every novel thing creates interest in the individual to learn.
Intelligence

Intelligence is defined as the ability to learn, adjust to the environment, adapt to new situations, or profit from experience (Sternberg, 1981). According to Wechsler, intelligence is defined as the aggregate or global capacity of an individual to act purposely, to think rationally and to deal effectively with his or her environment. The lack of a single definition of intelligence often results in confusion and disagreement about how we understand, and measure intelligence. That is, for many years, the notion of creativity was not easy to differentiate from the view of intelligence. Sir Francis Galton (1887), was one of the first to examine intelligence in-depth, he based his observation of intellectual differences on grades or marks earned by men at Cambridge. He suggested that intelligence was inherited and measurable with certain tests. Thus, Alfred Binet developed a test designed to measure intelligence by performance on a series of tasks.

In the same vein, Lewis Terman, of Stanford University, standardized Binet’s original test with American participants, and the Stanford-Binet became the standard measure of
intelligence in the United States. Overtime, the notion of traditional intelligence began to change.

In 1950, J.P. Guilford questioned the idea of intelligence as scores on an Intelligent Quotient (IQ) test. In his presidential address to the American Psychological Association (APA), he expressed doubt that intelligence tests could adequately measure creativity, suggesting that creativity and creative product extend well beyond the domain of intelligence, instead, he proposed that intelligence be considered as a construct of multiple factors, including creativity. Additionally, he differentiated between creative potential and creative production, linking creative production to personality traits such as motivation.

**Measurement of Intelligence**

In the early part of the twentieth century, educational psychologists focused mainly on models of intelligence, called psychometric models that rely heavily on statistical research methods. Psychometrics refers to the process of measuring psychological traits. Some of these models are:
1. Spearman’s ‘g’ and ‘s’ Factors
Spearman developed a psychometric model in which intelligence consists of a general or (g) factor and a set of specific or (s) factors. To him, intelligence reflects a combination of general and specific abilities.

2. Crystallized and Fluid Intelligence
There are some psychologists who note that a single g factor fails to provide a comprehensive explanation of intelligence. Cattel (1971) and Horn (1968), for example, divided intelligence into two types: crystallized and fluid. Crystallized intelligence involves learning things a given culture considers important, which vary from one culture to another. Fluid intelligence involves thinking and reasoning abilities that are independent of any given culture. Although age and health factors can influence fluid intelligence.

3. Thrustone’s Primary Mental Ability
Thrustone (1938) proposed a model in which intelligence consists of seven factors: verbal comprehension, word fluency, number, space, associative reasoning, perception, and oral speech, and general reasoning. Thrustone’s
theory that there are different types of intelligence is an early announcer of newer theories of multiple intelligence. Gardner (1993) supports the belief that students can be weak in some types of intelligence and strong in others.

4. Guilford Structure of Intellect Model
Guilford’s Structure Model of (1938) contains 120 unique types of intelligence within a three dimensional system. The first is operation or types of the mental processes; the second is content, or the types of information to which mental processes are applied, and the third is product, or the type of outcomes of mental processes.

Current Theories of Intelligence
The current theories, which regard intelligence as multidimensional, come from the cognitive psychology and neuropsychology, not from psychometrics. The leading theorists are:

1. Gardner. Gardner (1993) believes that people have seven kinds of intelligence, with high ability in some and low ability in others. These intelligences are independent of one another. They include:
1. Linguistic-verbal: This is to use language and to have awareness of its functions;
2. Logical Mathematical: To manipulate numbers and reason through a series of logical statements;
3. Spatial: To perceive the physical world and transform one’s perceptions;
4. Musical: To have appreciation for the qualities of music;
5. Bodily Kinesthetic: To control the body’s movement to manipulate objects;
6. Interpersonal: To be sensitive to the needs, moods, personalities, and motivation of others.
7. Intrapersonal: To be aware of one’s own needs, feelings, motivation, strength, and weakness, and to use this awareness as a basis for one’s behaviour.

Gardner believes that the early emphasis on intelligence testing diverted attention from studying the mental abilities people use in typical circumstances. For example, he argues that the abilities teachers, surgeon, athletic, couches, dancers, artists or psychotherapists need to be successful vary widely from job to job. He also notes that our society and our
schools lay more emphasis on linguistic and mathematical intelligence and deemphasize the other types of intelligence. This theory can be used to address all types of intelligence. Thus, the schools should develop curriculum and use teaching methods that match the abilities and talent of individual student.

2. **Sternberg Triarchic Theory**

Sternberg (1990) develops Triarchic theory that he conceptualizes intelligence as consisting of three major aspects:

i. The componential (the mental processes or components of problem solving);

ii. the experiential (the management of new experiences), and

iii. the contextual (the application of cognition to the environment).

Each aspect requires different mental strategies or abilities.

**Intelligence Testing**

The most frequently used intelligence tests are the Stanford-Binet and the series of tests developed by David Wechsler. These tests are individually administered by qualified psychologists. Individual
intelligence tests are generally given in schools only when a student is having significant academic problems or when a school is considering placing a student in programmes. To express intelligence in a more stable form, revised versions of the Stanford-Binet reported intelligence in terms of intelligence quotient (IQ). An IQ is the ratio of students’ mental age to their chronological age. To avoid decimals, this ratio is multiplied by 100. Thus, the formula for IQ is $IQ = \frac{MA}{CA} \times 100$. MA is Mental Age while CA is Chronological Age. Using this formula, a child whose mental age and chronological age are equivalent would have an IQ of 100%.

**The Wechsler Tests**

David Wechsler also developed a well-known series of individual intelligence tests that measure people at three different age ranges:

1. **WPPSI**: Wechsler Preschool and Primary Scales of Intelligence; (3 to 7 years).
2. **WISC**: Wechsler Intelligence Scale for Children (6 to 16 years)
3. **WAIS**: Wechsler Adult Intelligence Scale (16 to adult)
Creativity
Creativity is variously defined as a characteristic that a person possesses, a product or outcome that is regarded as original, and a process by which an unusual outcome is obtained. For a solution to become creative, it must be both novel and suitable.

Psychologists have been interested in creativity for a long time. Binet, for example attempted to measure creativity by including open-ended items on the intelligence test. He later discarded these items, because they could not be scored reliably. Freeman, 1924, Guildford, 1967, and Torrance, 1974,) later succeeded in developing test of reliability. Similarly, psychologists have explored the cognitive and personality dimension of creativity. For example, Gardner, 1999, Perkins, 1988, Sternberg, 1988, examined the role that insight, dreams, and the social environment might play in the creative process.

Similarities and differences of Intelligence and Creativity
Intelligence and creativity relationship question is of great interest because, in our schools, we seem to value intelligence over
creativity. Sternberg & O’Hara (1999) argued that the relationship between creativity and intelligence is important, and its answer probably affect the lives of many adults and children.

The roots of creativity as a scientific discipline are planted in the intelligence literature. Many of the earlier scholars, such as Francis Galton, Lewis Terman, Alfred Binet, and Charles Spearman who considered and discussed creativity were more primarily focused on intelligence. Indeed, it was an intelligence researcher, J.P Guilford, who first publicly recognized the need for independent study of creativity. He placed creativity into a larger framework of intelligence in his Structure of Intellect model. He also attempted to organize all of human cognition along three dimensions. The first dimension was called operations, and simply meant the mental processes needed to complete almost any kind of task, such as cognition. The second dimension was content, this refers to the general subject matter, such as words. The third dimension was product, this represented the actual products that might result from different kinds of thinking in different kinds of subject matters, such as writing.
In recent years, there has been an emphasis on creativity theories that incorporate factors that are interrelated. For instance, the investment theory of creativity, in which the key to being creative is to “buy low and sell high in the world of ideas”. In this model, a creative person is like an investor. A successful creator will generate ideas that may be initially unpopular, yet will persist and convince others of the ideas’ merits. The creator will then know when to move on to pursue other ideas. According to this model, six main elements contribute to creativity: intelligence, knowledge, thinking styles, personality, motivation, and environment (Sternberg & Lubart, 1996).

Furthermore, Plucker (1999) notes that most studies that investigate creativity and intelligence used divergent thinking tests such as Torrance Tests of Creative Thinking (TTCT) or other related paper and pencil tests scored for fluency, originality, or other divergent thinking-related methods of scoring. Creativity extends beyond the domain of intelligence. Therefore, fluency of ideas and flexibility in idea production are fundamental to divergent thinking. In addition, creativity is not seen as important as intelligence because it involves
adapting to the novel situations that can lead people either to great success or failure. Even though creativity can be evolved within each of the seven intelligence identified by Gardner. An individual can be creative in one domain but not in others or all.

Implications of Creativity and Intelligence to Teaching and Learning
From the discussion on intelligence and creativity, it is obvious that the two concepts are very important in teaching and learning. Thus, teachers can do the following to promote them.

1. Teachers should ensure that they engage the students in activities that will increase their creative skills.

2. Learning is an active process, thus, teachers should encourage good and productive classroom discussion in order to help develop the understanding of students. This will only happen if there is good teacher students’ relationship.

3. Teachers should also fill their classrooms with interesting things to explore and encourage the students to become active creators of their own knowledge through experience.
4. Teachers should ensure that teaching and learning process must graduate along the lines of cognitive operations.

5. Every novel thing creates interest in the individual; the teacher must introduce novelty in his or her teaching. This is because novelty has merit when the teacher points out the relationship between the new and what is already known, use familiar procedures and show the expansion of knowledge into new areas. So, the teacher should present his or her subject matter in a varieties of ways to bring novelty in his or her teaching.

6. Teachers should ensure that they do not kill creative abilities in their students.

**Test yourself**

1. Explain how intrinsic and extrinsic motivation influence creativity.

2. Give the implications of creativity and intelligence to teaching and learning.

3. Justify if creativity and intelligence are the same.
CHAPTER SEVENTEEN

Creativity, Guidance and Counselling

Guidance traditionally, involves provision of direction or advice as in a decision or course of action, showing the way, setting and helping to drive, and lead, assist, pilot, by the professional councilors to enhance achievement of goals. Kolo (1992) defines guidance as a form of assistance that involves many activities that will help the individual understand himself or herself more and the problem. Shertzer & Stone (1976) noted that a client understands his or herself in terms of interest, needs, fears, anxieties, and general personality make up which help him or her to choose his or her subjects, career, and vocation on the basis of interest, attitude, and aptitude. He or she understands his or her environment in terms of rules and regulations must be observed to avoid punishment. Counselling on the other hand is defined as a person to person relationship in which one person helps another to resolve an area of conflict that has not been resolved (Gerald, 2003).
Creative Counselling combines creativity with other therapies such as Play Therapy, Art Therapy, Sand Tray Therapy, Visual Imagery, Group Therapy, etc. Creative Counselling offers more to clients than the traditional therapies do. This approach offers a creative way of doing therapy for clients in order to promote emotional well-being and healing. Creative Counseling can also be modified to use in school counselling for students. Angeloska, (1996) asserts that using creative counselling approach with clients allows the Following:

a. A stronger therapist and client relationship develops,
b. Creative ways of doing things are developed within the psyche,
c. The counsellor identifies the client’s creative strength,
d. It removes many mental blocks the client has,
e. It helps the client to know more about his or her, weakness,
f. The client learns new creative ways towards a healthier life,
g. It promotes a deeper healing and growth in therapy,
h. People of all ages, cultures, and religions
can benefit from using creativity counselling therapy.

Creative counselling is noted to be important because there are many Guidance and Counselling teachers or counsellors who still use monotonous methods that are less attractive to their students. This condition makes the students to be unresponsive and not interested to the service provided for them. Then they become bored of the guidance and counselling activities. This condition should be overcomed immediately in order to give a better service to them. For this reason, guidance and counselling teachers should be creative in organizing and managing their classes in order to create acceptable materials to the students.

One of the methods which can be applied is games. Some experts assert that games are needed in the learners’ development. Research findings show that games are mediums to develop creativity in both teacher and students. Consequently, a guidance and counsellor teacher should enrich his or her knowledge and materials through meaningful games.
Creative Methods in Guidance and Counselling

Creative methods in guidance and counselling have a lot of benefits. They can enhance both the well-being of people as well as help them recognize and engage in responding to life and work opportunities. The following reflections highlight the relevance of creative methods and what they can bring to a guidance and counselling context.

Creative methods which may include various forms of artistic expression or appreciation, help people to become more open to the full spectrum of their emotions and reduce the defensiveness towards so-called negative emotions. It also assist one to know how to access, express and respond to emotion. Allowing a broad range of emotions and feelings can also help a person to overcome a limited perspective created by one dominant emotion, (Hermans & Hermans-Konopka, 2010). The value of arts-based research, poetry and poetic form can also help people to cope with the mental and emotional stresses of modern life.

Creative methods often nurture another important aspect of sel-playfulness. According to Santrock (2006), playing is a pleasurable
activity which is done for the sake of the activity itself. Playing as a form of human adjustment is useful in helping a child cope with worries and conflicts. Playing is also an activity which is done based on some pleasure and without relying on the result. Playing activity is done voluntarily, without compulsion or pressure from others. The ability to play is often forgotten and underestimated human capacity. Although, serious questions often need a playful search to move into new spaces and possibilities in one’s self, life and work.

According to Winnicott (1971), it is in playing that the individual child or adult is able to be creative and to use the whole personality, and it is only in being creative that the individual discovers the self.

Furthermore, creative methods activate the parts of the brain untapped by rational thought. According to Evans (2008), Kahneman (2011), and Lieberman (2007), humans have two contrasting but complementary modes of thinking systems. These are:

i. **Intuition**: This is slow to learn but fast in operation. It is effortless, automatic and spontaneous, uses shortcuts to form judgements, it is holistic and may be
influenced by emotional responses to an event.

ii. **Analytic**: This is quick to learn but slow in operation. It is consciously controlled, effortful, using logic and analysis of information to reach a rational decision and is generally free from emotional response. Wide varying of methods can be used to empower individuals to become conscious of their own thinking patterns and preferences.

**Games as a Method of Creativity in Guidance and Counselling**

Play media and expressive arts can be used in the implementation of guidance service. Pamela (2006) argues that they are important in a counsellor’s job because:

1. children usually do not have verbal ability to ask questions, to help them solve their problems, playing becomes a way to communicate with them and see their world;

2. these can be shown as one of the methods to help them express their feelings and develop positive attitudes for themselves and their friends;
3. developing relationship strategy is used as an attitude of improvements,

Counselling interventions also make use of music, dance, playing and humour, imagination, fine arts, literature, writings, and drama. By employing these media, art develop an experience that is process-oriented, emotionally sensitive, socially directed and awareness. It makes possible for people from diverse backgrounds to develop in them ways that are personally enhancing and enjoyable. This creativity technique can lessen attitude problem, improve good results, promotes healthy cognition, affection, and interpersonal development. Some approaches in playing techniques are clearly described in Play Therapy with Adults.

Charles (1993) elaborates on some playing techniques which have been adapted to counselees’ problems in their play therapy, such as:

1. dramatic role play with drama therapy, psychodrama, improvisational play in couples therapy;
2. therapeutic humour with therapeutic humour with depressed and suicidal elderly;
3. sand play with counselees with somatic conscious or dementia, doll play for psycho-generic; (4) play groups using games with adults, hypno-play, client-centered play, play therapy for dissociative disorder.

Abraham Maslow and some other personality experts, opined that they function in groups, especially in playing, developing human personality, forming social contexts through social interest, decrease interpersonal relationship problems (Schaefer, 2003). Their theories bring values that group forms in games is the curative step for all adult types problem.

Furthermore, Russ (2004) writes that there are three important functions of games in counselling.

i. Firstly, playing is children’s natural expression of feelings, it is also as an effort to express their wants and fantasy, and even let the problems and conflicts inside them out. As a result, playing can be categorized as a media to confess.

ii. Secondly, they can use games as the language for communicating with the counsellor. It also stimulates empathy to
one another, so that functional interpersonal relationship can be achieved.

iii. Thirdly, playing acts as a vehicle which heighten understanding and accelerate counselling process. Studies on playing in guidance and counselling are described by Russ (2003) that, by observing playing process, counsellors are able to perceive expressions from a number of cognitions, affections, interpersonal processes, and problem solving.

Cognition process through playing games includes:

i. organisation,
ii. divergent thoughts,
iii. symbolism, and
iv. fantasy or imagination.

In the same way, Sweeney & Homey (1999) outlined nine benefits from counselling through play. These are:

1. group play can raise children’s spontaneity so that they achieve higher participation levels;
2. counselling through group play can be
used to respond to two problems at the same time; i.e. children’s interpersonal and intra-psychic dimensions;
3. group acts make possible for reflexion and confession to take place;
4. counselling through group play is a chance for children to achieve self-growth and self-exploration;
5. through counselling with group play, children are pulled closer to the actual life realities;
6. since counselling through group play is important, children should be made to understand the meaning of their presence toward other children;
7. the roles in counselling through group play can lessen children’s tendency to fantasise in solving their problems;
8. children have more chances to practise in their daily life the experience gained;
9. the presence of one or more children might help in therapeutic development for other children.

The role of games done by counsellors, according to Geldard & Geldard (2001), is aiming at:
i. Building a counselling relationship with a resistant or reluctant child;

ii. Helping a child to explore his or her responses to restrictions, limitations and the expectation of others;

iii. Providing an opportunity for a child to discover his or her strengths and weaknesses with regard to fine and gross motor skills, and/or visual perceptual skills;

iv. Providing a child with an opportunity to explore his or her ability to attend, to concentrate and preserve with tasks;

v. Helping a child to practice social skills such as cooperation and collaboration and to practice appropriate responses to disappointment, discouragement, failure and success;

vi. Helping a child practice problem solving and decision making;

vii. Providing an opportunity for a child to learn about relevant issues or life events for example, child abuse.
Test yourself
1. Give six reasons why creative counselling is important.
2. Explain how a counsellor can use game as a method of creativity in guidance and counselling.
3. State any five benefits of counselling through group play.
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