PGED S1-02

Psychological Foundation of Education

SEMESTER - I

EDUCATION

BLOCK 1

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COURSE INTRODUCTION (COURSE 2, BLOCK 1)

COURSE INTRODUCTION

The MA in Education Programme is of two years. The programme is divided into a total of four semesters. For the First Semester Course, we have a total of four courses namely Course-I:Philosophical Foundation of Education, Course-II: Psychological Foundation of Education, Course-III: Sociological Foundation of Education and Course-IV: Methods and Techniques of Teaching and Teaching Practical . In the Second Course of this Semester, we shall have to go through Psychological Foundation of Education in detail. There are a total of two blocks in this course. The first block comprises 7 units, and the second block consists of 8 units.

BLOCK INTRODUCTION

This is the first block of the course. In this course, the *First Unit* deal with the meaning, importance of Psychology in education and the methods of Educational Psychology. The *Second Unit* deals with the meaning and concept of growth and development, its relationship as well as various principles of development in the learning processes. The *Third and Fourth Units* shall help you to discuss the meaning and nature of learning, theories of learning, transfer of learning and its theories. The *Fifth Unit* explains the meaning, techniques, factors and theories of motivation. The *Sixth Unit* discusses the concept and theories of intelligence. The *Seventh Unit* deals with the meaning and nature of creativity and relationship between creativity and intelligence.

While going through this block, you will come across some along-side boxes, which are put on the left side or right side of the text. These boxes will explain you meaning of some words and concepts within the text. Apart from this, there will be some broad and short questions which have been included under 'ACTIVITY' and 'CHECK YOUR PROGRESS' in every unit. Activities will increase your thinking capacity because qestions put in Activity are not directly derived from text. Hints on the answers to the short questions have been put under section 'ANSWERS TO CHECK YOUR PROGRESS'. Besides, a few text-related questions have been put in 'POSSIBLE QUESTIONS'. These questions will help to draw your attention on the probable topics for the examination so that you can prepare for the examination with confidence.

CONTENTS

UNIT 1: EDUCATIONAL PSYCHOLOGY

UNIT STRUCTURE

1.1 LEARNING OBJECTIVES

After going through this unit, you will be able to–

- define the meaning and nature of educational psychology;
- identify the relationship between education and psychology;
- explain the scope of educational psychology; and
- discuss the various methods of educational psychology.

1.2 INTRODUCTION

Psychology has been a branch of study for centuries. However, until the beginning of the twentieth century, it remained a part of philosophy. Now, Psychology is an independent discipline and it is one of the latest of all mental disciplines whose meaning is continuously changing. It took nearly 200 years for psychology to transform from the speculative psychology of

the past to modern-day psychology as science of behaviour. In the modern times, psychology is considered the scientific study of mental processes, experiences and behaviour. We are students of education. The main aim of education is to modify the human behaviour on the basis of the processes of education. As such, education requires the study of developmental characteristics of human growth to suggest proper education for different abilities. This requirement has led to the development of a new branch of knowledge Educational psychology. This unit will introduce you to the meaning and nature of educational Psychology, the relationship between psychology and education, and the scope and methods of educational psychology.

1.3 MEANING OF EDUCATIONAL PSYCHOLOGY

Let us first discuss the meaning of Psychology. Etymologically, the word 'Psychology' has been derived from the Greek words 'Psyche' and 'Logos'. 'Psyche' means 'soul' or 'atma', and 'Logos' means 'talk of' or 'study of' or 'science of'. Therefore, the derivative meaning of Psychology is the 'study of soul' or 'science of soul.' However, the soul cannot form the basis of science, because soul is invisible, the nature of soul is not known and cannot be put into any scientific study. Therefore, this view was opposed by contemporary philosophers, and the definition of Psychology as the science of soul was rejected. Then, another definition of Psychology was evolved as the 'science of mind'. However, controversy arose again regarding the nature of the mind, and finally this definition was also rejected. Psychology was then defined as the 'science of consciousness.' Consciousness means immediate awareness of the mind in a situation. That consciousness is a very negligible portion of total mind. A more comprehensive definition of Psychology has emerged later as the 'science of behaviour.' Behaviour is the external expression of experience of the total mind of an individual. It includes all types of behaviour– physical as well as mental, normal as well as abnormal, child behaviour as well as adult behaviour. This definition of Psychology as science of behaviour is the most accepted definition. McDougall has described it as 'The positive science of conduct and behaviour.'

Educational Psychology is a branch of general psychology, which studies the behaviour of the individual in the learning situation and its problems. Education is concerned with teaching, training and instruction whereas Psychology deals with behaviour of man and animals. Educational Psychology is the result of interdisciplinary approach to education. Psychology has influenced the educational process in several ways. Keeping its importance into consideration, the teaching of Educational Psychology has been made compulsory in teachers training programmes, to equip the prospective teachers with the necessary skills and competencies to enable them to deal effectively with the teaching learning problems in a classroom. Skinner states, "Educational Psychology describes and explains the learning experience of an individual from birth through old age." Judd mentioned Educational Psychology as "a scientific study of the life stages in the development of an individual from the time he is born until he becomes an adult."

An analysis of these definitions reveals that Educational Psychology is an applied discipline, which integrates the two disciplines—Education and Psychology. Educational Psychology is concerned with the development, evaluation, and application of the theories and principles of human learning and instructions. It is the scientific study of human behaviour, which helps in understanding, predicting and guiding to realize the goals of life. Educational Psychology is the application of educational findings in the field of education. Both in the past as well as in the present, educational psychologist have studied learning and teaching, and at the same time, strived to improve educational practices. (Pintrich, 2000)

1.3.1 Relationship Between Education and Psychology

Education and Psychology are the two distinct branches of knowledge, but they have a deep relationship. They are intensely connected with one another, and they are inseparable. It is one of the most important branches of Psychology that deals with the problems that the educationists face. In general, Educational Psychology is an applied branch of general Psychology that studies the behaviour

of an individual in the learning situation and its problems. The principles, laws, and the new findings of general Psychology are utilized by Educational Psychology in the learning situation of the classroom. It mainly deals with the problems with the students and the teachers in their respective situations of teaching as well as learning. It is the science concerned with behaviour pertaining to education.

Educational Psychology is not concerned with the aims and objectives of education, but it helps to explain the simple method of teaching and learning. It is the study of educational problems with reference to psychological facts. It covers the development of the child from early childhood to maturity as well as the general facts of Psychology having a relationship with the modification of behaviour of the child. It takes into consideration the creation of interest and motivation in learning. It involves the question of individual differences in ability, potentiality, prospects and limitations in learning. On this aspect, Peter Sandi Ford defined Educational Psychology, as "Its subject matter is the behaviour of the human beings undergoing the process of education."

The following are the salient features emphasizing the relationship between Psychology and Education:

- Psychology is the science of behaviour and education is modification of behaviour. Human behaviour can be modified through teaching and learning.
- With the help of the psychological approach, education becomes child centered.
- Psychological foundation has helped education to give importance on individual differences of the child.
- Having psychological base, education stresses character building.
- Educational thoughts are translated into action by psychology.
- Importance is given on social development.
- Psychology helps education in developing different methods of teaching according to the stages of development.

- It is psychology that makes educational norms, aims or goals a reality.

1.3.2 Nature of Educational Psychology

- Educational psychology is the application of psychological principles to the field of education. Therefore, it is an applied psychology.
- Educational psychology is concerned with the things as it is, and not as it should be. It therefore, describes an object or an event objectively and without any pre-determined ideals.
- Educational psychology is a part of social sciences. Because, the results obtained from educational psychology are applicable to the individual as well as the groups of individuals.
- Educational psychology is an educational science as it helps the teacher to know the problems of education of the learner.
- Educational psychology selects only those facts and principles from general psychology that are of specific significance and utility for the teaching-learning process.
- Educational psychology is utilitarian and practical in nature. It deals with the world of reality. Both the teacher and the learner make use of the knowledge of educational psychology at every step.
- Educational psychology is an ever-growing and developing science following continuous research in this field. It opens new avenues in the field of education.
- G. Lester Anderson is of the opinion that educational psychology is an academic discipline. All the results and findings of educational psychology are the basis of various educational theories and practices.

1.3.3 Scope of Educational Psychology

Educational psychology is a major branch of psychology and its scope is also broad. But, it was only after 1920 that educational

psychology attained a definite form. The scope of educational psychology is vast and comprehensive. The following are its distinct and promising areas or scope of study.

- **Growth and Development of the Human Child:** Educational psychology studies all the aspects of the human development. From birth to maturity, the human being passes through several stages of development. How a child passes through the various stages of growth? What are the characteristics of each stage? What are the needs and desires of each stage? etc. are highlighted by educational psychology. Educational psychology helps in making an analytical study of the nature of the psycho-physical development of an individual.
- **Study of the Human Behaviour:** Educational psychology deals with the behaviour of human beings in the educational situations. An individual's interests, attitudes, aptitudes, his motivational behaviour, level of aspiration, social, emotional, intellectual, physical, aesthetic needs etc. are the main subject areas of educational psychology.
- **Study of Individual Difference:** No two individual are alike. Individuals differ from each other physically as well as mentally. So different individuals require different types of teaching and learning suitable to their individualism. Similarly, not all pupils are benefitted to the same extent by similar type of classroom activities. The individual's prospects and limitations, interests etc. need greater attention of the teacher. Therefore, the study of a child's individuality with a view to individualisation of his teaching and learning, form a major area of educational psychology.
- **Measurement and Evaluation:** In educational psychology, mental measurement provides a promising field of study. Educational psychology includes the basic principles of measurement, measurement of learning, and measurement of adjustment. It is necessary for the psychologists to identify

human talents and evaluate the findings relating to development, learning, and adjustment. Various measurements on individuals like intelligence test, personality test, aptitude test, interest inventories etc. help the teacher in judging the effects of his teaching as well as the learning capacity of his students.

- **Personality and Adjustment:** To assess, develop and study human personality and their adjustments, educational psychologists take into consideration the emotions and interest, mental life of the child as well as the teachers. Since adjustment requires a healthy social and emotional development, educational psychologists study the factors that help the individual to explore the possibilities, enhancing his emotional maturity and thus helping him to adjust to his environment. Educational psychology studies the nature of personality, factors responsible for the personality development, adjustment of the individual to his environment etc.
- **Study of Mental Hygiene and Abnormalities:** Mental hygiene and abnormalities are the two important subjects of study under educational psychology. Increasing social complexities around us has created different problems to adjust effectively with the changing situations. How to get rid of mental-ill health, frustrations, tensions and chaotic situations is the major concern of educational psychology.
- **Guidance and Counseling:** Though guidance and counseling constitute a distinct area of study in itself, it is an important field of study included in educational psychology. To meet the individual differences among the learners, guidance have assumed much recognition in the present day society. An individual always needs guidance services to secure the utmost utilization of their potentialities for better success in life. Necessary guidance helps the pupils to overcome their complexities and problematic situations arising in the social and educational field. It also helps the pupils to realize their power and potentiality in making

necessary adjustments with the surrounding world. Thus, educational guidance and counseling form an important aspect of educational psychology.

CHECK YOUR PROGRESS

Q.1: What is the meaning of educational psychology?

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Q.2: Give a comprehensive definition of educational psychology.

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Q.3: Explain briefly the scope of educational psychology.

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1.4 METHODS OF EDUCATIONAL PSYCHOLOGY

Educational psychology employs various methods to improve the teaching-learning process in the classroom. It uses the methods to gather facts about the nature of children, how they learn, and how they develop. It

employs the methods to know how any aspect of a child's personality like learning, social adjustment, or skill grows from the elementary stage to a complex one, how a group of children passes through the several stages of growth and development. As educational psychology is an applied branch of general psychology, it makes use of the methods of general psychology. Some methods of educational Psychology are discussed below:

1.4.1 Observation Method

Observation is one of the oldest techniques that man has made use of. Even today, it is our common experience to notice farmers feeling the breeze, watching the sky, sun, moon and the stars– all to determine what the weather is likely to be and what season is approaching.

In the words of Good, "Observation deals with the overt behaviour of persons in appropriate situations." Observation is also defined as the "measurement without instruments."

In education, observation is the most commonly employed of all measurement techniques. In the present as well as in the past, students have been labelled as good, fair, or poor in terms of achievement and lazy or diligent in terms of studies etc. on the basis of observation. Similarly, the teachers have listened to speeches and ranked students 1, 2, 3 and so on.

Uses and Merits of Observation:

- Being a record of the actual behaviour of the child, it is more reliable and objective.
- It is a study of an individual in a natural situation, and is therefore more useful than the restricted study in a test situation.
- The method can be used with children of all ages; of course, the younger the child the easier it is to observe him. This method has been found very useful with the shy children.
- It can be used with a little training and almost all teachers can use it. It does not require any special tool or equipment.

- It can be used in every situation, physical activities, workshops, classroom situations and so on.
- It is adaptable to both the individuals and groups.

Limitations and Demerits:

- There is a great scope for personal prejudices and bias on the part of the observer.
- Records may not be written with hundred percent accuracy as the observation is recorded after the actions of the observed. There is a time lag.
- The observer may get only a small sample of student's behaviour. It is very difficult to observe everything that a student does or say.
- It reveals the overt behaviour only– behaviour that is expressed and not remain within.

Chief Characteristics of Observation Method: There are certain characteristics of observation methods. They are as follows:

- Observation is a systematic method. It is not haphazard or unplanned. The interval time, the area or situation, techniques used for observation, length of observation periods etc. are carefully planned in this method.
- Observation is specific in nature. It is not just looking around for general aspects of human behaviour.
- Observation is objective and free from bias as far as possible. It should generally be guided by a hypothesis.
- Observation is quantitative, and it can be interpreted in objective manner.
- Observation must have some definite aims and objectives. It should be clearly defined before the actual observation process is begins.
- Observation result can be checked and verified.

Steps for Observation: In order to obtain valid and reliable data through an observation procedure, the observer must follow the following steps–

- **Planning:** At this stage, the observer must define the specific activities to be observed. The nature of the groups of the subjects

to be observed, the scope and length of the observation, the tools to be used during observation, should be determined at this stage.

- **Execution:** At this stage, real work of observation is done. The observer should have proper arrangement of the specific conditions for the observing subjects. He should assume the proper physical position for observing the behaviour. He has also to handle the recording instruments properly.
- **Recording:** Recording of the observation may be done at the time of observation or soon after the observation is over. The observer may record it in writing or he may use some electronic medium like tape recorder, camera, one-way vision screen etc.
- **Interpretation:** When the observer has interpreted his data, it becomes easier for him to draw various generalizations. This step must be done without any biasness or influence of personal attitudes and values of the observer.

Types of Observation: Observation may be classified into different types according to the method used, and the type of control exercised. The following are the chief types of observation.

- **Participant Observation:** The participant observation means watching the events, situations or activities by taking part in the group to be observed. He freely interacts with the other group members, participates in various activities of the group, and studies their behaviour or other activities.
- **Non-Participant Observation:** When the observer observers the group passively from a distance without participating in the group activities, it is known as non-participant observation. Here, the observer does not try to influence them or take part in the group activities. The observer can carefully judge the merits and demerits or each phenomenon under study.
- **Non-Controlled Observation:** In this method, observation is made in natural course without extra influence, control or guidance or instructions from external agencies and factors.

- **Controlled Observation:** With the help of controlled observation, the researcher can arrive at valid generalization and understand the cause-effect relationship between different phenomena. One way screens, mirrors movement recorders, sound recorders, motion picture etc. are used for measuring data. Through this type of observation, one can verify the biasness and the inadequacies of data, and thereby maintain objectivity.

1.4.2 The Experimental Method

The most dependable way of obtaining facts is the experimental method. It is used to investigate behavior, which can be brought into the laboratory and studied under controlled conditions. In 1879, Wundt established the first psychological laboratory at Leipzig. Since then, the experimental method in psychology has become popular.

Thus, experimental method is a procedure in which certain hypotheses on the basis of previous findings are tested by systematically varying certain conditions and controlling some other conditions. In other words, it is observation under pre-arranged conditions. Here, all the conditions and factors are kept constant, and only one factor is verified under the standard conditions of the psychological laboratory. The main requirements of an experimental method include a well-planned laboratory, apparatus and equipments, subject and experimenter, problem, hypotheses and design. In experimental conditions, there are two variables– the independent variable. It operates within a person or within his or her environment to affect behaviours. On the other hand, dependent variables is known as a response or output variable. It is an observed aspect of the behaviours of an organism that has been simulated. As the experimenter changes the independent variable, changes also occur in the dependent variables. These changes are observed and reported by the experimenter.

Steps involved in Experimental Method: While performing an experiment, generally the following steps are followed:

- Statement of the problem i.e. selection of the topic to be experimented.
- Formulating of a hypothesis: If the results of the study support the hypothesis, it is accepted. If not, it is rejected.
- Determining dependent and independent variables in the experiment.
- Creating a controlled situation for the experiment with the help of certain instrument or other devices.
- Analysis of the data.
- Testing the hypotheses on the basis of the results obtained from the experiment.

Methods of Experimentation: In education, experiments are conducted mostly in the classrooms where the experimenter has to work with groups of children. According to Mc.Call, there are three types of group methods:

- **One-Group Method:** Here, out of a number of factors, one factor is eliminated, or one new factor is introduced and the resulting change or changes are measured.
- **The Parallel-Group Method:** In this method, two or more groups are selected. The groups are such that they are equivalent in every respect. Then, in one of the groups, one of the factors is varied, and others are kept constant. At the same time, the parallel groups is also kept under observation, but that variable factor is not introduced there. Thus, after a period, the results of the groups are compared.
- **The Rotation-group Technique:** This method makes use of a number of groups and is used when it is not possible to have parallel groups. Normally, it is very difficult to have a parallel group. So, the rotation group technique is very commonly used. Here, the groups are reversed at intervals according to the procedure followed.

Advantages of the Experimental Methods: The experimental method has certain advantages, which are–

- Experiments can be repeated and the results can be generalised and verified by the same procedure. This is one of the most significant advantages of experimental techniques.
- This method is undoubtedly very systematic, objective, extremely accurate, and most reliable of all the methods.
- It can eliminate irrelevant and confusing factors from the experimental situation by only taking the variables, which are necessary for the study.

Disadvantages of the Experimental Methods: Experimental method has some disadvantages also–

- It is difficult to study all child behavior and related events experimentally.
- Experimental method needs a well-equipped laboratory, tools, and equipments. However, these may not be possible under all circumstances.
- The results provided by experimental method may not be the same result obtained under natural conditions. The subjects also may not behave in the same way in an experimental situation as they behave normally.
- It is extremely difficult to study infants experimentally because the affective factors dominate during the period of infancy, and it is almost impossible to control such affective factors.
- It is also not possible to study the private and personal experiences of a person in all cases.
- This method is not economical in use.

In spite of these limitations, in many ways, the experimental method is the best technique for collecting scientific information. It proves very useful in psychological research for its objectivity, economy, precision, accuracy, systematisation, reliability and validity. If this method is supplemented with introspection, case history, statistical method etc., then it proves to be very effective and successful in observing, analysing, predicting, and finally modifying human behaviour in desirable channels.

Application of Experimental Method: The application of the experimental method to problems of education has been extremely useful and has contributed to education in a large measure. The following areas of study in education are the result of the application of the experimental method to education.

- **Understanding the Child:** Experimental method has enabled the child psychologists as well as the teachers to understand the nature of the child as well as his development. He has to find out the learning capacity of the child. He comes to know the native endowments of the child and the other related factors.
- **Helps in locating Individual Differences:** Experimental Psychology has also helped in studying individual differences. This enables the teacher to understand and appreciate different stages in the development of the child. Through this method, the teachers come to know the nature and factors of individual differences, and apply this knowledge in the education of children.
- **Study of Likes and Dislikes:** With the help of the experimental method, it is possible for the psychologists and educators to study the likes and dislikes of children in an objective manner.
- **Study of Intelligence:** The application of the experimental method in psychology and education has greatly helped in understanding the nature and measurement of intelligence. After knowing the intellectual capacity of every child, the teacher can pay individual attention and plan for the development of the child.
- **Useful for the Teacher:** Through the experimental method and experimental psychology, the teacher can know about the conditions and forces, which can bring the desired behaviour. It enables the teacher to understand the problems of learning and teaching objectively.
- Nevertheless, the experimental method has been extremely helpful in the development of experimental education.

1.4.3 Case Study Method

A case study is the study of an individual case. The Case study method is usually used in the case of a problem child. Some case studies give cross-sectional views of the subject at the beginning of the study, and some give longitudinal studies of the individual that is historical in nature by providing detailed information regarding the family background of the subject, development of his infancy and childhood, information regarding his schooling, etc. Case study is used in research purposes, and this may give proper clue to the diagnosis and treatment of special problems. This may be used largely for instructional purposes regarding how to summarise and interpret the data collected on the students.

Some case studies end with the diagnosis; others report extended treatment and the success that attended the treatment.

Making and Using a Sase Study: In the case study of a pupil, usually the first step is to collect from school records all-important information pertaining to the pupil. Cumulative records are of much help in this case.

As a rule, the data are entered at regular intervals, and there will usually be a period of several weeks between the time of the last entry on the record and the time of making the case history. The case investigator will therefore find it necessary to interview those who have contact with the pupil, so that he might get the relevant information regarding the child.

The next step is to interview the child himself and if necessary, give him tests. For example, if the case is one of reading disability, a diagnostic silent reading test and an oral reading check test should be given.

When reasonably complete data about the pupil have been collected, the case should be written up and a tentative diagnosis and plan for treatment should be formulated before the treatment starts. The record should be amplified from time to time. A written

record of all these will help for further suggestions before proceeding with a plan for handling the case.

For studying a case, the following suggestions will be of much help for the counselor who prepares the case.

- If possible, select a pupil from your own class who, you feel, needs help and more attention.
- To start with, try to plan the case in a small way. As you proceed, if you feel that you should elaborate the case, plan it on a large scale.
- While collecting data, the pupil should not be put on the defensive. Rather, it is necessary to discuss the problems at a friendly and normal level. The teacher should be like a friend to whom the subject tells about all his worries and difficulties.
- While writing the case, use plain and simple language, and the points should be direct and matter of fact.
- In the report of the case, use both general and specific illustrations.
- The investigator should not attempt to apply the treatment which is beyond his experience. Normally, a teacher can handle such problems arising out of learning difficulties, lack of interest or minor behaviour problems.
- After the case has been released from treatment, it should be followed up so that the subject does not have a relapse. This is especially important in cases involving skills such as reading, spelling and arithmetic. Some pupils, who have improved tremendously during the period of treatment, will tend to return to the old habits later unless they are carefully supervised.

Various Steps in Case Studies:

- Determination of the status of the phenomenon under investigation through direct observation or measurement.
- Determination of the most probable antecedents of the case.
- Formulation of a definite hypothesis or a set of hypotheses through the knowledge of similar cases.
- Verification of the hypothesis.

- Remedial steps for removing the causes for maladjustment.
- Follow-up of the case.

Characteristics of a Good Case Study:

- Completeness of data
- Validity of data
- Confidential recording
- Scientific synthesis
- Continuity

Advantages of Case Study Methods:

- It looks at the "whole child". A good case study will examine all possible factors like mental, physical, social, emotional, which may give some clue to the problem behaviour.
- It is one of the important tools of evaluation in the hands of a teacher.
- Reliable interpretation can be effectively ensured.
- It makes the teachers to be more aware of the special problems of individual children.
- With the increased use of the method, it is fundamentally a part of the teaching process itself.
- It helps the teachers to gain a better understanding of normal behaviour and better insights and perspective towards abnormal behaviour of children.

Disadvantages: There are certain limitations in the case study method. These are–

- Case study is highly subjective. It needs highly trained and competent investigators to conduct interview or collect case history.
- The teacher may lack unnecessary skills for collection and interpreting data.
- The case study is time-consuming and durable.
- In some cases, particularly among the children, information about early years may not be available. Even, adults are also found sensitive to reveal some of the secrets of life.

- In spite of these limitations, the case study method is a very useful method for collecting necessary and relevant information about the individual.

1.4.4 Introspection Method

Introspection is composed of two words "intro" and "aspection". "Intro" means within or inward and "aspection" means looking. Hence, it implies self-observation or looking within or looking inward to experience 'one's' own mental state. It is a process of examining one's own mental process of thought, feeling and motives. An individual looks within, observes, analyses, and reports his own feelings. Let us explain this process with the help of an example. Suppose you are happy, and in this state of happiness, you look within yourself. It is said you are introspecting your own mental feelings and examining what is going on in your mental process in the state of happiness. Similarly, you may introspect in the state of anger or fear, etc.

Introspection is the oldest method, which was formerly used by philosophers. This method was developed by the structuralists in psychology who defined psychology as the study of conscious experiences of the individual.

Merits of Introspection Method:

- It is the cheapest and most economical method. We do not need any apparatus or laboratory for its use.
- This method can be used any time and everywhere.
- It is the easiest method and is readily available to the individual.
- Introspection has generated research, which gradually led to the development of more objective methods. It is still used in all experimental investigations.
- It is the only method with the help of which an individual can know his emotions and feelings.

Limitation of Introspection Method:

- In introspection, the mind studies its own working. However, the mind cannot study itself. For example, when one is in a state of

anger or fear, one cannot study the working of one's mind, and when one is able to study one's mind, the state of anger or fear, etc. disappears.

- Human beings are not static objects. Their mental process is under constant change. Therefore, when one attempts to introspect, the state of mental process disappears. It is difficult to introspect changing psychological experiences.
- The data collected by introspect cannot be verified. An individual may not pass through the same mental state again. There is no independent way of checking the data.
- The data collected by introspection is highly subjective. It has the danger of being biased and influenced by preconceptions of the individual.
- There is ample scope for the reporter i.e. the individual who introspects to lie deliberately and hide the facts to mislead.
- Normal or superior individuals can do introspection. Abnormal human beings cannot introspect.
- Children cannot do introspection. Adults can do it.
- Highly trained and skilled workers can do introspection.
- The limitations of introspection can be overcome by practice and training, by remaining alert during introspection and by comparing results obtained by experts.

Stages of Introspection: There are three distinct stages of introspection.

- The first is the state of explicit self-consciousness. The person tries to find the basis or reason for his mental activities. The individual is conscious that he is watching something.
- The second is the stage of reflection and deliberation. Here, the individual begins to think of the good or bad consequences of his activities.
- The third stage is the final stage of drawing conclusion. In this stage, the individual tries to understand himself, and determines whether his actions are desirable or undesirable.

Thus, introspection is self-observation with a view to study the nature of mental process. It is not self-reflection.

Applicability of Introspection Method:

- Introspective method in psychology is a subjective approach to study the mental processes of an individual. It is a very easy and inexpensive method. If other methods like observation, experimentation, and psychoanalysis fail to do so, we have to turn to introspection. The difficulties stated above can be overcome by systematic training and practice. When a person gets proper training and acquires efficiency and skill in the introspection method, he can use it successfully.
- Similarly, due to the unstable condition of mind, correct introspection is not possible. In other words, an introspectionist is no more in the same state of mind when he begins to examine his own mental processes. James S. Ross has remarked, "Reflection on a mental state inevitably changes the character of the state.'' In order to remove this defect from the instrospective method, it has been suggested that a person should allow his mental activity or reaction for a long time without interruption. When the activity is completed, the individual can examine his mental processes with the help of his memory.
- One of the arguments against the introspection method is that it is not possible to test the results achieved by this method. The reason for this is that the results are mostly subjective in nature.
- Although, the introspection method has certain limitations, the psychologists had pointed out that it has a wide application. This method is very useful in the application of psychology to the problems of education. It has been of great help in the analysis of the mental processes. It is through this method that we understand and interpret the experiences of other people. Therefore, in spite of its subjective approach, the introspective ability or power can be regarded as the most desirable quality of a psychologist. This method can provide us direct views and

knowledge of the mental process. Therefore, considering this aspect, the psychologists can never discard the introspection method entirely. Even when we use observation or experimental method, the introspection method can also be used very perfectly to obtain supplementary data.

CHECK YOUR PROGRESS

Q.4: Explain briefly the experimental method.

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Q.5: Write a brief note on the observation method.

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Q.6: Explain two advantages and limitations of the case study method.

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1.5 LET US SUM UP

- Psychology has a unique status as a positive science due to the expansion of its boundaries.
- Etymologically, the word 'Psychology' has been derived from the Greek word "Psyche" which means 'soul' or 'atma', and "logos" which means 'talk of' or 'study of' or 'science of.' The derivative meaning of "Psychology" is the "study of soul" or "Science of soul"
- Educational psychology is one of the most important branches of psychology and it deals with the problems faced by the educationists. In general, educational psychology is an applied branch of general psychology that studies the behaviour of an individual in the learning situation and its problems. The principles, laws, and new findings of general psychology are utilized by educational psychology in the learning situation of the classroom.
- The scope of educational psychology is vast and comprehensive. The scope includes growth and development of the human child, the study of human behaviour, the study of individual differences, the study of measurement and evaluation, the study of personality and adjustment, the study of mental hygiene, abnormalities, and guidance and counseling.
- Observation method, experimental method, case study method and introspection method are discussed in this unit in detail.

1.6 FURTHER READING

1) Agarwalla, Dr. S. (2008). *Psychological Foundation of Education and Statistics*. Bookland.
2) Chauhan, S. S. (1993). *Advanced Educational Psychology*. New Delhi: Vikas Publishing House.

3) Pintrich, P. R. (2000). *Educational Psychology in the Millennium: A Look Back and A Look Forward*. *Educational Psychologist*, 35, 221-226.

1.7 ANSWERS TO CHECK YOUR PROGRESS

Ans. to Q. No. 1: Educational psychology is an applied branch of general psychology. Educational psychology studies the human behaviour in educational situations. It is because the meaning of psychology means to study the human behaviour whereas the meaning of education means the modification of human behaviour.

Ans. to Q. No. 2: According to Skinner, "Educational Psychology utilizes those findings that deal specifically with the experiences and behaviour of human beings in educational situations." In fact, educational psychology is an applied discipline, it is the scientific study of human behaviour, by which the goal of life can be understood, directed, and predicted.

Ans. to Q. No. 3: The scope of educational psychology means the area that educational psychology deals in or implies in the field of study. In fact, the scope of educational psychology basically indicates the following points:

- The limits of operations and applications of educational psychology.
- The branches, topics, and the subject matter with which educational psychology deals.
- Growth and development of the human child, the study of human behaviour, the study of the individual differences, measurement and evaluation, personality and adjustment, study of mental hygiene and abnormalities, and guidance and counseling are some of the areas commonly discussed under educational psychology.

Ans. to Q. No. 4: The experimental method is one of the most important methods of psychology. Through this method, attempts are made to establish the cause and effect relationships through carefully

planned and controlled observation of the subject's behaviour. Some of the characteristics of the experimental method are:

- It essentially requires at least two persons, the experimenter and the subject.
- In experimental method, the conditions are always controlled.
- The experimental method involves two different types of variables– independent and dependent.
- The experimental method is applied on persons in a random order.

Ans. to Q. No. 5: Observation method means observation of an individual's behaviour– his bodily gestures, facial expressions and other bodily actions. The observer makes systematic observation through recording of information in a natural situation. This method is very useful as psychologists accept the view that an individual's overt behaviour is the result of his internal mental conditions. Three principles to be followed in the observation method are:

- Observation should be made not only of the individual's behaviour but of the whole situation.
- Proper planning of the observation process should be made; objectives must be clearly formulated, and proper tools must be used.
- The time of observation should be fixed. Too long time may make the observer distracted and tired; and too short time will not provide the proper information.

Ans. to Q. No. 6: The two advantages of the case study method are,

- The case study method is very effective in understanding an individual's anxiety, worry or any kind of maladjustment of an individual.
- Proper guidance and counseling can be provided to the subject to help the latter adjust with the environment better.

The drawbacks of the case study method are:

- In most cases, the investigators are not technically proficient, and so the data obtained may not be reliable.

- The possibility of errors in understanding the problems as well as in its treatment is high.

1.8 POSSIBLE QUESTIONS

A) Very Short Questions (Answer each question in about 50 words)

Q.1: Define Educational Psychology.

Q.2: How is Psychology related to Education?

Q.3: Explain the meaning of introspection and observation methods of educational Psychology.

Q.4: Mention briefly the importance of the case study method.

Q.5: Write briefly about the importance of the experimental method.

B) Short Questions (Answer each question in about 150 words)

Q.1: Describe the nature and scope of educational psychology.

Q.2: What is the effectiveness of educational psychology as a tool for a teacher in the classroom transaction?

Q.3: Select five classroom problems, where you can make use of the knowledge of educational psychology.

C) Long Questions (Answer each question in about 300-500 words)

Q.1: What do you mean by experimental method? What are the steps to be followed in the experimental method?

Q.2: What do you mean by Introspection method? What are its advantages and disadvantages?

Q.3: Explain the experimental method of educational psychology with its merits and demerits.

Q.4: Explain how the case-study method of educational psychology helps the teacher to modify the behavioural problems of a child.

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UNIT 2: GROWTH AND DEVELOPMENT

UNIT STRUCTURE

2.1 LEARNING OBJECTIVES

After going through this unit, you will be able to–

- explain the meaning, definition, characteristics of growth and development;
- describe the various stages and aspects of growth and development; and
- discuss the principles and educational implications of growth and development.

2.2 INTRODUCTION

The sole aim of education is to bring the all round development in the personality of a child. Educational psychology and technology of education should help in the realisation of this aim. The continuous interaction with the

environment results in the growth and development of the innate capacities, abilities, and potentialities of a child. The task of formal as well as informal education, therefore, is to provide help in the growth and development of the child. Hence, it is imperative that the teachers, supposed to be connected with the task of helping the child to grow and develop satisfactorily, must be acquainted with the nature of growth and development. It is only with the knowledge of growth and development of the learner at each stage of his/her life, that it is possible for the teachers to render proper guidance, arrange the learning situations, and plan the instructional programmes for bringing the desirable and harmonious development in the personality of the children. In this unit, we shall try to understand the process of growth and development with reference to their various aspects.

2.3 MEANING OF GROWTH AND DEVELOPMENT

Education aims at the all-round harmonious development of an individual. The development of a nation depends upon the development of its children, and there is no doubt that the childhood is the foundation upon which the development of an individual depends. Development of proper attitudes, habits and patterns of behaviour formed during the early years determine, to a great extent, how successfully an individual will adjust himself, as he grows older. It is, therefore, imperative that the teachers who are charged with the responsibility of the development of the child should be acquainted with the meaning and characteristics of development.

Every child is unique. There are individual differences in children, which has a great bearing on their development. The needs of each individual child must be catered to for his optimum development. The United Nations International Children Fund (UNICEF), an important organization of the United Nations, measures the development of a nation in terms of the yardstick of the development of its children. It is of interest to note that this organisation gives a secondary importance to per capita income. Under the auspices of UNICEF, an Italian Committee organized a workshop at Rome in 1990 for promoting the movement of child growth and development. The workshop prepared the *Development Tree,* which represents the rights of the children,

which should be taken into consideration in the development and growth of children. The roots of the tree represent the right to social and economic development, and the branches represent the complementary rights (the right to information, to play, to live in peace, etc.)

2.3.1 Definitions of Development

In the words of E. B. Hurlock (1959), the term "Development means a progressive series of changes that occur in an orderly predictable pattern as a result of maturation and experience."

According to J. E. Anderson (1950), "Development does not consist merely of adding inches to one's height or improving one's ability. Instead, development is a complex process of integrating many structures and functions."

Robert M. Liebert, R. W. Poulos and G. S. Marmor (1979) state, "Development refers to a process of change in growth and capability over time as function of both maturation and interaction with the environment." Thus, development includes: (i) Growth; (ii) Capability; (iii) Maturation; and (iv) Interaction with the environment.

Harold Stevenson (1968), a prominent development psychologist, has put the concept of development as, "Development, psychology is concerned with the study of changes in behaviour throughout the life span."

G. W. Allport (1948) thinks, "The developing individual cannot be thought of a thing in himself. Development, insofar as it is considered to be produced from within the individual himself alone, is only a convenient abstraction."

A. Angyal (1941) opined, "Development cannot be considered in terms of the mind alone but rather in terms of the individual as a whole in relationship with his experience with others. Thus, development is concerned with the biological total process taking place in the subject-object interrelation."

To sum up, development is a series of orderly progression of change towards maturity. 'Orderly' refers to the arrangement of the

changes. That is, each change at each stage is dependent upon what preceded it, and it affects what will come later. Development does not take place haphazardly. The term 'progressive' signifies that changes are leading forward and that the direction is towards adaptation is conductive to survival of the individual. Development has the four basic elements:

- Growth
- Maturation
- Experience
- Social Transmission (Learning through language, schooling or training by parents)

2.3.3 Development, Growth, and Maturation

Development, growth and maturation are terms, which are commonly, used to convey the same meaning but there is a great difference.

Arnold Gessel (1929) wrote, "Growth is a function of the organism rather than that of environment as such. The environment furnishes the foil and the milieu for the manifestation of development, but these manifestations come from inner compulsion and are primarily organized by inherent inner mechanics and by an intrinsic physiology of development. The very plasticity of growth requires that there be limiting and regulatory mechanisms. Growth is a process so intricate and so sensitive that there must be powerful stabilising factors, intrinsic rather than extrinsic, which preserve the balance of the total pattern and direction of the growth trend. Maturation is, in a sense, a name for this regulatory mechanism."

Growth refers to change in size.

Maturation involves qualitative change.

L. D. Crow and A. Crow (1962) suggested that growth refers to structural and physiological changes, and development is concerned with growth as well as those changes in behaviour, which result from environment situations.

Growth takes place when a child grows taller, his bones, muscles, and other parts of the body increase in size. ***Maturation*** is

the unfolding of the characteristics with which the individual is endowed. As the child grows, his mind and body mature and he is able to function at a higher level. ***Development*** is a product of maturation and learning.

Growth does not always contribute to development. A child or adult may grow very fat and heavy, but such growth can hardly be considered development in the sense of advancement to a higher level of maturity. Actually, a person can be stated to have developed if he is physically healthier and/or has more sensory motor skills so that his physical condition is conductive to greater personal effectiveness. Thus, by improving his sensory motor skills and thereby utilizing better the capacities he has received from about two decades of growth, a person can develop even after physical growth stops. Physical growth is quantitative in nature and is usually measured in inches and pounds or their equivalents.

Development involves a series of progressive, orderly and meaningful changes leading to the goals of maturity. Usually growth contributes to development but not always. A person can develop even after physical growth ceases and maturity is attained.

2.3.3 Comparison between Growth and Development

Growth	*Development*
➢ The term growth is used in purely physical sense. It generally refers to an increase in size, length, height and weight. Changes in the quantitative aspects come into the domain of growth.	➢ Development implies the overall changes in shape, form or structure resulting in improved working or functioning. It indicates the changes in the quality or character rather than in quantitative aspects.
➢ Growth is one of the parts of the develop-mental process. In a strict sense, development in its quantitative aspect is termed as growth.	➢ Development is a wider and comprehensive term. It refers to the overall changes in the individual. Growth is one of its parts.
➢ Growth describes the changes, which take place in the body and behaviour of an organism.	➢ Development describes the changes in the organism as a whole and does not list the changes in parts.

➢ Growth does not continue throughout life. It stops when maturity has been attained.	➢ Development is a continuous process. It grows from womb to tomb. It does not end with the attainment of maturity. The changes, however small they may be, continue throughout the life span of an individual.
➢ The changes produced by growth are the subject of measurement. They may be quantified.	➢ Development, as stated earlier, implies improvement in the functioning and behaviour, and hence brings qualitative changes, which are difficult to be measured directly. They are assessed through keen observation in behavioural situations.
➢ Growth may or may not bring development. A child may grow (in terms of weight) by becoming fat, but this growth may not bring any functional improvement (qualitative change) or development.	➢ Development is also possible without growth as we see in the cases of some children that they do not gain in terms of height, weight or size, but they do experience functional improvement or development in physical, social, emotional or intellectual aspects.

Physical development is both qualitative and quantitative and implies increasing capacities and abilities, maturing functional improvement, and progress towards higher levels of potentiality and effectiveness.

Growth can be 'measured', development can be observed by noting the changes in shape as they occur, and the modes of behaviour as their maturation is completed.

2.3.4 Characteristics of Development

The following are the important characteristics of development:

- Childhood is the foundation period of development in the life of an individual.
- Development is the result of maturation and learning.
- Development follows a definite and predictable pattern.
- All individuals are different and their development takes different courses.
- Certain characteristics traits are associated with each phase of development.
- Each period of development involves hazards.
- Traditional beliefs exist about individuals of different ages.
- There is development from generalized to more specific forms of response.
- Development further makes it possible for the child to differentiate among the movements.
- Development in the body structure as well as its functions, proceed from head downward.
- Development also proceeds from the trunk outward towards the more distant parts.
- Development of behaviour is the result of growth and learning.
- Development is gradual. It takes time.
- Development follows a sequence. The child crawls before he creeps, stands before he walks, babbles before he utters a word.
- There is interaction among different aspects of development.
- Development is not uniform in all individuals.
- Development depends on both heredity and environment.

LET US KNOW

Growth and Development means:

- Often used as synonymous terms.
- Important characteristics of a living organism.
- Growth refers to change in size.
- Development implies the overall changes in the individual.
- The process of growth and development goes on simultaneously.

CHECK YOUR PROGRESS

Q.1: Define development.

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Q.2: Maturation involves qualitative change. (Say True or False)

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2.4 STAGES OF DEVELOPMENT

Educators and psychologists have pointed at different ways of describing stages of development in the life span of an individual. A brief account of these stages is given here to show how children behave differently at successive stages. This outline indicates how children learn new and more complex tasks, as they grow older.

I) **Rousseau's (1712-1778) Views on Stages of Development:** The earliest effort at marking out the stages of development was made by Rousseau. He attempted to divide the individual's development into four stages as given:

Stage	***Period and Approximate Age***	***Characteristics***
I) Infancy	1 to 5 years	1) Free wandering stage 2) Simple play things 3) Physical development
II) Childhood	Between 5 to 12 years	1) Development of senses 2) No verbal lessons 3) Activity and experience
III) Pre Adolescence	12 to 15 years	1) Period of developing intellect 2) Study of natural sciences 3) Manual work and industrial arts

IV) Adolescence	15 to 20 years	1) Sex instruction. 2) Moral education through activities and occupation. 3) Understanding of complex social relationship.

II) E.H. Erickson's Eight Stages of PsychoSocial Development: According to Erickson, development is the result of the interaction between the individual's biological needs and the social forces encountered in everyday life and its application over the entire life span. See the order in the following.

Psycho-Social Stage	Tasks or Crisis	Social Condition	Social Psycho-Outcomes
Stage I: Oral Sensory (Birth to 1 year)	Can I trust the world?	Support and provision of basic needs. Lack of support and deprivation.	Basic trust. Basic mistrust.
Stage II: Muscular Anal (2-3 years)	Can I control my own behaviour?	Permissiveness and support. Over protection and lack of support.	Autonomy. Shame and doubt.
Stage III: Loco motor (4-5 genital years)	Can I become independent of my parents by exploring my limits?	Encouragement to explore. Lack of opportunity to explore.	Initiative. Guilt.
Stage IV: Latency (6-11 years)	Can I master the necessary skills to adapt?	Adequate training and encouragement. Poor training and lack of support.	Industry. Inferiority.
Stage V: Puberty and (12-18 adolescence years)	Who am I? What are my beliefs and attitudes?	Internal stability and feedback, which is positive. Confusion of feedback and unclear feedback.	Personal Identity. Role confusion.
Stage VI: Young Adulthood	Can I give fully of myself to another?	Warmth and sharing. Loneliness.	Intimacy. Isolation.
Stage VII: Adulthood	What can I offer to succeeding generations?	Purpose-fullness and productivity. Lack of growth and repression.	Generativity. Stagnation.
Stage VIII: Maturity	Have I found contentment and satisfaction through my life's work and play?	Unity and fulfilment. Disgust and dissatisfaction.	Integrity. Despair.

III) Jean Piaget's (1896-1980) Development Stages: Piaget, a Swiss educator, observed children for about 50 years and wrote more than 20 books on the various aspects of development. He pointed out four stages of development as shown below.

Stage	Age/Periods	Characteristics
1) Sensory motor stage	Birth to 2 years	Manipulation of objects in the environment.
2) Pre-Operational stage	Between 2 to 6 years	Child begins to acquire vocabulary.
3) Concrete Operational stage	Between age of 6 and 11 or 12	Child learns to add, substract, multiply and divide.
4) Formal Operational stage	Between 11 or 12 to 14 or 15	The child begins to think logically.

Summing up: If we include the pre-birth period also, the life span or stages of development of human organism can be divided conveniently into the following stages.

S. No.	Name of the Stage	Period and Approximate Age
1)	Pre-natal (pre-birth) stage	From conception to birth.
2)	Infant Stage	From birth to 3 years of age.
3)	Childhood Stage:	From 4 to 12 years of age or to the onset of puberty.
	i) Pre-Childhood Stage	From 4 to 6 years of age.
	ii) Early Childhood Stage	From 7 to 9 years of age.
	iii) Later Childhood Stage	From 10 to 12 years of age.
4)	Adolescence	From the onset of puberty to the age 0f maturity– Generally 13 to 19 years of age.
5)	Adulthood	From 20 years of age or age of maturity until the age of productivity.
6)	Old age	From the end of the productivity till death.

It is observed that there is no rigidity in the above classification in terms of either the division of life span into stages or the duration of the period mentioned against each stage. There are great individual differences, and it should not presume that every child would necessarily have each stage according to the period indicative above. These are general generalizations drawn. Nevertheless, these generalizations indicate broad outlines of the course to be followed in the development of human organisms.

2.5 VARIOUS ASPECTS OF GROWTH AND DEVELOPMENT

If we use the term growth and development synonymously, the major aspects or areas in which a human child goes ahead for his complete development can be named as follows:

a) Physical development
b) Intellectual or Mental development
c) Emotional development
d) Moral or Character development
e) Social development

Let us now see what we understand by these different aspects of development.

a) Physical development: The physical development of the individual includes the development of his internal as well as external organs.

b) Intellectual or Mental development: It includes the development of intellectual powers like the powers of reasoning and thinking, imagination, concentration, creativity, sensation, perception, memory, association, discrimination, and generalization etc.

c) Emotional development: Under this aspect, starting with the basic instinct, the evolution of various emotions takes place, and also the emotional behaviour is developed to the point of emotional maturity.

d) Moral or Character development: Moral or character development include the evolution of moral sense and development of character. The individual develops his ethical and moral codes.

e) Social development: Initially, the child is selfish and anti-social. Gradually, he is developed into a social being by learning how to behave according to the rules and norms of his society, and by making adjustment to it.

2.6 PRINCIPLES OF GROWTH AND DEVELOPMENT

From the scientific knowledge gathered through observing children, some principles have emerged. These principles enable the parents and

the teachers to understand how children develop, what is expected of them, how to guide them and provide proper environment for their optimum development and so on.

- **Principle of Continuous Development:** First of all, development is a continuous process. Development follows continuity. It goes from womb to tomb and never ceases. An individual starting his life from a tiny cell develops his body, mind, and other aspects of his personality through a continuous stream of development in various dimensions.
- **Rate of Growth and Development is not Uniform:** Although development follows continuity, yet the rate of growth and development is not steady and uniform at all times. It proceeds more rapidly in the early years of life but slows down into later years of infancy. Again, at the dawn of puberty, there is a sudden rise in the speed of growth and development, but it is not maintained for long. Therefore, at no stage, the rate of growth and development show steadiness. It rather takes place by fits and starts.
- **Principle of Individual Difference:** According to this principle, there exist wide individual differences among the children with respect to their growth and development in various dimensions. Each child grows at his own unique rate.
- **Uniformity of Pattern:** Although development does not proceed at a uniform rate and shows marked individual differences, yet it follows a definite sequence or pattern somewhat uniform in the offsprings of a species. For example, all offsprings of human beings begin to grow from head downwards. Similarly, the motor development and language development in all children seems to follow a definite sequence.
- **Development Proceeds from General to Specific Responses:** In all phases of child's development, the general activity precedes specific activity. His responses are of a general sort before they become specific. For example, the boy waves his arms in general which is a random movement before he is capable of so specific a

response as reaching. Similarly, when a newborn infant cries, the whole of the body is involved. With growth, crying is limited to the vocal cords, eyes etc. In language development, the child learns general words before specific. He uses the word daddy in greeting many men, and it is only afterwards that he uses it for his father.

- **Principle of Integration:** Where it is true that development proceeds from general to specific or from whole to parts, it is also seen that specific responses or part movements are combined in the later process of learning or development. "Development" as Kuppusuwamy observes, "thus involves a movement from the whole to the parts and from the parts to the whole." It is the integration of whole and its parts as well as of the specific and general responses that make a child developed satisfactorily in the various dimensions of his growth and development.
- **Principle of Interrelation:** The growth and development in various dimensions like physical, mental, social etc. are interrelated and interdependent. Growth and development in any one dimension affects the growth and development of the child in other dimensions. For example, children with the above-average intelligence are generally found to possess above-average physical and social development. The asset of growth in one dimension diminishes the bright possibility in other dimensions. That is why, the child having poor physical development tend to regress in emotional, social and intellectual development.
- **Development is Predictable:** With the help of the rate of growth and development of a child, it is possible for us to predict the range within which his mature development is going to fall. For example, X-rays of the bones of the wrist of a child will tell approximately, what his ultimate size will be. Similarly, the knowledge of the present mental ability of a child will help in predicting his ultimate mental development.
- **Principle of Interaction of Heredity and Environment:** The individual is the product of interaction between his heredity and

environment. However, genes are important in determining the rate and quality of his growth and development, his social and cultural environment, physical surroundings and the emotional climates will have their own impact.

- **Principle of Interaction of Maturation and Learning:** Growth and development occur because of both maturation and learning. Maturation refers to change in a development organism due to the unfolding and ripening of abilities, characteristics, traits and potentialities present at birth. Learning denotes the changes in behaviour due to training and/or experience. Maturation and learning are interacting.

2.7 EDUCATIONAL IMPLICATIONS OF THE PRINCIPLES OF GROWTH AND DEVELOPMENT

The above-mentioned principles of growth and development carry wide educational meaning for the children, parents and the teachers. It can be explained in the following ways:

- Knowledge of the principles of growth and development tells us that there are wide individual differences among the children with respect to their rate of growth and development. Therefore, we must pay attention to their individual pattern and growth rate while planning the course for their education and development.
- Its knowledge helps us to know what to expect and when to expect from an individual child with respect to his physical, mental, social development etc. at different stages of development. The correct knowledge of the growth trend of a child helps the parents and teachers not to under or over-estimate the future competency or expectancy of their child.
- It helps us to know the direction as well as the general pattern of development. It guides us to locate the degree of abnormality in our children and students and to take like-wise remedial steps. The knowledge that development starts from whole to parts, and then

from parts to whole, helps us to plan the learning procedure and set the learning methods accordingly.

- Principles of inter-relation and interdependence of the various aspects of growth and development help us to aim for the harmonious growth and development of the personality of the child, and warn us not to develop a particular aspect at the cost of one or the other.
- The knowledge of the uniformity of pattern with respect to growth and development makes it possible for the parents and teachers to plan ahead of time for the changes that will take place in their children. Children will also get benefitted if they can be acquainted with these changes before hand.
- The knowledge that heredity and environment both play a joint role in the process of growth and development helps us to pay sufficient attention over the environmental conditions in upbringing the children.

In this way, the knowledge of the principles of growth and development helps much in the well-being of the youngsters.

LET US KNOW

The changes which cover physical, emotional, intellectual, and social aspects of a human life are roughly divided into four major classes by Mrs. Hurlock:

i) Change in size
ii) Change in proportion
iii) Disappearance of old features
iv) Acquisition of new features

Various aspects of growth and development are:

- Physical development
- Intellectual development or Mental development
- Emotional development
- Moral or Character development
- Social development

CHECK YOUR PROGRESS

Q.3: Write two principles of growth and development.

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Q.4: Who made the earliest effort at marking out the stage of development?

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2.8 LET US SUM UP

- Development of proper attitudes, habits and patterns of behaviour formed during the early years determines, to a great extent, how successfully an individual will adjust himself, as he grows older. It is, therefore, imperative that the teachers who are charged with the responsibility of the development of the child should be acquainted with the meaning and characteristics of development.
- According to J. E. Anderson (1950), "Development does not consist merely of adding inches to one's height or improving one's ability. Instead, development is a complex process of integrating many structures and functions."
- Growth refers to change in size. Maturation involves qualitative change. Development involves a series of progressive, orderly, and meaningful changes leading to the goals of maturity. Usually, growth

contributes to development but not always. A person can develop even after physical growth ceases and maturity is attained.

- Various aspects of Growth and Development are: Physical development, Intellectual or Mental development, Emotional development, Moral or Character development and Social development.
- The Principles of growth and development are: Principle of continuity, Rate of growth and development is not uniform; Principle of individual differences, Uniformity of Pattern, development proceeds from General to specific responses, Principle of integration, Principle of Interrelation, Development is predictable, Principle of Interaction of Heredity and Environment, Principle of Interaction of Maturation and Learning.

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2.10 ANSWERS TO CHECK YOUR PROGRESS

Ans. to Q. No. 1: According to J. E. Anderson (1950), "Development does not consist merely of adding inches to one's height or improving one's ability. Instead, development is a complex process of integrating many structures and functions."

Ans. to Q. No. 2: True

Ans. to Q. No. 3: Principle of Continuous Development: First, development is a continuous process. Development follows continuity. It goes from womb to tomb and never ceases. An individual starting his life from a tiny cell develops his body, mind and other aspects of his personality through a continuous stream of development in these various dimensions.

Rate of growth and development is not uniform: Although development follows continuity, yet the rate of growth and development is not steady and uniform at all times. It proceeds more rapidly in the early years of life, but slows down into later years of infancy. Again, at the dawn of puberty, there is a sudden rise in the speed of growth and development but it is not maintained for long. Therefore, at no stage, the rate of growth and development show steadiness. It rather takes place by fits and starts.

Ans. to Q. No. 4: Rousseau made the earliest efforts at marking out the stages of development.

2.11 POSSIBLE QUESTIONS

A) Short Questions (Answer each question in about 150-300 words)

Q.1: What do you understand by terms like growth and development? Explain.

Q.2: Bring out the differences between growth and development.

Q.3: Explain the four basic elements of development.

Q.4: Identify some characteristics of development.

B) Long Questions (Answer each question in about 300-500 words)

Q.1: Describe the various principles of development.

Q.2: Explain the educational implications of the principles of growth and development.

Q.3: What are the main stages of an individual's development? Give a satisfactory division of human life span into the most accepted stages of development.

Q.4: Discuss in brief the various aspects of human growth and development.

Q.5: Why should a teacher understand human growth and development? Critically explain.

Q.6: "Child not only grows but also develops into man." Explain.

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UNIT 3: LEARNING

UNIT STRUCTURE

3.1 LEARNING OBJECTIVES

After going through this unit, you will be able to–

- explain the meaning, definition, characteristics, nature and goal of learning;
- explore the various theories of learning– its characteristics, limitations and educational implications; and
- discuss Constructivism, its principles, and its importance in classroom interaction.

3.2 INTRODUCTION

Learning is a natural and common experience in life. Everyone loves to learn. All living creatures learn. Learning is the key process in the behaviour

of human beings. Generally, the learning process begins from the birth of a child and continues till death. The learning process begins consciously or unconsciously in the life of every living being from its very infancy. Learning may be described as a form of growth or change in a person, which brings a change or which modifies one's behavioural pattern. In Educational Psychology, learning is the most essential component. Educational Psychology is the study of human behaviour that can be modified through learning. The child starts learning as soon as he comes in contact with the environment. We come across this phenomenon in almost every walk of life. Learning situations are most natural and common in life, and everyone learn one thing or the other although they may not be aware of it. Actually, learning involves new ways of doing things. For example, a child touches a burning candle and gets burnt and withdraws. Another time, when he faces a burning thing, he takes no time to withdraw himself away. He learns to avoid not only the burning candle but also all burning things. Then, we say that the child has learned that if you touch flame, you get burnt. This unit is intended to provide the concept of learning along with its characteristics and nature, and the various theories of learning. The characteristics and limitations of each theory have been discussed in this unit along with its educational implications.

3.3 MEANING AND NATURE OF LEARNING

Learning occupies a very important place in our life. Most of what we do or do not do is influenced by what we learn and how we have learnt it. Learning, therefore, provides a key or structure to one's personality and behaviour. An individual starts learning immediately after his birth or in a strict sense even earlier when in the womb of the mother. Experience– direct or indirect– is found to play a dominant role in moulding and shaping the behaviour of the individual from the very beginning. While approaching a burning matchstick, the child gets burnt and he withdraws. The next time, when he faces a burning match stick, he wastes no time in withdrawing himself away. He learns to avoid not only the burning match stick but also all burning things. When this happens, we say that the child has learned that if

one touches a flame, one gets burnt. In this way, the behaviour of an individual is changed through direct or indirect experiences. This change in behaviour brought about by experience is commonly known as learning. In this way, the term learning broadly speaking, stands for all those changes and modifications in the behaviour of the individual, which he undergoes from his birth till death.

3.3.1 Definition of Learning

- Gardner Murphy defines learning as "The term learning covers every modification in behaviour to meet environmental requirements."
- Henry P. Smith: "Learning is the acquisition of new behaviour or strengthening or weakening of old behaviour as the result of experience.''
- Woodworth: "Any activity can be called learning so far as it develops the individual– (in any respect, good or bad) and makes him alter behaviour and experiences different from what that would otherwise have been.''
- Kingsley and Garry: "Learning is the process by which behaviour (in the broader sense) is originated or changes through practice or training.''
- Pressey, Robinson and Horrocks: "Learning is an episode in which a motivated individual attempts to adapt his behaviour so as to succeed in a situation which he perceives as requiring action to attain a goal".
- Crow and Crow: "Learning is the acquisition of habits, knowledge and attitudes. It involves new ways of doing things, and it operates on an individual's attempts to overcome obstacles or to adjust to new situations. It represents progressive changes in behaviour… It enables him to satisfy interests to attain a goal."
- Hilgard: "Learning is the process by which an activity originates or is changed through reacting to an encountered situation, provided that the characteristics of the changes in activity cannot

be explained on the basis of native response, tendencies, maturation, or temporary states of the organism (e.g. fatigue or drugs, etc.).''

The above definitions reveal the following facts about the meaning and nature of learning.

- **Learning as Adaption or Adjustment:** There is a constant interaction of an individual with his environment. Right from his birth, the individual is faced with the problem of making adjustment and adaptation to his physical as well as social environment. Learning is a proper means to achieve this end. Through a process of continuous learning as how to behave or respond to a particular situation, the individual prepares himself for necessary adjustment and adaptation. This is why; learning is so often described as a process of progressive adjustment to ever changing conditions, which one encounters.
- **Learning as Improvement:** Learning is often considered a process of improvement with practice or training. This means that all types of learning help the child in the path of its progress towards the desired ends or results. However, this is not always true. The child learns so many things in the classroom that did not at all help him to achieve his goal. The habits of idleness, disrespect towards the authority, truancy, developing poor handwriting, and defective pronunciation and exposition etc. are some of them. Therefore, it should be known clearly that learning does not necessarily imply improvement (with respect to the achievement of and end).
- **Learning as Development:** While defining learning as a process of development, it should never be confined to mean 'progress in right direction to achieve certain ends or results' as Woodworth clarifies in his definition. Because of learning, the pattern of development is free to move to either direction– positive or negative. It is no guarantee that individual will always pick up good knowledge, desirable habits, interests and attitudes. He

has equal chances to be drifted to the debit side of the human personality.

- **Learning and Behavioural Changes:** Whatever the direction of the changes may be, it is always true that learning brings progressive changes in the behaviour of an individual because of which the individual can adjust to the changing situation. Changes in the behaviour of an individual are not always brought and controlled by learning only. There are other factors like fatigue, drugs, illness, etc., which produce behavioural changes. However, the behavioural changes brought about by these factors are purely transitory in nature whereas the changes produced by learning (through experience and training) are relatively more enduring and stable.
- **Learning is Growth:** The word growth is generally associated with the body, which is growing, but through the mental growth of the learner. Although it is latent, yet we can perceive its growth. Through his daily activities, the child grows both mentally and physically. Therefore, we say that learning is growth through experience.
- **Learning is Organising Experience:** Learning is not mere addition to knowledge. It is not mere acquisition of facts and skills through drill and repetition. It is the reorganization of experience.
- **Learning is Purposeful:** All true learning is based on purpose. Purpose plays a big role in learning. According to Ryburn, "This purpose is always connected with the use of some instinctive power, with the use of the energy with which we are endowed with birth." We do not learn anything and everything that comes in our way, in a haphazard manner. All school activities should be purposeful so that the child should feel real urge for learning.
- **Learning is Intelligent:** Meaningless efforts do not produce permanent result. Any work done mechanically is without any soul. When a child learns something unintelligently, he is likely to forget it very soon. He does not assimilate but simply commits to memory. Only efforts made intelligently have lasting effects.

- **Learning is Active:** Learning does not take place without a purpose and self-activity. In the teaching-learning process, the activity of the learner counts more than the activity of the teacher. The principle of learning by doing is the main principle, and it has been recommended by all modern educationists. It is the basis of all progressive methods of education such as the Dalton, the Project, the Montessori and the Basic.
- **Learning is both Individual and Social:** Learning is more than an individual activity. It is a social activity also. The individual mind is affected by the group mind consciously as well as unconsciously as individual influenced by his friends, relatives, classmates, parents, etc., and learns their ideas, feelings, and notions. Social agencies like the family, church, film and gangs of playmates have a tremendous influence on the child and are always moulding and remoulding him.
- **Learning is the product of the Environment:** The **e**nvironment plays an important role in the growth and development of the individual. Therefore, the environment should be healthy and rich in educative possibilities.
- **True Learning affects the Conduct of the Learner:** There is a change in the mental structure of the learner after every experience.

3.3.2 Goals in Learning

Goals in learning can be classified in three broad categories– (i) Acquisition of knowledge (ii) Acquisition of skills (iii) Acquisition of attitudes and ideals.

i) Acquisition of Knowledge includes–

(a) Perception (b) Conception (c) Associative learning.

a) *Perception:* Perception refers to the acquisition of specific knowledge about objects or events directly stimulating the senses at any particular moment. An object comes before our sense organs. We get its sensation and attach meaning to it on the basis of our past experience. This is called

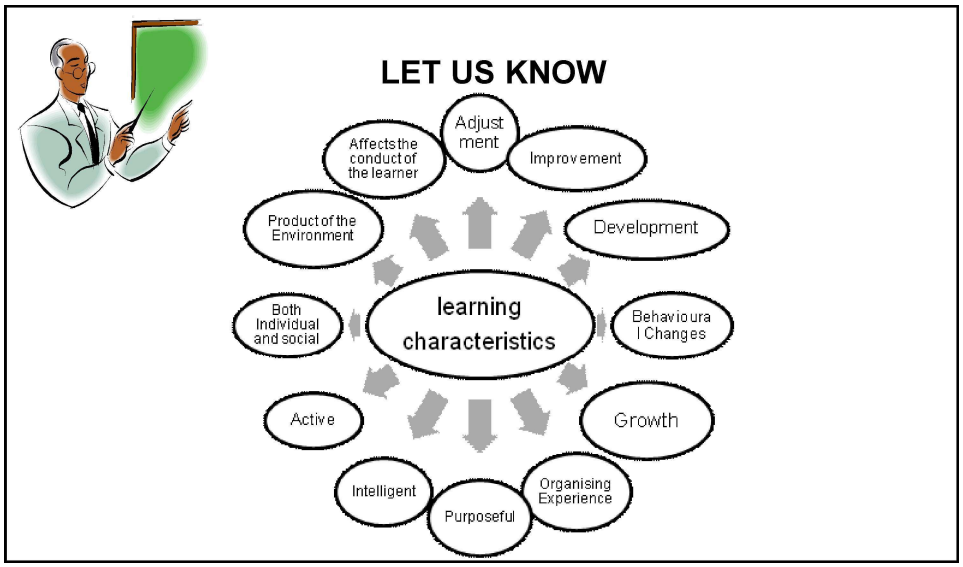
perception and the type of learning is known as perception learning. An infant sees a woman. In the past, the woman has fed him. On the basis of that experience, he comprehends that the woman is his nurse or mother.

b) *Conception:* Conception means the acquisition of organized knowledge in the form of general ideas or concepts. Percept refers to an individual or specific situation and concept to general or universal. The child gets the perception of an apple, banana, orange, etc., and is able to locate certain general qualities in them. On the basis of these qualities, he forms a conception of fruit.

c) *Associative Learning:* Associative learning corresponds to memory, both as the deliberate recall and recognition, past experience, and a habit or automatic memory due to association. Associative learning is fundamental to all other learning.

ii) **Acquisition of Skills:** This includes the sensory-motor processes– writing, reading, musical performance, language acquisition in its vocal aspect, art, drawing, handwork, etc.

iii) **Acquisition of Attitudes and Ideals:** This is present in the affective or feeling element. An ideal is a concept which is attached with some worth-while value.



CHECK YOUR PROGRESS

Q.1: Define Learning.

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Q.2: Mention two characteristics of learning.

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3.4 LEARNING AND MATURATION

Learning and maturation are closely interrelated and interdependent. Sometimes, it becomes difficult to determine definitely as to which of the behavioural change is the result of learning and which of the consequence of maturation.

A. Weismann (1889) gave the idea of maturation who considered the germ plasm as the carrier of heredity as passed from generation to generation. In recent years, particularly A. Gesell (1930), popularized this term. According to him, “Growth is a process so intricate and so sensitive that there must be powerful stabilizing factors, intrinsic rather than extrinsic growth trend. Maturation is in a sense a name for his regulatory mechanism.”

D. C. Marquis (1931) defined maturation in a more specific way. “Maturation is a modification of the organism pattern in response to stimuli present in the inter-cellular and intra-cellular environments, which at the given moment are independent of external influences.”

Later J. A. McGoeth (1942), defined maturation in terms of behaviour change, “Maturation includes any change with age in the conditions of learning which depends primarily upon organic growth factors rather than upon prior practice or experience.”

Learning has been defined by McGoeth as, “a change in performance as a function of practice. In most cases, if not in all this change has a direction which satisfies the current motivating conditions of the individual.”

L. Carmichael (1947) conducted extensive research on the problem of maturation– learning, and wrote, “Today it is becoming more and more clear that during the whole period of growth and even during maturity, and again especially in the decline of capacity in old age, the behaviour of an organism can always be seen as resulting from the changes, structure and function.” Further, he observed that these changes were practically the result of the inherited patterns and that some appeared to be somewhat independent of learning and environmental experience.

M. L. Biggie and M. P. Hunt (1968) wrote, “Maturation is a development process within which a person from time to time manifests different traits the *blueprints* which have been carried in his cells from the time of conception.”

George G. Thompson (1979) states, “Maturation is a name for the growth process during which a structure or a function is more and more becoming adult that is, mature.” Thompson further observes that these definitions stress different aspects of the maturation process, but are essentially similar in their emphasis on organically internal growth process, that are primarily independent of environmental factors external to the organism.

Thus, maturation involves changes that are associated with normal growth. It is relatively independent of activity, experience and practice.

Learning, on the other hand, is a change in the individual, which is not because of genetic inheritance. It is a process which takes place as a

result of 'stimuli' from 'without'. Activity, experience and training lead to changes in the behaviour in the process of learning.

The behaviour is stated to have matured if a behaviour sequence develops through regular stages, irrespective of intervening practices or training. If training procedures do not modify or speed up the behaviour, such procedures are not casually important and the changes do not classify as learning.

The swimming of tadpoles and the flying of birds can be attributed, primarily to maturation. However, in the case of human beings, it is not easy to decide whether the activities result from maturation or learning. The simplest example is that of a child. The child learns to talk only when he reaches a certain stage or age in maturation. It is also equally true that he does not learn the language just because he attains that age. The language is taught to him. The language which he learns is that which he hears. It is very clear that the two processes maturation and learning are closely related to each other. Maturation assists in the process of learning. Learning takes place only if the stage for that type of learning has been achieved through a process of maturation. A teacher would be effective if he understands the complexity of the changes that take place as a result of both processes and the interaction between the two. The reverse would be harmful. For instance, the normal development of speech in the child would be disrupted if a child were forced to learn certain speech patterns before certain maturation has occurred. On the other hand, the failure to provide specific training in speech at the appropriate time may be a great educational error.

Difference between Maturation and Learning:

Sl. No.	Maturation	Sl. No.	Learning
I)	Maturation is primarily based on heredity.	I)	Learning is primarily based on environment.
II)	Maturation is automatic process for behavioural change.	II)	Learning is planned process for the modification of behaviour.
III)	There is age-limit for the process of maturation.	III)	There is no age-limit for learning. Learning is a life-long process.
IV)	Maturation is related to the structure and potential capacity.	IV)	Learning is related to activities and experiences.

V)	Practice is not required for behavioural change.	V)	Practice is essential for behavioural change.
VI)	Motivation has no effect on maturation.	VI)	Motivation is essential for learning.
VII)	Maturation is influenced by racial differences.	VII)	Learning is influenced by psychological differences.
VIII)	Both suitable and unsuitable type of situations is used.	VIII)	Only conducive or suitable situations are used.

Relationship between Maturation and Learning:

Maturation and learning are not separate and distinct causes of development. Rather, they are closely inter-related, the one aiding or retarding the other. Maturation, which depends upon hereditary endowment, provides the raw material for learning and determines the more general patterns and sequences of individual's behaviour. However, without practice, development would not take place through maturation alone. It is wrong to presume that maturation is limited to the pre-natal and learning to the postnatal periods of individual's life.

There are certain phylogenetic functions which are common to the race, e.g., crawling, creeping, sitting, walking etc. They are mostly due to maturation and less due to learning. There are other ontogenetic functions which are due to the individual only e.g., swimming, cycling etc. They are mostly due to learning and less due to maturation. The following are the inter-relationship of maturation and learning:

- Individual differences in attitudes, interest, ambitions and personality patterns are not due to maturation alone, but due to maturation and learning. If development is the result of maturation alone, there would not have been individual personalities.
- Maturation sets the limits beyond which developments cannot progress even with the most favourable learning methods and the strongest motivation on the part of the learner (Gesell). The point has been stressed by Cattell and others when they said, "All learning and adjustment is limited by inherent properties of the organism."
- Inter-relationship between maturation and learning establishes a "timetable" for learning. The individual cannot learn until he is ready. Development readiness provides the "teachable moment" when the

task should be learned.

As Scott has pointed out, “Any attempt to teach a child or animal at too early a period of development may result in his learning bad habits or simply in his learning “not to learn” either of which results may greatly handicap him in later life.”

3.5 TYPES OF LEARNING

Learning, defined as a process of bringing relatively permanent changes in the behaviour of an organism, may be classified in a number of categories depending upon the domain or specific area of the behaviour in which changes are introduced or in terms of the methods or techniques that are employed for the introduction of behavioural changes.

If we follow the former criterion, the learning can be classified as verbal learning (involving verbal expression), learning of motor skills (such as walking, dancing, typing, swimming, etc.), affective learning (learning of habits, interest attitudes, appreciation, etc.) and cognitive learning (learning of concepts, principles, problem solving, etc.).

In the case of the latter criterion, we may categorize learning as trial and error learning, classical conditioning, operant conditioning, chain learning, shaping, learning through generalization, learning through discrimination, serial learning, associate learning, insightful learning, etc.

An alternative basis adopted by Gagne (1970) for classifying learning is worth mentioning. By taking into consideration a specific hierarchical order, he classified learning into eight types, namely, signal learning (classical conditioning), S. R. learning (instrumental and operant conditioning), chain learning, verbal associate learning, multiple discrimination, learning of concepts, multiple discrimination, learning of principles and problem-solving.

Many of these various types of learning are discussed somewhere in this unit at the proper place. However, a few are discussed below:

- **Verbal Learning:** Learning of this type helps in the acquisition of verbal behaviour. The languages we speak, the communication devices we use, are the result of such learning. Rote learning and rote memorization which is a type of school learning is also included

in verbal learning. Signs, pictures, symbols, words, figures, sounds and voices, etc., are employed by the individual as an essential instrument for engaging him in the process of verbal learning.

- **Motor Learning:** The learning of all types of motor skills may be included in such type of learning. Learning how to swim, riding a horse, driving a car, flying a plane, playing the piano, hitting a moving target, drawing a geometrical design, adding and multiplying long digits, performing experiments and handling various instruments are the examples of such learning. Acquisition of various skills through such learning helps in acquiring speed and accuracy in the field of operation of these skills, and it creates a sort of confidence in him to perform the task with great ease and satisfaction. The art of these skills can be acquired through a systematic and planned way of the acquisition and fixation of a series of organized actions or responses by making use of some appropriate learning methods and devices.
- **Concept Learning:** A concept in the form of a mental image denotes a generalized idea about the things, persons or events. For example, our concept of "tree" is a mental image that brings to us the similarities or common properties of all the different trees we know. We will call a thing tree which it has some specific characteristics, the image of which we have already acquired in our mind on account of our previous experience, perception or rich imagination. The formation of such concepts on account of previous experience, training or cognitive processes is called concept learning. Such type of concept learning proves very useful in recognizing, naming and identifying the things. All of our behaviour, verbal, symbolic, motor as well as cognitive, is influenced by our concepts. Thus what we do, say, understand, reason and judge is, to a great extent, controlled by the quality of our concept learning.
- **Problem Solving:** In the ladder of learning and acquisition of behaviour, problem solving denotes a higher type of learning. Such type of learning requires the use of the cognitive abilities like reasoning, thinking, power of observation, discrimination,

generalization, imagination, ability to infer and draw conclusions, trying out novel ways and experimenting, etc. Based on the grounds of earlier experiences, the effect of coaching, training, formal or informal learning and acquisition of knowledge, habits, attitudes, interests and learning sets, etc., an individual may be motivated to reach an unknown target or unfolding the mystery of an unresolved problem. How he can be trained to accomplish such a task in the function of problem-solving. This type of learning has essentially caused human beings to contribute significantly to the progress and improvement of society.

LET US KNOW

- Learning is the modification of behaviour by experience.
- Maturation is development of neuromuscular systems that allows behavioural improvement.
- Gagne classified learning into eight types, namely, signal learning (classical conditioning), S. R. learning (instrumental and operant conditioning), chain learning, verbal associate learning, multiple discrimination, learning of concepts, multiple discrimination, learning of principles and problem solving.

CHECK YOUR PROGRESS

Q.3: Maturation and learning is closely ..... (Fill in the blank)

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Q.4: Write three differences between learning and maturation.

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3.6 THEORIES OF LEARNING

What goes in the process of learning? How do we learn? How can a child learn to solve Mathematical problems? How does a girl learn to cook the food or sew the clothes? There are so many questions, the answer of which needs a thorough explanation of the phenomenon of learning. Psychologists have tried to perform experiments for throwing light on the phenomenon of learning and as a result have developed various learning theories. Each theory, with its systematic body of knowledge explains the nature and process of learning. These theories represent broad principles and techniques of learning. The set of rules and the laws of learning, having wide applicability, are drawn from these theories. In other sense, these theories also put forth various methods of learning, and suggest the teacher and learner to take proper steps for the effective learning.

Modern learning theories may be classified into two broad types, namely,

A) Stimulus response-associationist types of theories

B) Gestalt field or field cognition types of theories.

The former interprets learning in terms of the change in behaviour of the learner brought about by association of the response to a series of stimuli. The chief exponents of this type of theories are–Edward L. Thorndike (1874-1949); John B. Waston (1878-1958), and Evan Petrovich Pavlov (1849–1935). While the ideas and system propagated by Thorndike is called “Connectionism”, the system presented by Watson and Pavlov is known as conditioning.

The second type of theory looks upon learning as the change in the field consisting of the learner and environment, and the learner’s perception of the field. These theories emphasise the role of purpose, insight and understanding in the process of learning. The chief exponents of this type of theories are Max Wertheimer, Wolfgang Kohler, Kurt Koffka, and Kurt Lewin.

All these theories belonging to one or the other type represent the viewpoints, held by their propagators about the nature and process of learning. None of these theories is said to be complete in all aspects for

explaining the phenomenon of learning. Each one of them gives a partial description. For example, one theory is good in explaining the learning process in one situation while the others hold equally good in the other different situations. Therefore, it is essential to have a working knowledge of some important theories. These are:

3.6.1 Thorndike's Theory of Connectionism or Theory of Trial and Error

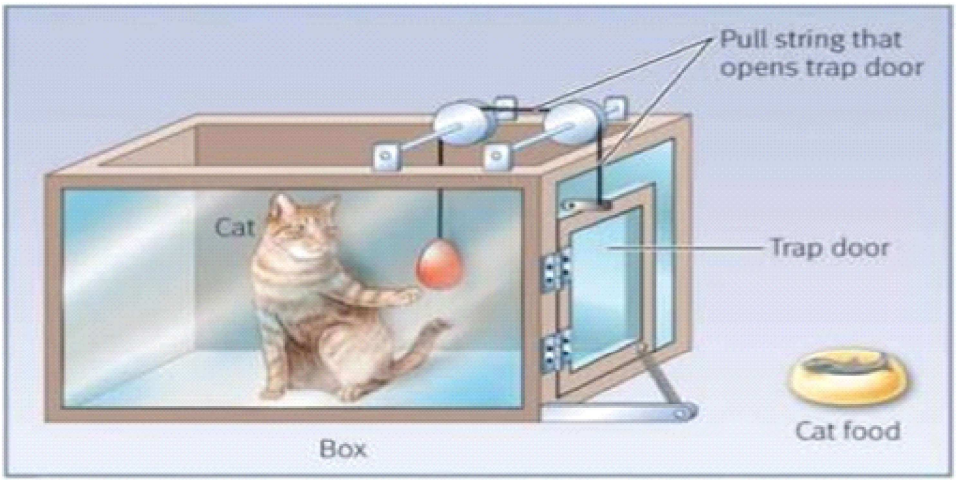
E. L. Thorndike (1874-1949) was the chief exponent of the theory of connectionism or trial and error. The basis of learning accepted by Thorndike is an association between the sense impressions and impulses to action. This association came to be known as a 'bond' or a 'connection'. Since, it is these bonds or connections, which become strengthened or weakened in the making called a 'bond' psychology or simply 'connectionism'. As it believes in stimulus and response type of learning, it is called S. R. Psychology of Learning. Thorndike called it learning by selecting and connecting. It is also known as trial and error theory as learning takes place through random repetitions.

Thorndike propounded his theory on the basis of the experiments conducted on cats, chickens, dogs, fish, monkeys and rats. He placed them under different learning situations and studied them carefully. With the help of these experiments, he tried to evolve certain laws and evolved his theory of connectionism or trial and error. It is interesting to know the type of experiments he performed with these animals. For illustration, below we narrate two of his experiments:

- He put a hungry cat in a puzzle box. There was only one door for exit which could be opened by correctly manipulating a latch. A fish was placed outside the box. The smell of the fish worked as a strong 'motive' for the hungry cat to come out of the box. Consequently, the cat made every possible effort to come out. The situation described by Thorndike himself is as– "It tries to

squeeze through every opening; it claws and bites at the bars or wires, it thrusts its paws through any opening and claws at everything it reaches". In this way, it made a number of random movements. In one of the random movements, by 'chance', the latch was manipulated. The cat came out and got its 'reward'.

- For another trial, the process was repeated. The cat was kept hungry and placed in the same puzzle box. The fish and its smell again worked as 'motive' for getting out of the box. It again made random movements and frantic efforts. But this time, it took less time in coming out. On subsequent trials such incorrect responses– biting, clawing and dashing were gradually diminished out and the cat took less time on every succeeding trial. In due course, it was in a position to manipulate the latch as soon as it was put in the box. In this way, gradually, the cat learned the art of opening the door.



An analysis of the trial and learning indicates the following characteristics:

- Where there is drive or motive, there is learning. In this experiment, the cat was hungry, so its motive was to get food by learning to come out of the cage.
- The organism makes a number of varied types of responses. The cat made these responses– clawing, scratching, walking around, pawing, pulling, etc.

- Some responses lead to the goal and they are known as satisfying responses. The response of pulling the strings, etc. by the cat was satisfying. Some do not lead to the goal and they are known as annoying responses. The responses of clawing, pawing, scratching, and walking were annoying for the cat.
- Satisfying responses become better learned as they lead to the attainment of the goal.
- Annoying responses tend to be eliminated gradually as they do not lead to the goal.

The experiment sums up the following stages in the process of learning:

- **Drive:** In the present experiment, drive was hunger and was intensified with the sight of the food.
- **Goal:** To get the food by getting out of the box.
- **Block:** The cat was confined in the box with a closed door.
- **Random Movements:** The cat, persistently, tried to get out of the box.
- **Chance Success:** Because of this striving and random movement, the cat, by chance, succeeded in opening the door.
- **Selection of Proper Movement:** Gradually, the cat selected the proper way of manipulating the latch out of its random movements.
- **Fixation:** At last, the cat learned the proper way of opening the door by eliminating all the incorrect responses and fixing the only right responses. Now it was able to open the door without any error or in other words, it learned the way of opening the door.

Thorndike named the learning of his experimental cat as "Trial and Error Learning". He maintained that the learning is nothing but the stamping in of the correct responses and stamping out of the incorrect responses through trial and error. In trying for the correct solution the cat made so many vain attempts. It committed errors and errors before getting success. On subsequent trials, it tried to avoid the erroneous ways and repeat the correct way of manipulating the latch. Thorndike called it "Learning by selecting and connecting"

as it provides an opportunity for the selection of the proper responses and correct or associate them with adequate stimuli. In this context, Thorndike wrote, "Learning is connecting. The mind is man's connection system." Learning is caused by the formation of connection in the nervous system between stimuli and response.

The following summary description of the behaviour of 12 cats ranging from 3 to 19 months of age in the puzzle box is quoted from Thorndike's book entitled, "*Animal Intelligence"* (1901). "When put into the box, the cat would show evident signs of discomfort and of an impulse to escape from confinement. It tries to squeeze through any opening. It claws and bites at the bars or wire; it thrusts its paws out through any opening and claws at everything it reaches; it continues its efforts when it strikes anything loose and shaky; it may claw at things within the box. It does not pay very much attention to the food outside, but seems simply to strive instinctively to escape from confinement. The vigour with which it struggles is extra-ordinary. For eight or ten minutes, it will claw, bite and squeeze incessantly. The cat that is clawing all over the box in her impulsive struggle will probably claw the string or loop or button as to open the door. And gradually, all the other non-successful impulses will be stamped out by the resulting pleasure, until, after many trials, the cat will, when put in the box, immediately claw the button or loop in a definite way."

On the basis of his experiments, Thorndike propounded the following laws of learning:

- **The Law of Readiness:** This law states, "When any conduction unit is ready to conduct, for it to do so is satisfying. When any conduction unit is not in readiness to conduct, for it not to do so is annoying." The law is indicative of the learner's state to participate in the learning process. According to Thorndike, readiness is preparation for action. Readiness does not come automatically with maturation. It is a law of preparatory adjustment, not a law about growth. Thorndike termed the neurons and synapses involved in establishment of a specific

bond or connection, a conduction unit. According to this law, for a conduction unit ready to conduct, to do, is satisfying and for it not to do so is annoying.

- **Educational Implications:** Teacher should prepare the minds of the students to be ready to accept the knowledge, skills and aptitudes. For this, he should provide opportunities for those experiences in which students can spontaneously participate. In other words, he should arouse their capacity to link the experiences with their everyday life. 'Simple to complex' is the important maxim. Aptitude tests may be given to the students to find out their readiness to learn.
- **The Law of Effect:** The law states, "Of several responses made to the same situation, those which are accompanied or closely followed by satisfaction to the animal will, other things being equal, be more firmly connected with the situation, so that, when it recurs, they will be more likely to recur, those which are accompanied or closely followed by discomfort to the animal, will, other things being equal, have 'their' connections with that situation weakened, so that, when it recurs, they will be less likely to occur. The greater is the satisfaction or discomfort, the greater is the strengthening or weakening of the bond." Thorndike explains the meaning of *satisfaction* and *discomfort* as, "By a satisfying state of affairs is meant one which the animal does nothing to avoid, often doing such things as attain and preserve it. By a discomforting or annoying state of affairs is meant one which the animal commonly avoids and abandons."
- **Educational Implications:** A pleasing environment should be created in the classroom. The teacher should be sympathetic but firm. He himself should enjoy his work. Experiences provided to the students should be satisfying and meaningful. They should be organized in the order of increasing difficulty. Material should be provided in a number of interesting ways including the use of audio-visual aids.

In simple words, the law of effect means that learning takes place properly when it results in satisfaction and the learner derives pleasure out of it. In the situation when the child meets a failure or gets dissatisfaction, the progress in learning is blocked. All the pleasant experiences have a lasting influence and are remembered for a long time, while the unpleasant ones are soon forgotten. Therefore, the satisfaction or dissatisfaction, pleasure or displeasure obtained as a result of some learning ensures the degree of effectiveness of that learning.

- **The Law of Exercise or Repetition.** It states, "Any response to a situation will, other things being equal, be more strongly connected with the situation in proportion to the number of times it has been connected with that situation and to the average vigour and duration of the connection." According to this law, the more a stimulus-induced response is repeated, the longer it will be retained. The law states, other things being equal, exercise strengthens the bond between situation and response. Conversely, a bond is weakened through failure to exercise it. Thus, the law has two sub-parts, (*i*) law of use, and (*ii*) law of disuse.

  Law of Use means, "When a modifiable connection is made between a situation and response that connection's strength is, other things being equal increased."

  Law of Disuse means, "When a modifiable connection is not made between a situation and response, during a length of time, that connection's strength is decreased.

  Educational Implications: More and more opportunities should be provided to the students to use and repeat the experiences they get in the classroom. Drill strengthens the bonds of S-R. Review of the lesson maintains connections.

- **Subordinate Laws:** Apart from the three laws explained above Thorndike gave the following subordinate laws:
  - **Multiple Response:** Confronted with a new situation the organism responds in a variety of ways before arriving at the correct response.

- **Attitude:** The learner performs the task well if he has his attitude set in the task.
- **Prepotency of Elements:** The learner reacts to the learning situation in a selective manner. He uses his insight, selects the prepotent elements in a situation and bases his response upon those elements.
- **Analog:** The organism responds to a new situation on the basis of the responses made by him in similar situation in the past. He makes responses by comparison or analogy.
- **Associative Shifting:** According to it, we can get any response, from the learner of which he is capable, associated with any situation to which he is sensitive.
- **Principle of Polarity:** It states that connections act more easily in the direction in which they were first formed than in opposite direction.

➢ **Educational Implications of Thorndike's Theory of Learning and Laws:** Thorndike's theory of trial and error and laws of learning have great educational significance. Thorndike's findings have made the learning purposeful and goal-directed. There is no doubt that many discoveries and inventions in various fields of knowledge are the results of trial and error. However, at the same time, it must be recommended that in the case of human beings, trial and error is not always devoid of thinking and understanding. Trial and error, coupled with insight will make the process of learning more effective. Important educational implications are:

- According to Thorndike, readiness is preparation for action. It is very essential for learning. If the child is ready to learn, he learns more quickly, effectively and with greater satisfaction than if he is not ready to learn. He warns us to make the child learn till he is ready to learn and also not to miss any opportunity of providing learning experiences if the child is, already prepared to learn. The right movements

concerning the learning situation and the learner's state of mind should be very well recognized and maximum use of this knowledge should be made by the teacher. He should also attempt to motivate the students by arousing their attention, interest and curiosity.

- The law of effect emphasizes the role of rewards and punishment in the process of learning. Getting reward because of some learning motivates and encourages the child to proceed on the same path with more intensity and enthusiasm while the punishment of any sort discourages him and creates distaste and distraction towards the learning.
- The main task of the teacher in the teaching-learning process is to see what generalizations, principles, etc., he likes his students to remember or forget. Consequently, he must try to strengthen the bonds or connection between the stimuli and the responses of those things, which are not to be remembered. This could be done through drill, repetition and reward. For forgetting, he should make attempts to weaken the connections through disuse and annoying elements.

Thorndike's theory and laws also imply the following:

- Mere repetition is of no use. Repetition becomes useful when the response is rewarded. In the case, repetition strengthens the connections.
- Understanding goes out of previous experience. The best way to develop understanding is to develop a body of connections appropriate to that understanding.
- Transfer in learning takes place because of identical elements in the two situations.
- Rewards have more strengthening effect than the corresponding weakening effect of punishment.
- Forgetting takes place because of the law of disuse.
- The child should be encouraged to do his work independently.
- Thorndike has given five aids to improve learning. They are:

I) Interest in the work.

II) Interest in improvement.

III) Significance of the work.

IV) Adventives.

CHECK YOUR PROGRESS

Q.5: What do you mean by satisfaction and discomfort according to Thorndike?

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Q.6: Who wrote the book "Animal Intelligence"?

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Q.7: Mention two sub parts of the law of exercise.

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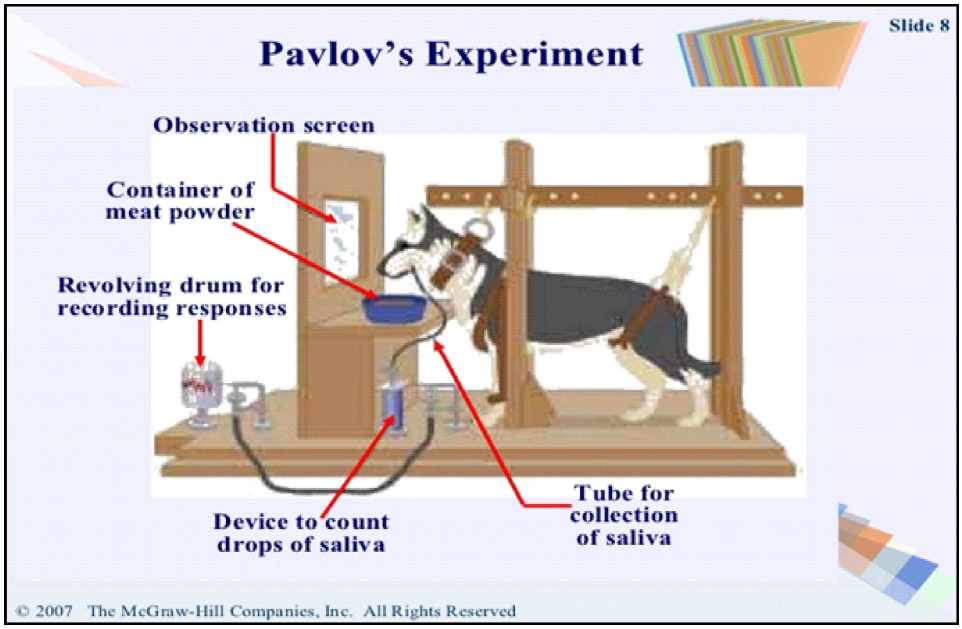
3.6.2 Pavlov's Classical Conditioning Theory of Learning

Ivan P. Pavlov (1849-1936), a Russian psychologist was the discoverer of classical conditioning theory of learning. He won Novel Prize in 1904 on his research on the digestive process. He was basically interested in studying the process of gastric secretion in dogs. His finding brought about a revolutionary change in the field of learning. Conditioning is the modification of the natural response. By conditioning, Pavlov modified the behaviour of the dog on which he experimented. Now, we modify the behaviour of the learner in such a way as the response originally connected with a particular stimulus comes to be aroused by a different stimulus. The classical experiment conducted by Pavlov will make clear the process of conditioning.

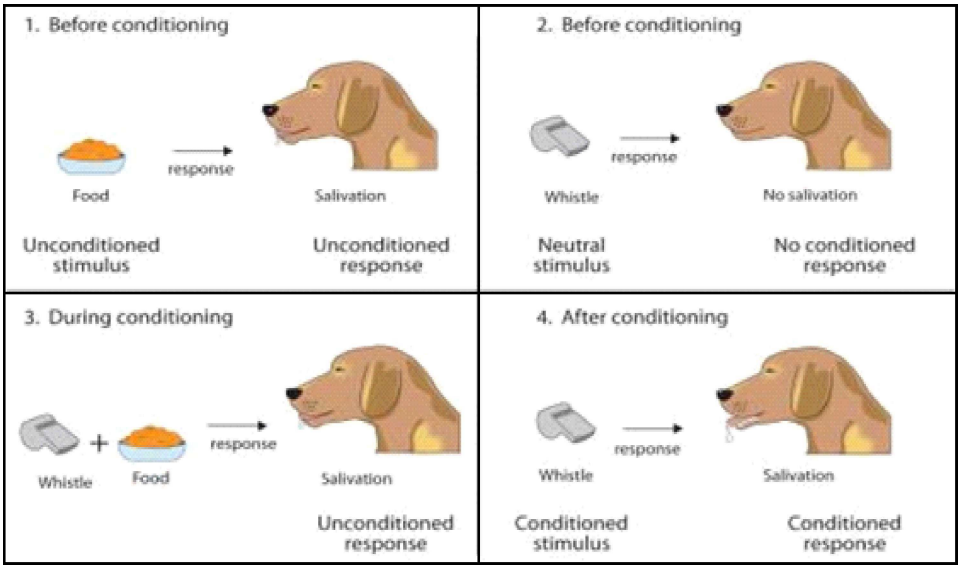
Pavlov's Experiment: In one of his experiments, Pavlov kept a dog hungry during the night and then tied him on the experimental table, which was fitted with certain mechanically controlled devices. The dog was made comfortable and distractions were excluded as far as possible. The observer (Pavlov) kept himself hidden from the view of the dog but was able to view all the movements of the dogs by means of a set of mirrors.



Arrangement was made to give food to the dog through automatic devices. Simultaneously, with this act of offering the food to him, a bell was rung. It was natural that the dog secreted saliva when he saw the food. The saliva went into the tube and it was measured. The experiment went on for some days. After that, the bell was rung one day, but no food accompanied it. The dog secreted the saliva even then. It was observed that the saliva went on coming in the same quantity with the ringing of the bell for some days. The actual stimulus to bring forth the response, i.e., the secretion of saliva, was the sight of the food but it was conditioned in such a way that another stimulus which ordinarily had nothing to do with secretion of saliva began to stimulate it.

Food is the 'natural stimulus' as it motivates the dog to respond. His response is secretion of saliva. Ringing the bell is an

'artificial stimulus', also called 'conditioned stimulus'. The response of the dog when the bell rung is called a 'conditioned response'. Conditioning is thus the modification of the natural response. The abbreviations used are: NS for Natural Stimulus, CS for Conditioned Stimulus, NR for Natural Response and CR for Conditioned Response.



In this experiment, the dog learned to secret saliva at the sound of the bell. This kind of learning was named as Learning by Conditioning.

The experiment was conducted in a windowless soundproof room in order to minimise the effects of extraneous stimuli on the subject.

An apparatus was used to measure the number of drops of the saliva secreted as well as the total amount in cubic centimetres.

Principle of Conditioning: For explaining his theory, Pavlov has given some principles of conditioning.

Principle of Reinforcement: The term reinforcement refers to the following conditioned stimulus by the unconditioned stimulus, i.e., food following the bell. Pavlov stated that it was only reinforcement that led to the conditioning. Without reinforcing the bell with meat, no conditioning could be developed– this was reinforcement. This is applicable to children also. Children's learning becomes effective

when they are rewarded immediately after they perform well. Their behaviour is conditioned with reinforcement. Quite often, the unconditioned stimulus reduces a drive or tension. Thus, the term reinforcement has also come to mean reduction in drives or tensions.

Principle of Sequence and Time Intervals: There is an optimal time between the presentation of the conditioned stimuli and the unconditioned stimuli. If there is any variation, i.e., increase or decrease in the optimal time, then there is no conditioning and bond cannot be formed.

Principle of Stimulus Generalisation: According to this principle, if we are conditioned to one thing, i.e., the bell, then we would be conditioned, more or less, to all sorts of bells. In the earlier stage of learning by conditioning, the animal responded to a number of stimuli, which accompanied the exact conditioned stimulus. The response is the greatest to the conditioned stimulus and goes on decreasing to other stimuli, which are less similar to the original one.

Principle of Differentiation: When two stimuli are sufficiently distinguishable, the organism can be conditioned to respond to one of them. This is done by regularly reinforcing one stimulus and non-reinforcing the other. The organism can be conditioned to react differently to the two stimuli, which at first make nearly the same response. This is how we learn to react differently to different brands of tea or coffee. However, in case the organism is pressed too far it causes experimental neurosis. In the laboratory, when the dog was made to discriminate between two very thin ellipses' it started howling at the experiments. It is clear that response to a particular stimulus can be achieved only through selective reward.

Principle of Extinction: If the sound of the bell is not followed by food, it implies that there is no reinforcement. A stage reaches when the dog stops to secrete saliva. This process is called as extinction. Pavlov noted in his experiments that when the spacing of test trials was increased, the response extinguished rapidly.

Principle of Spontaneous Recovery: The principle of spontaneous recovery explains that there is no complete extinction on account of

the time interval but there is inhibition of CR, when the dog is brought out of the experimental set-up and again put in the set-up after a lapse of time, the dog responds to conditioned stimulus (CS) by gastric secretion. This process is called spontaneous recovery.

Principle of Inhibition: Inhibition may be defined as a process in which a stimulus inhibits a response that would otherwise occur. Pavlov mentioned two types of inhibitions.

a) **External Inhibition:** Once the dog was conditioned, it was found not giving conditioned response in the presence of some stranger. Often, we come across cases when pupil-teachers fail to deliver a well-prepared lesson in the presence of their supervisors.

b) **Internal Inhibition:** Pavlov observed that if complete extinction of CR is obtained by not providing food to the dog and it is then given a period of 24 hours rest, CR will show spontaneous recovery when the dog is tested again. The extinction does not permanently weaken the CR. It was argued by Pavlov that spontaneous recovery proved that CR in extinction did not represent dying of the reflex or any real weakening of the learned SR connections. Some internal inhibitory process blocked it. For example, physical health of the organism or pre-occupation with some other activity etc. may block the response.

- **Principle of Higher Order Conditioning:** When conditioning is done to a new stimulus on the basis of a previous conditioned stimulus, it is designated as higher order conditioning. By this process, conditioning can be done by associating one stimulus with another. The process of conditioning becomes difficult if the process is carried too far.
- **Principle of Secondary Reinforcement:** Conditioned response is established to some stimulus other than the primary one, e.g., food elicited salivation. By repeated presentation, it was found that the sight of food led to salivation or a part response. It is called secondary reinforcement. Secondary reinforcement plays an important role in later

learning especially in the case of children when the reward may be no more than a kind word or some other gesture or some token reward

- **Principle of Age and Conditioning:** The process of conditioning is valuable at all ages but especially in early childhood.

Contribution of Pavlov's Theory of Conditioning to Learning and Classroom Implications: Pavlov's work on the laws of conditioning is considered a landmark contribution to educational Psychology. No learning theorist can ignore the technical and theoretical discoveries of Pavlov. Pavlov's work contributed most richly to the behaviouristic schools and systems of psychology, especially to those of Watson, Gurthie, and Hull and indirectly to Skinner. Pavlov explained learning in terms of physiological changing by adopting an objective method of study. Conditioning was accepted as theoretical framework and practical technique of solving a variety of applied problems. Most of the terminology used in learning was developed by Pavlov.

The principles of classical conditioning can be used in various areas of teaching learning in the classroom also.

A child learns through conditioning. A child who fears a particular object or subject can be made to seek pleasure from it. Through conditioning, we can dispel fear and hatred, and create love towards subjects. A teacher of English, with his defective methods of teaching or improper behaviour may be disliked by a particular student or a group of students. He may have developed the habit of rebuking children while returning the checked assignment or listening to their answers. Gradually, the students develop hatred for the subject as well as the teacher. On the other hand, a friendly and sympathetic teacher will have a positive impact on the students through the process of conditioning. The students develop positive attitudes towards the subject and the teacher.

The use of audio-visual aids in the teaching-learning process involves the conditioning theory. For instance, the teacher shows

the picture of a cow, along with the written word 'cow'. The teacher speaks out the word 'cow' and asks the students to say 'cow', every time the picture is presented. After some time, the picture of the cow is not presented. Only the written word cow is shown. But the child responds to it by saying cow. He associates the written word cow with the picture of the cow and the sound of the word.

Principles of classical conditioning are very helpful in developing good habits in children– habits of cleanliness, punctuality, respect for others etc. Bad habits can be eliminated through conditioning. Most of the learning is acquired in social environment. Principles of classical conditioning can be used to deconditioning bad habits like fear and anxiety in children. Classical conditioning can be used for developing favourable attitude to subjects, teachers and above all the school. The concept of reinforcement in classical conditions points out the need for immediate rewards. Pavlov's theory of conditioning is criticised on two grounds.

- All learning is not conditioning and on the other hand, it is an active process.
- Learning needs intelligence and understanding but conditioning ignores it by and large.

CHECK YOUR PROGRESS

Q.8: Mention three principles of conditioning.

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Q.9: Write about the process of conditioning.

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3.6.3 B.F. Skinner's Theory of Operant Conditioning

Skinner called his theory as Operant Conditioning, as it is based on certain *operations or actions,* which an organism has to carry out. The term 'operant' stresses that behaviour operates upon the environment to generate its own consequences. An operant is a set of acts which conditions and organism in doing something. In the process of operant conditioning, operant responses are modified or changed by reinforcement. Reinforcement is a special kind or aspect of conditioning within which the tendency for a stimulus to evoke a response on subsequent occasions is increased by reduction of a need.

Most S-R theorists have assumed the existence of a stimulus as a pre-requisite for evoking a response. In the absence of any external stimulus, they have assumed some internal stimuli for evoking the response. Skinner was against this "No stimulus–no response" theory and believed that most of the responses could not be attributed to the known stimuli. He defined two kinds of responses– the one elicited by known stimuli, which is called as respondent or reflexive behaviour and the other emitted by the unknown stimuli, which is called as operant behaviour.

Respondent behaviour is learnt according to Pavlovian model of conditioning. Since it is concerned with the stimuli, it is known as S-type conditioning. Skinner attaches greater importance to operant behaviour which is primarily concerned with response rather than stimuli, it is known as R-type conditioning. Out of many responses

which an organism is capable of giving, the problem with the experimenter is to evoke only the appropriate responses and fix them properly. Thus Skinner changed the usual S-R formula into an R-S formula.

Operations involved in Operant Conditioning: Several operations are involved in the process of operant conditioning. Some of the important operations are briefly described are as follows:

- Shaping (generalization, changing and habit competition.)
- Extinction.
- Spontaneous recovery.
- Concept of reinforcement.

- **Shaping:** Shaping is the most important mechanism used in operant conditioning. It refers to the judicious use of selective reinforcement to bring certain desirable changes in the behaviour of the organism. The basic process in shaping is successive approximation to the desired behaviour. The experimenter shapes or moulds the behaviour of the organism as clay is moulded by a potter in a definite form of a pot.
  - *Principles involved in shaping:* There are three important psychology principles which are involved in the process of successful shaping of behaviour. They are as follows:

  a) Generalization
  b) Habit competition
  c) Each segment in the chain must be linked to the other

- **Extinction:** It is permitting a behaviour to die out by not reinforcing it. This is known as external approach to motivation.
- **Spontaneous Recovery:** Extinction of a response may take place due to non-reinforcement or interference by incompatible responses, but recovery can be spontaneous recovery of the responses, which means extinction and not forgetting.
- **Reinforcement:** A reinforce is the stimulus whose presentation or removable increases the probability of a response. Skinner thinks of two kinds of reinforcers– positive and negative. A positive

reinforce is any stimulus the presentation of which strengthens the probability of a response. A negative reinforce is any situation the withdrawal of which weakens the probability of response. Any electric shock, a loud voice are negative reinforcers while food, water, etc., are positive reinforcers.

Skinner does not attribute motivation to internal process within the organism. He takes for granted the reinforcement of conditions in a common sense way for motivation. Food is reinforcing to a parrot or a pigeon. Knowledge of correctness is reinforcing to a learner in the school. Reward strengthens the behaviour, which preceded it, but punishment does not permanently reduce a tendency to respond. Extinction, permitting behaviour to die out by not reinforcing it, and not punishment, is the appropriate process for breaking habits. This is known as external approach to motivation.

Schedules for Reinforcement: As a result of this external approach, Skinner has worked out the following effective schedules of reinforcement:

- ***Fixed Internal Reinforcement***– Reinforcement is called fixed Internal reinforcement when it is given after a fixed interval of time.
- ***Fixed Ratio Reinforcement***– When reinforcement is given after a fixed number of responses, it is called fixed ration reinforcement.
- ***Variable-Interval Ratio Reinforcement***– When reinforcement is given on varying intervals of time or after a varying number of responses, it is called variable reinforcement.

Learning of a response takes place quickly if every correct response is reinforced, but it is forgotten easily when the reinforcement is stopped. If reinforcement is given after varying number of responses or a varying interval of time, the response is remarkably resistant to extinction

Two Types of Operant Reinforcements: There are two types of operant reinforcements– stimulus discrimination and response discrimination. Stimulus discrimination occurs when a given response is made to one member of a pair of stimuli and not to the

other member of the pair. Differentiation of a response occurs when the response form is adjusted or attested approximately to the situation.

Typical Problems in Learning Explained by Skinner's Theory:

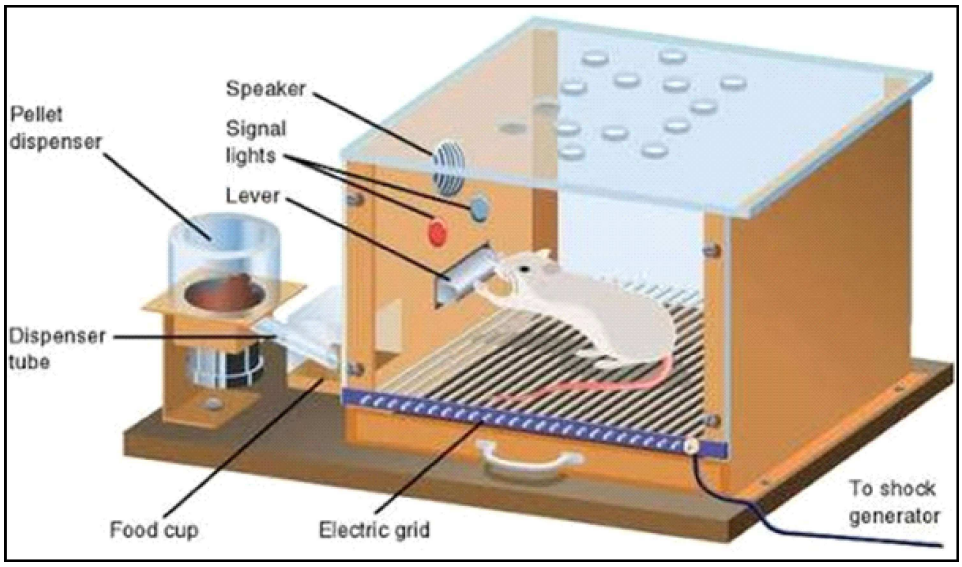
- **Capacity:** Differences in capacity have been attributed to the empirical constants, which are formed in Skinner's law, because the values of these constants vary from species to species.
- **Practise:** Skinner accepts something like a law of exercise for 'Type-S' conditioning and for 'Type-R' conditioning he favours repeated reinforcement. He emphasizes intermittent reinforcement as protection against extinction.
- **Motivation:** Reward increases the operant strength, while punishment has no corresponding weakening influence. Drive level also affects the role of responding.
- **Understanding:** Rapid learning, which has been identified with "insight" by Keller and Schoenfeld, depends upon– (1) Similarity of the problem to one solved earlier, and (2) Simplicity of the problem. Problem-solving is the process of manipulating variables to correct response. It does not involve originality.
- **Transfer:** Generalization, which Skinner calls induction, is the basis of transfer.
- **Forgetting:** There is no special theory proposed by Skinner for forgetting. Extinction of a response may take place due to non-reinforcement or interference by incompatible responses, but, there can be spontaneous recovery of the response also, which means that extinction is not forgetting. True forgetting is slow process of decay with time.

Skinner's Experiments: The early experimental work by Skinner was carried out with rats with pressing levers for food packets in a Skinner box. The experimental base of the analysis was gradually extended to other animals, to human and to situations and behaviours differing increasingly from the original base, i.e., to teaching machine. Entire Programmed Learning is based on Skinner's learning theory.

Skinner constructed a box and equipped it with a lever and a food tray. The lever could be pressed. Skinner placed a hungry rat in the box and the rat would wander over the bar from time to time and push the bar down. The moment it happened, a food pellet would fall into the tray. The rat learned this task of pressing the lever more frequently when the food pellet *reinforced the behaviour.* Skinner modified the procedure, food pellets would be supplied under certain conditions–when the lever was pushed down and a tone was sounded but not under other conditions. The rat generalized and pushed the lever when tone was sounded.

Skinner used pigeons also as subjects where the operant investigation was pecking at a spot that acted as a key to trigger the reinforcement. He also conducted experiments on human beings where the operant was problem-solving. For the pigeons, food was the reinforcement just as it was for the rat in the box. For the human subjects, it would be getting the right answer or a verbal expression of approval.

The first few reinforcements were relatively ineffective but later on the rats of response was extremely rapid.



Educational Implications of Skinner's Theory:

- Learning objectives should be defined very specifically in terms of behaviours.

- Objectives should be arranged in order of simple to complex.
- For developing motivation in the students for classroom work, reinforcers like praise, blames, grades, etc. should be used.
- Proper use of positive and negative gestures also serves as reinforcers to work.
- Reinforcers should be used periodically so that the possibility of extinction of the desired behaviour is resisted.
- In the classroom, the principle of immediacy of reinforcement is very important. Praise for a job done well given immediately can be a stronger reinforce or motivator than a grade given much later.
- Skinner's principles of learning focus attention on the individual's pace of learning. Teaching machines and the programmed learning system have been devised on the basis of the theory of learning founded by Skinner.

Limitations of Operant Conditioning:

- It is doubtful if the results derived from controlled experimental studies on animals would yield the same results on human beings in the social learning situations.
- It is argued that Skinner has ignored the structural and hereditary factors which are very important in the development of psychological process of language.
- The operant reinforcement system does not adequately take into account the elements of creativity, curiosity and spontaneity in the human beings.
- Skinner argues that all human behaviour is acquired during the life-time of the individual. Thus it gives no place to the importance of genetic inheritance.
- Skinner's theory of learning dehumanizes the learning process on account of its emphasis on the mechanization of the mental process.
- Operant theory of learning does not deal with the depth of mind and thus it is artificial in nature.

Comparison between Classical And Operant Conditioning:

Sl. No.	Classical Conditioning	Sl. No.	Operant Conditioning
i)	It was formulated by a Russian psychologist named Pavlov.	i)	It was formulated by an American psychologist Skinner.
ii)	Pavlov conducted experiments on dogs.	ii)	Skinner conducted experiments on rats and pigeons
iii)	It is called Pavlovian or type-1 learning (respondent).	iii)	It is called Skinnerian or type-2 learning (operant).
iv)	In classical conditioning, the occurrence of conditioned response is forced reflectively by unconditioned stimulus.	iv)	Response is more spontaneous and voluntary in operant conditioning.
v)	The unconditioned stimulus occurs irrespective of subject's behaviour.	v)	The reward is contingent upon the occurrence of response.
vi)	Classical conditioning is preparatory or anticipatory response. It is also called.	vi)	Operant conditioning serves mainly to stress or guide the learner that already has certain responses available.
vii)	The law of contiguity is the basis of association between stimulus-response (S-R).	vii)	The law of effect is the basis of association between stimulus response (S-R).
viii)	Automatic nervous system in the organism is the controlling authority.	viii)	Central nervous system is the organism is the controlling authority.
ix)	There is pairing of unconditioned stimulus and conditioned stimulus.	ix)	There is the pairing of a response and the reinforcing stimulus which follows. There is no pairing of unconditioned stimulus and conditioned stimulus.
x)	Bondage between specific unconditioned stimulus and conditioned stimulus is established.	x)	Tendency to respond in a specific manner is developed.
xi)	Reinforcement takes the first place in the Pavlov's experiment as food is presented first to the elicit the response.	xi)	Reinforcement comes after the response is made by the organism.
xii)	Conditioned stimulus and unconditioned stimulus can be placed in different temporal sequence. Close contiguity is followed.	xii)	Close contiguity is followed and response stimulus chain is formed.
xiii)	In classical conditioning, focus is on the single stimulus response bondage.	xiii)	Operant conditioning is concerned with the sequence of responses. A chain of response is formed leading to the desired goal.

xiv)	Regardless of the occurrence of conditioned response, we present the unconditioned stimulus.	xiv)	Stimulus is presented only if the organism makes the desired response.
xv)	Classical conditioning presents different pictures of behaviour and learning in which an arbitrary stimulus is associated with a specific elicitable response.	xv)	The operant conditioning deals with the differentiation and discrimination of a out of a mass behaviour emitted in response to a complex stimulus field.
xvi)	Classical conditioning lays stress on time control.	xvi)	Operant conditioning lays stress on motivation and reward.
xvii)	Stimulus substitution is the essence in learning.	xvii)	Response-modification is the essence in learning.
xviii)	Initially the classically conditioned reflexes.	xviii)	The operant conditioning cannot have zero strength as it has to occur once at least before it can be reinforced.
xix)	Respondent behaviour is internal.	xix)	Operational behaviour is external. The organism operates on the environment.

LET US KNOW

Prof. Skinner started his research work on behaviour while he was graduated in the Department of Psychology of the Harvard University. In 1931, he wrote his thesis entitled, *The Concept of the Reflex in the Description of the Behaviour*. Thereafter, in the middle of the forties, Skinner conducted a good deal of research at the Minnessota and Indian Universities, on the theory of operant conditioning. Skinner was a practical psychologist who conducted several experiments on rats and pigeons. He popularized 'teaching machines' in learning in 1954. His important publications are: *The Behaviour of Organism* (1938); *Science and Human Behaviour* (1953); *Verbal Behaviour* (1957); *Cumulative Record* (1959); *Beyond Freedom and Dignity* (1971) *and About Behaviourism* (1974).

CHECK YOUR PROGRESS

Q.10: What is reinforcement?

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Q.11: Write the meaning of Operant Conditioning.

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Q.12: What is the most important contribution of this theory in educational practice?

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3.6.4 Gestalt Theory of Learning by Insight

The Gestalt theory of learning, also named as *Learning by Insight,* is the contribution of the German psychologists who were studying the nature of perception. Max Wertheimer (1880-1943) was the founder of Gestalt psychology. He did a lot of research work at the University of Frankfurt and the University of Berlin. Thereafter, he worked at the New School of Social Research in New York city. Wolfgang Kohler and Kurt Koffka were the other German psychologists associated with Wertheimer. Gestalt Theory of Learning (Learning by Wholes) or Learning by Insight states that perceptual phenomena are only experienced as *wholes* or Gestalts.

Learning according to Gestalt Theory, is not by random steps, not by trial and error, not by conditioning but by insight, introspection and understanding. The Gestaltians tend to place far more emphasis on the intrinsic organizing capacity in the brain of the individual and

emphasise the dynamic interaction of the elements in the entire perceptual field. Gestalt theory of learning essentially consists in problem-solving by understanding the relative position of the elements in the entire perspective or situation.

"Gestalt" is a German word for which there is no equivalent English word. The term was carried out into English psychological literature. The nearest English translation of Gestalt is 'configuration' or more simply 'an organized whole in contrast to collection of parts'. Gestalt psychologists consider the process of learning as a Gestalt– an organized whole. A thing cannot be understood by studying its constituent parts, but only by studying it as a totality, is a basic idea behind this theory.

Gestalt School makes a strong attack on Thorndike's Theory of 'trial and error' and asserts that learning is not stamping of correct responses through trial and errors. The behaviourists approach to learning is also not acceptable to Gestaltist as they want to study behaviour as a whole and learning in its totality.

Gestalt psychology is a revolt against S.R. approach to learning. It points out two weaknesses in the theory of conditioning:

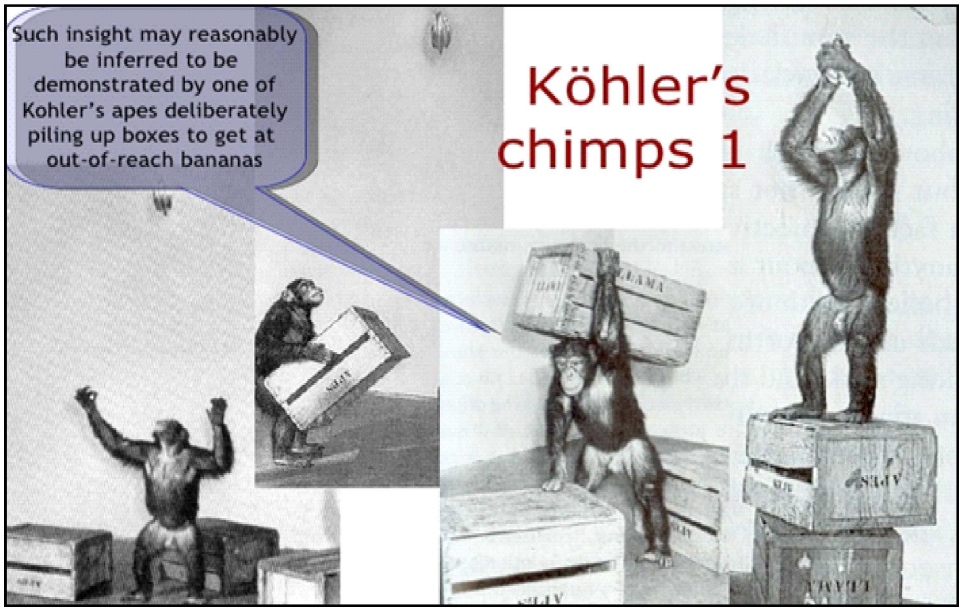
i) Conditioning reduces complex human behaviour to an accumulation of simple conditioned responses.
ii) S.R. theorists attribute learning to reduction of basic organic drives.

Gestalt psychology is primarily concerned with the nature of perception. According to it, an individual perceives wholes and not parts. Learning is viewed as purposive, explorative, imaginative, and creative enterprise in which the total situation is taken into account by the learner. Kohler and Koffka conducted many experiments on Chimpanzees and brought out a book, '*Mentality of Apes*' in 1925 (result of the experiments conducted during 1913-17). These experiments show that learning was not the result of trial and error but of insight and the ability to see relationships between various factors involved in a situation.

A very detailed and systematic treatment of learning from Gestalt view-point is found in Koffka's *Principles of Gestalt Psychology* (1935). As mentioned earlier, Kohler and Koffka were the chief exponents of this theory. They stressed the totality of the process of learning. They took the process of learning as a synthetic activity, which brings forth complete solutions of problems.

Experiment 1:

In one of his experiments, Kohler shut the chimpanzee, Sultan by name, in a big cage. A banana was placed outside, at a considerable distance of the cage. Inside the cage there were two sticks– one of them a long one and the other a bit shorter. The shorter stick could be screwed into the long one. The long stick could not reach the banana but if the other one was screwed into it, the banana could be touched. Sultan tried to get at the banana. He tried the long stick but it does not reach the fruit. The other was still smaller. He sat down and began to play with the sticks. But he is still brooding over the matter. Suddenly, an idea flashed to him. He thrust the smaller stick into the hole of the longer one and thus managed to get at the banana with the help of the combined sticks.



Experiment 2:

In this experiment, the chimpanzee was shut up in a room with unscalable walls. A banana was hanging with the ceiling. The

animal was hungry. He jumped at the fruit but it was too high. He left the efforts and sat down. There was a box lying in the corner of the room. The animal began to play with the box. He then suddenly got up and pushed the box to the centre of the room below the banana, jumped from it and got the fruit.

Principles of learning: Koffka suggested that the laws of perception were equally applicable to learning. A learning situation is a problem situation and the learner has to see the problem as a whole and find its solution by insight. The law of organisation of perception as applicable to learning is the law of Pragnanz and four laws of organisation subordinate to it –the laws of similarity, proximity, closure and good continuation.

The Law of Pragnanz: The German word "Pragnanz" means 'compact but significant'. The law suggests the direction of events. Psychological organisation tends to move in one general direction, always towards the state of Pragnanz, towards good gestalt. A good gestalt has the properties as regularity, simplicity, stability, etc. Therefore, this law speaks of the movement of our psychological organisation towards the direction of stability i.e., we accept only those experiences which do not disturb our psychological organisation (equilibrium). How good the Pragnanz is, is examined by the following subordinate laws:

The Law of Similarity: This law says, "other things being equal, the stimuli that are more similar to one another will have greater tendency to be grouped." Thus learning similar things is easier than learning dissimilar things.

The Law of Proximity: According to this law, "perceptual groups are favoured according to the nearness of the parts." This means that we perceive all closely situated or located things as groups.

The Law of Closure: This law states, "closed areas are more stable than unclosed ones and therefore more readily form figures in perception." It is similar to the Thorndike's law of effect. Unless the work is finished the individual does not feel satisfied.

The Law of Good Continuation: This law states "organisation in perception which appears to go in a particular direction appears to be going infinitely in the same direction." So there is a tendency of factors to give direction, movement and continuation to perceptual organisation. Koffka believes in the trace and create new ones. The essential features of the trace theory are:

i) Trace is the result of experience so that it represents past in the present.
ii) The present process can select, reactivate or communicate with the trace.
iii) There is a resulting new process of recall or recognition.

Factors upon which Insights depends on the following points:

- The learner perceives the situation as a whole.
- The learner tries to understand the relationship between various factors involved in a situation.
- As a result of the understanding the relationship, the learner is helped in the sudden grasping of the solution of the problem.

Overall, insight depends upon the following factors:

i) *Experience*– Past experience assist in the insight of the problems.
ii) *Intelligence*– Basic intelligence of the learner is an important factor in insight learning.
iii) *Learning Situation*– As a common observation insight occurs when there is ample scope for observation in a learning situation.
iv) *Initial Efforts*– The initial efforts in the form of trial and error open the way of insight learning.
v) *Reception and Generalisation*– Learning gained in one situation helps the learner to react insightfully in other identical situations.

The distinctive criteria for insightful solution are given by Yerks (1927) as:

a) Survey of the problem followed by critical solutions.
b) Repetition of the solution after a single critical solution.

According to Werthemier, insight can be developed by productive thinking. Productive thinking helps in the systematic solution of the problem in line with the truth structure of the situation.

Gestalt Theory and Problems of Learning: The following points deserve special attention.

- *Capacity*– Learning depends upon learning capacities of the learner.
- *Practice*– Repetitions bring to light new relationships and consolidate trace systems.
- *Motivation*– Law of effect is recognised in motivation.
- *Understanding*– The relationship between parts and wholes, and means and ends are emphasized.
- *Transfer*– Generalized principles, common patterns and relationships are transferred.
- *Forgetting*– Forgetting takes place because of changes in the trace. Trace may completely disappear or they may not be available at a particular time.

Educational Implications of the Theory of Insight: The Gestalt theory brings the following points into focus.

- **From whole to Parts:** The whole is greater that the parts. Therefore, the teachers should present the picture of a topic or subtopic as a whole. It is especially more important in the case of small children. While teaching the topic *parts of a flower,* the flower should be presented before the students and thereafter the parts should be taken up. Similarly, the *whole* poem may be taken up as a whole.
- **Problem-Solving Approach:** The theory rejects memorisation and rote learning. It stresses that the learners must be given opportunities for using their thinking power and power of observation. The students should be placed in the position of discoverers. They should be provided training, to ponder over questions. *Why* and *How* in place of *What* and *When* should be the keynote of the teaching-learning process. Spoon-feeding in no way results in constructive and creative thinking. Progressive and scientific methods like Heuristic, analytical and problem-solving should be made use of.

- **Integrated Approach:** The contents of a subject should not be treated as the mere collection of isolated facts. They could be closely integrated into a *whole.* In the same way, all subjects and activities of the curriculum should reflect unity and cohesion.
- **Motivation Aspect:** The child's curiosity and interest must be aroused. He should be fully familiarised with the specific aims and purposes of every task that is being undertaken.

Limitations of the Theory: It is argued that not every type of learning is the product of insight. Quite a number of our day-today experiences are the results of chance contiguous associations and not of insight. In insight learning, we cannot altogether eliminate *learning by trial.* Some measure of learning by trial and error comes into play in insight learning also. Not all children are capable of independent thinking. Slow learners need to be taught with other method as well. Mechanical application of rules is also needed in several cases.

CHECK YOUR PROGRESS

Q.13: What is Gestalt?

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Q.14: What is the important contribution of Insight Theory?

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3.6 CONSTRUCTIVISM

In 1710, two philosophers, an Italian named Vico and an Irishman named Berkeley, separately made deplorable assertions that went against the grain of thousands of years of ancient philosophy. They dared to fundamentally change the concept of what knowledge is and what it means to exist. The human mind can only know what it constructs for itself and to be able to say something exists it must be first perceived by the human mind.

Constructivism really got its start in the late 1980s. However, many people did not know how to label what they were doing. The principles of Constructivism are broadly adopted in many areas of education today. The notions of authentic activities, social negotiation, juxtaposition of instructional content, nurturance of reflexivity and the student-centered instruction inspired many instructors to examine and think about the importance of interactions between teachers and students, students and students, and students and learning materials as well. Therefore, both instructors and students may have opportunities to enhance the effectiveness of their teaching and learning.

The constructivism learning theory argues that people produce knowledge and form meaning based upon their experiences. Two of the key concepts within the constructivism learning theory which create the construction of an individual's new knowledge are accommodation and assimilation. Assimilating causes an individual to incorporate new experiences into the old experiences. This causes the individual to develop new outlooks, rethink what were once misunderstandings, and evaluate what is important, ultimately altering their perceptions. Accommodation, on the other hand, is reframing the world and new experiences into the mental capacity already present. Individuals conceive a particular fashion in which the world operates. When things do not operate within that context, they must accommodate and reframing the expectations with the outcomes.

Constructivism gives teachers another perspective to rethink how students learn and to focus on process and provide ways of documenting change and transformation. It also reminds teachers to look for different

ways to engage individual student, develop rich environments for exploration, prepare coherent problem sets and challenges that focus the model building effort, elicit and communicate student perceptions and interpretations. The role of teachers is very important within the constructivism learning theory. Instead of giving a lecture the teachers in this theory function as facilitators whose role is to aid the student when it comes to their own understanding. This takes away focus from the teacher and lecture and puts it upon the student and their learning. The resources and lesson plans that must be initiated for this learning theory take a very different approach toward traditional learning as well. Instead of telling, the teacher must begin asking. Instead of answering questions that only align with their curriculum, the facilitator in this case must make it so that the student comes to the conclusions on their own instead of being told. Also, teachers are continually in conversation with the students, creating the learning experience that is open to new directions depending upon the needs of the student as the learning progresses. Teachers following Piaget's theory of constructivism must challenge the student by making them effective critical thinkers and not being merely a "teacher" but also a mentor, a consultant and a coach.

Principles of Constructivism:

- Constructivist learning environments provide multiple representations of reality.
- These representations represent that complexity of the real world.
- Knowledge construction is emphasized over knowledge reproduction.
- Authentic tasks are emphasised in meaningful context.
- Real world settings or case-based learning is provided.
- Thoughtful reflection on experience is encouraged.
- Enable context and context-dependent knowledge construction.
- Supports collaboration and social negotiation among learners.
- Discovery learning.
- Collaborative activity
- Integration and activation of prior knowledge
- Opportunities for hands-on activities.

Merriam and Caffarella (1999) suggest that adult learning, while self-directed, must have input from outside influences. That may take the form of investigation, social interaction, or more formal learning environments. The constructivistic learning approach involves educators building school curriculum around the experience of their students. Constructivists believe learner-centric instructional classroom methods will strengthen the commitment and involvement of self-motivated learners because of their high level of interaction. Today, there is a trend for incorporating technology into classrooms o support instructional learning methods. Nevertheless, the constructivistic methods of instruction with using computer technology have developed to meet the instructional goals and conditions. One of the most powerful and versatile tools is the web-based learning. The web-based learning provides learners with optimal learning environment. They can be exposed to the multiple perspectives through collaborative social negotiation within peers or teachers.

Constructivistic theory's (J. Bruner) main theme is that learning is a process in which the learner is able to build on present and previous information. The student is able to take information, create ideas and make choices by utilizing a thought process. The trainer should encourage the student to develop the skills to find out principles on their own. There should be on-going dialog between the student and the trainer. The trainer is responsible for making sure the information is in a format the student can comprehend. The key is to assure the course builds on what has already been learned.

LET US KNOW

- According to Constructivism, knowledge is constructed based on personal experiences and hypotheses of the environment.
- Constructivist teachers pose questions and problems, and then guide students to help them find their own answers.

CHECK YOUR PROGRESS

Q.15: What the principles of constructivism?

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3.6 LET US SUM UP

- Learning stands for all those changes and modifications in the behaviour of the individual, which he undergoes from his birth till death.
- *Crow and Crow:* "Learning is the acquisition of habits, knowledge and attitudes. It involves new ways of doing things, and it operates on an individual's attempts to overcome obstacles or to adjust to new situations. It represents progressive changes in behaviour…It enables him to satisfy interests to attain a goal.
- Learning and maturation are closely interrelated and interdependent. Sometimes, it becomes difficult to determine definitely as to which of the behavioural change is the result of learning, and which of the consequence of maturation.
- E. L. Thorndike (1874-1949) was the chief exponent of the theory of connectionism or trial and error. The basis of learning accepted by Thorndike is an association between the sense impressions and impulses to action. This association came to be known as a 'bond' or a 'connection'. Since it is these bonds or connections which become strengthened or weakened in the making called a 'bond' psychology

or simply 'connectionism'. As it believes in stimulus and response type of learning, it is called S. R. Psychology of Learning. Thorndike called it learning by selecting and connecting. It is also known as trial and error theory as learning takes place through random repetitions.

- Thorndike propounded the following laws of learning: Law of Readiness, Law of Effect and Law of Exercise.
- Ivan P. Pavlov (1849-1936), a Russian psychologist was the discoverer of classical conditioning theory of learning. Conditioning is the modification of the natural response. By conditioning Pavlov modified the behaviour of the dog on which he experimented. Now we modify the behaviour of the learner in such a way as the response originally connected with a particular stimulus comes to be aroused by a different stimulus.
- Skinner called his theory as Operant Conditioning, as it is based on certain *operations or actions* which an organism has to carry out. The term 'operant' stresses that behaviour operates upon the environment to generate its own consequences. An operant is a set of acts which conditions and organism in doing something. In the process of operant conditioning, operant responses are modified or changed by reinforcement. Reinforcement is a special kind or aspect of conditioning within which the tendency for a stimulus to evoke a response on subsequent occasions is increased by reduction of a need.
- Max Wertheimer (1880-1943) was the founder of Gestalt psychology. Learning according to Gestalt Theory, is not by random steps, not by trial and error, not by conditioning but by insight, introspection and understanding.
- The principles of Constructivism are broadly adopted in many areas of education today. The notions of authentic activities, social negotiation, juxtaposition of instructional content, nurturance of reflexivity and the student-centered instruction inspired many instructors to examine and think about the importance of interactions between teachers and students, students and students, and students and learning materials as well. Therefore, both instructors and

students may have opportunities to enhance the effectiveness of their teaching and learning.

3.7 FURTHER READING

1) Aggarwal, G. C. (1996). *Essential of Educational Psychology*. New Delhi: Vikas Publishing House.
2) Chauhan, S. S. (1993). *Advanced Educational Psychology*. New Delhi: Vikas Publishing House.
3) Mangal, S. K. (1993). *Advanced Educational Psychology*. New Delhi: Prentice Hall of India.
4) Sarma, M. (2008). *Educational Psychology*. Dibrugarh: Tushar Publishing House.

3.8 ANSWERS TO CHECK YOUR PROGRESS

Ans. to Q. No. 1: According to *Crow and Crow*: "Learning is the acquisition of habits, knowledge and attitudes. It involves new ways of doing things, and it operates on an individual's attempts to overcome obstacles or to adjust to new situations. It represents progressive changes in behaviour…It enables him to satisfy interests to attain a goal."

Ans. to Q. No. 2: Two characteristics of learning are:

1) **Learning as adaption or adjustment:** There is a constant interaction of an individual with his environment. Right from his birth, the individual is faced with the problem of making adjustment and adaptation to his physical as well as social environment. Learning is a proper means to achieve this end. Through a process of continuous learning as how to behave or respond to a particular situation the individual prepares himself for necessary adjustment and adaptation. This is why learning is so often described as a process of progressive adjustment to ever changing conditions which one encounters.

2) **Learning as improvement:** Learning is often considered as a process of improvement with practice or training. This means that all types of learning help child in the path of his progress towards desired ends or results. But this is not always true. The child learns so many things in the class room that did not at all, help him to achieve his goal. Habits of idleness disrespect towards authority, truancy, developing poor handwritings and defective the pronunciation etc. are among these. Therefore, it should be known clearly that learning does not necessarily imply improvement (with respect to the achievement of and end).

Ans. to Q. No. 3: Inter-related.

Ans. to Q. No. 4: The three differences between learning and maturation are:

Sl. No.	Maturation	Sl. No.	Learning
I)	Maturation is primarily based on heredity.	I)	Learning is primarily based on environment.
II)	Maturation is automatic process for behavioural change.	II)	Learning is planned process for the modification of behaviour.
III)	There is age-limit for the process of maturation.	III)	There is no age-limit for learning. Learning is a life-long process.

Ans. to Q. No. 5: Thorndike explains the meaning of *satisfaction* and *discomfort* as: "By a satisfying state of affairs is meant one which the animal does nothing to avoid, often doing such things as attain and preserve it. By a discomforting or annoying state of affairs is meant one which the animal commonly avoids and abandons."

Ans. to Q. No. 6: E. L. Thorndike

Ans. to Q. No. 7: Two sub parts of law of exercise are: (i) Law of Use and (ii) Law of Disuse.

Ans. to Q. No. 8: For explaining his theory, Pavlov has given some principles of conditioning.

- **Principle of Reinforcement:** The term reinforcement refers to the following of the conditioned stimulus by the unconditioned stimulus, i.e., food following the bell. Pavlov stated that it was

only reinforcement that led to the conditioning. Without reinforcing the bell with meat, no conditioning could be developed– this was reinforcement. This is applicable to children also. Children's learning becomes effective when they are rewarded immediately after they perform well. Their behaviour is conditioned with reinforcement.

- **Principle of Sequence and Time Intervals:** There is an optimal times between the presentation of the conditioned stimuli and the unconditioned stimuli. If there is any variation i.e., increase or decrease in the optimal time, then there is no conditioning and bond cannot be formed.
- **Principle of Stimulus Generalisation:** According to this principle, if we are conditioned to one thing, i.e., the bell, then we would be conditioned, more or less, to all sorts of bells. In the earlier stage of learning by conditioning the animal responds to a number of stimuli which accompany the exact conditioned stimulus. The response is the greatest to the conditioned stimulus and goes on decreasing to other stimuli which are less similar to the original one.

Ans. to Q. No. 9: The experiment done by Pavlov brings into the picture the four essential elements of the conditioning process. The first element is a natural stimulus, technically known as unconditioned stimulus (US) i.e. food. It results in a natural response known as unconditioned response (UR). This response constitutes the second element. The third element is the artificial stimulus like ringing of the bell which is technically known as Conditioned Stimulus (CS). It is substituted in place of the natural stimulus (food). Initially the conditioned stimulus does not evoke the desired response, i.e. conditioned response (CR); the fourth element is the chain of the conditioning process.

Ans. to Q. No. 10: Reinforcement means rewarding the learner at every step of learning.

Ans. to Q. No. 11: Skinner called his theory as Operant Conditioning, as it is based on certain *operations or actions* which an organism has to

carry out. The term 'operant' stresses that behaviour operates upon the environment to generate its own consequences. An operant is a set of acts which conditions and organism in doing something. In the process of operant conditioning, operant responses are modified or changed by reinforcement. Reinforcement is a special kind or aspect of conditioning within which the tendency for a stimulus to evoke a response on subsequent occasions is increased by reduction of a need.

Ans. to Q. No. 12: The most important contribution of this theory in educational practice is programmed learning and teaching machine.

Ans. to Q. No. 13: "Gestalt" is a German word for which there is no equivalent English word. The term was carried out into English psychological literature. The nearest English translation of Gestalt is 'configuration' or more simply 'an organized whole in contrast to collection of parts'. Gestalt psychologists consider the process of learning as a Gestalt –an organized whole. A thing cannot be understood by study of its constituent parts but only by study of it as a totality, is a basic idea behind this theory.

Ans. to Q. No. 14: The most important contribution of the Insight Theory is that it has given importance on inner psychological functioning such as perception, concept formation, problem solving etc. It has made learning purposeful and a goal oriented task. The learner has to be motivated by arousing his interest and curiosity for learning process.

Ans. to Q. No. 15: The principles of constructivism are:

- Constructivist learning environments provide multiple representations of reality.
- These representations represent that complexity of the real world.
- Knowledge construction is emphasized over knowledge reproduction.
- Authentic tasks are emphasised in meaningful context.
- Real world settings or case-based learning is provided.
- Thoughtful reflection on experience is encouraged.
- Enable context and context-dependent knowledge construction.

- Supports collaboration and social negotiation among learners.
- Discovery learning.
- Collaborative activity
- Integration and activation of prior knowledge
- Opportunities for hands-on activities.

3.11 POSSIBLE QUESTIONS

A) Short Questions (Answer each question in about 150-300 words)

Q.1: Define learning. Write the characteristics of learning.

Q.2: What is reinforcement?

Q.3: Mention the types of learning theories.

Q.4: Who first coined the term "Behaviourism" and what does it mean?

Q.5: What are the characteristics of behaviouristic approach?

Q.6: What do you mean by conditioned response?

Q.7: What are the differences between classical and operant conditioning?

Q.8: What is insightful theory of learning? Illustrate with classroom learning.

Q.9: What are the educational implications of unconscious and conscious imitation of learning?

Q.10: What is constructivism? Write down its principles.

B) Long Questions (Answer each question in about 300-500 words)

Q.1: Discuss the different laws of learning with its educational implications.

Q.2: Discuss various methods of learning. Which one is commonly followed by the young children?

Q.3: Explain the Theory of Connectionism. Discuss its limitations.

Q.4: Explain the contribution of Skinner towards educational theory and practice.

Q.5: Discuss the educational implications of insight learning.

Q.6: Explain the theory of Pavlov's Classical Conditioning. Discuss its limitation.

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UNIT 4: TRANSFER OF LEARNING

UNIT STRUCTURE

4.1 LEARNING OBJECTIVES

After going through this unit, you will be able to–

- explain the meaning of transfer and transfer of training or learning;
- identify the theories of transfer of training;
- discuss the types of transfer as positive, negative, and zero transfer;
- analyze the efforts taken by the teacher for maximizing positive transfer; and
- elaborate the connection between constructivism and transfer of learning.

4.2 INTRODUCTION

This unit introduces you to the components of the most powerful principle of learning, know as transfer. The entire structure of education in schools is based on the assumption that whatever knowledge we acquire

about a particular subject is not confined to it only. It also helps us in future life. According to this theory, knowledge of a subject is not confined to it only. It helps in the knowledge of other subjects as well. This is called Transfer of Training. You should note that Transfer of learning from one performance situation to another is an integral part of skill learning and performance. This unit will introduce you to three types of transfer—positive transfer, negative transfer, and zero transfer. You should be familiar with various theories of transfer that tell about the working procedure of transfer of training. This unit shall help in examining the factors that affect transfer and how the teachers can use past learning effectively to enhance present and future learning. After completion of this unit, you will be able to enlist the various efforts that can be undertaken by the teachers to maximize transfer of training.

4.3 MEANING OF TRANSFER

"Transfer is the basis of all creativity, problem solving and the making of satisfying decisions."

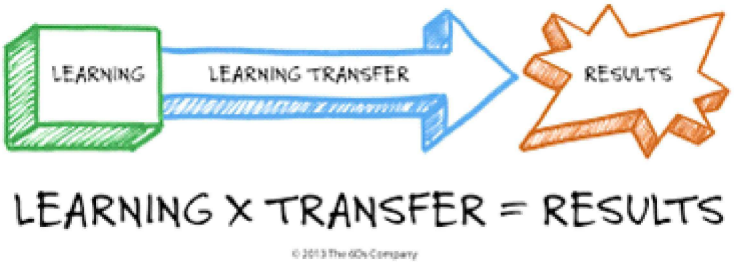
–Madeline Hunter Mastery Teaching

The word transfer is used to describe the effects of past learning upon present acquisition. In our day-to-day life, how well and how rapidly we learn depends largely upon the kinds and amount of things we have learned previously. In simple terms, transfer may be defined as "the partial or total application or carryover of knowledge, skills, habits, attitudes from one situation to another situation." Hence, the carryover of skills of one learning to other is transfer of training or learning. Such transfer occurs when the learning of one set of material influences the learning of another set of material later. For example, a person who knows to drive a moped can easily learn to drive a scooter.

The two way process of transfer: The principle of learning, called *transfer,* describes a two-part process:

- **Transfer *during* learning**. This refers to the effect that past learning has on the processing and acquisition of new learning.
- **Transfer *of* learning**. This refers to the degree to which the learner in future situation applies the new learning. This type of transfer can

be further separated into near and far transfer. Near transfer describes the use of new learning in very similar and closely related settings. Far transfer includes the ability to use the new learning in a similar setting as well as the ability to solve novel problems that are not very similar but do share common elements with the learning that was initially acquired.



4.4 MEANING OF TRANSFER OF LEARNING

The following definitions will help you to understand the meaning of transfer of training.

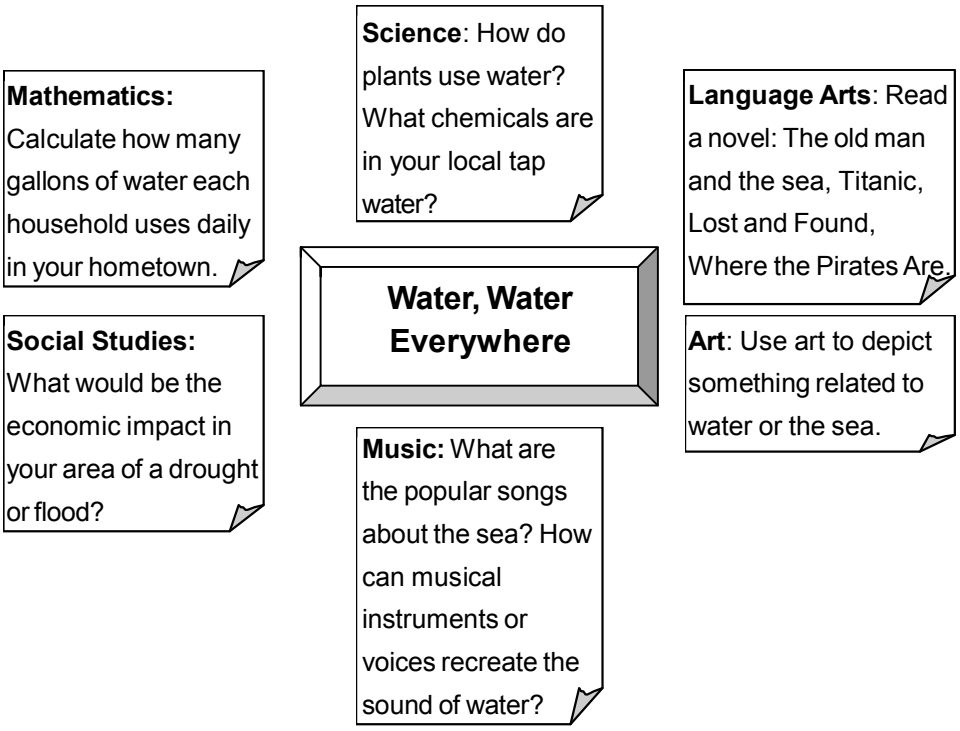
According to Crow & Crow (1963), "The carry over habits of thinking, feeling or working of knowledge or of skills from one learning to another usually is referred to as transfer of training."

According to M. L. Bigge, "Transfer of learning occurs when a person's learning in one situation influence his learning and performance in other situation."

Therefore, transfer of training means the process of carrying over the habits, thinking, knowledge, skill, and attitudes from one learning situation to another is called transfer of learning or training.

A review of any curriculum reveals that transfer is an integral component and expectation of the learning process. Every day, teachers deliberately or intuitively refer to past learning to make new learning more understandable and meaningful. Students are expected to transfer the knowledge and skills they learn in schools to their daily routines, jobs, and ventures outside the school. Writing and speaking skills should help them communicate with others; scientific knowledge should inform their decisions on environmental and health issues; sociology and civics should help them in solving various social problems. Not only the knowledge & skills acquired in particular subject, but also the habits and interest try to influence other activities to utilize the transferred knowledge. In other words, the effects of schooling should not remain 'specific' but should 'spill' over to new situations. Obviously, the more information the students can transfer from their schooling to the context of everyday life, the greater is the probability that they will be good communicators, informed citizens, critical thinkers, and successful problem solvers.

The educators who advocate thematic units and an integrated curriculum can enhance successful transfer. This approach provides more stimulating experiences to students, and helps them to see the commonalities among diverse topics, while reinforcing understanding for future applications. Thematic units, for instance, could focus on the environment (global warming, recycling, air quality etc.), history (the Civil war, exploring the West etc.), science (sources of electrical power, space exploration, ecosystems etc.) or language arts (tall tales, realistic fiction, poetry etc.). Integrated thematic units cut across curriculum areas. The internet is an excellent source of ideas for integrated units. The following diagram is an example of an integrated thematic unit that could be adapted for elementary and secondary grade levels.



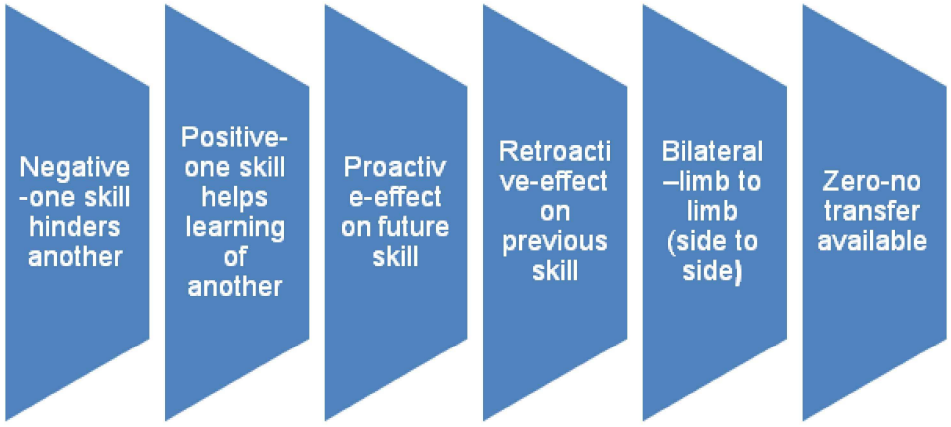
Here is an example of an integrated thematic unit on water. The students have the opportunity to gain a deeper understanding of how water directly affects their daily lives. This approach increases the chances of transfer of learning to future situations.

LET US KNOW

- Learning or performance in one situation influences learning or performance in some other situation.
- Transfer may be defined as “the partial or total application or carryover of knowledge, skills, habits, attitudes from one situation to another.
- Thematic units and an integrated curriculum enhance the transfer process.
- Past learning always influences the acquisition of new learning.
- Teachers are frequently the provokers of transfer in their students.

4.5 TYPES OF TRANSFER OF LEARNING

Depending on the learning situations faced by the learner, the following six kinds of transfer can occur:



Out of these six different types, we shall study about three types of transfer in detail.

4.5.1 Positive Transfer

When learning in one situation *facilitates* learning in another situation, it is known as positive transfer. It is stated to be positive when the learning or training carried out in one situation proves helpful to the learner in another situation. For example:

- Skills in playing violin facilitate learning to play piano.
- Knowledge of mathematics facilitates to learn physics in a better way.
- Driving a scooter facilitates driving a motorbike.
- Learning to play badminton may help an individual to play table tennis and lawn tennis.

4.5.2 Negative Transfer

Some times past learning interferes with the learner's understanding of new learning that result in confusion or error. When learning of one task makes the learning of another task harder, it is known as negative transfer. For example:

- Speaking regional language hindering the learning of national or foreign language.
- Left hand drive vehicles hindering the learning of right hand drive.
- Having learned to pronounce 'But' correctly, the child may find it difficult to pronounce 'put' correctly.
- Driving an auto start kinetic Honda Scooter may find difficulty in driving Bajaj or Vespa scooter.

4.5.3 Neutral Transfer or Zero Transfer

When learning of one activity neither facilitates nor hinders the learning of another task, it is a case of neutral transfer. It is also called as zero transfer. Such a situation may arise when the learning activities and subject areas have nothing in common between them. In such cases, it is quite natural that the possession of knowledge and skill related to one area may have no or quite minimal effect on the acquisition of knowledge and skill related to another area. For example:

- Knowledge of history in no way affects the learning of driving a car or a scooter.
- Learning to play football may not help or hinder learning to play volleyball.
- Learning to play Guitar or Sitar neither helps or hinders one's performance in cooking or laundry class.

CHECK YOUR PROGRESS

Q.1: What are the various types of transfer of learning?

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Q.2: What do you mean by Positive transfer? Give one example.

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Q.3: What do you mean by negative transfer? Give one example.

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Q.4: What do you mean by zero transfer? Give one example.

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4.6 THEORIES OF TRANSFER OF LEARNING

There are different theories, which explain transfer of learning.

A) Theory of Formal Discipline: According to the advocates of this theory, the mind is divided into various powers like memory, imagination, observation, reasoning etc. It is possible to strengthen these powers by exercise. When these powers have grown strong, they may be used efficiently, under any situations and conditions. Therefore, in the curriculum, such subjects should be included, which provide practice for the development of these various powers.

The word 'Formal' lays stress on the form of the subject and not on its contact material. If someone is anxious to develop the power of memory, he should study the forms of memory. The study of Arithmetic should be conducted not to make a man a mathematician, but to make him capable of distinguishing between good and bad.

It is the word 'discipline' that expresses the real meaning of this theory. This theory lays stress on the point that, for the proper development and improvement of the mental power, different exercises and self-determination are helpful. In the modern age, many experiments have also been carried out in the field. Generally, the subjects are divided into two categories:

a) Trained group

b) Controlled group

Both the groups are examined, on the basis of certain questions having a bearing on the power of memory. This is called initial test. Later on, the trained group is asked to remember a subject of the similar nature. No rule is explained. The control group is given specific training, and then the trained group and the controlled group are examined together. After this, the result of the preliminary examination and the final examination are compared. An attempt is made to find out which group has made what improvement. Generally, it is seen that the controlled group makes greater progress and improvement in the learning, as compared to trained group.

B) Theory of Identical Elements: E. L. Thorndike has developed this theory. According to him, most of the transfers occur from one situation to another in which there are most similar or identical elements. This theory explains that carrying over from one situation to another is roughly proportional to the degree of resemblance in the situation, in other words—the more is the similarity, the more is the transfer. The degree of transfer increases as the similarity of elements also increases. For example, learning to ride a moped is easy after learning to ride a bicycle. Here, transfer is very fast because of identical elements in both vehicles. Thorndike was convinced that the method used in guiding a pupil's learning activities had a great effect upon the degree of transferability of his learning.

C) Theory of Generalization of Experience: Charles Judd developed this theory. The theory of generalization assumes that what is learnt in task 'A' transfers to task 'B', because in studying 'A', the learner

develops a general principle which applies in part or completely in both 'A' and 'B'.

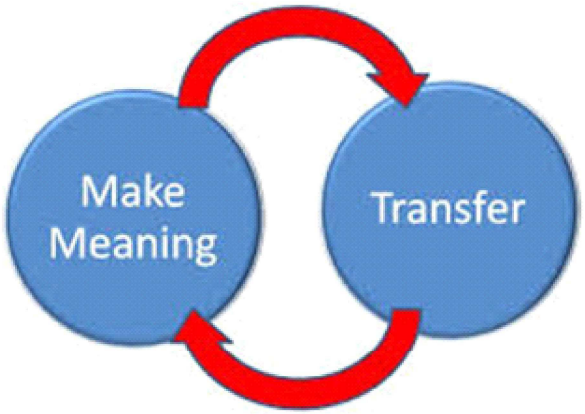
Experiences, habits, and knowledge gained in one situation help us to the extent to which they can be generalized, and applied to another situation. Generalization consists of perceiving and understanding what is common to a number of situations. The ability of individuals to generalize knowledge varies with the degree of their intelligence.

D) **Spearman's Two-Factor Theory:** According to this theory, transfer of training or the power of memory is dependent on two factors: General ability and Special ability. It means that if a child has the general ability to learn a thing quickly, then he shall be able to improve his ability in learning other subjects. It is quite possible that a person may have special ability to learn a particular thing. He held the view that is possible in general ability only. It is not possible in case of special ability. In learning Arithmetic, Science, history etc. there is greater improvement in the general ability.

4.7 CONDITIONS OF TRANSFER

Transfer of training is possible on the following conditions.

- **Generalization:** The more it is possible to find out general rules on the basis of experiences, the more it is possible to transfer the knowledge of one subject to the learning of the other subject.
- **Proper Attitude:** If the attitude of the student with regard to the subject that he wants to transfer is proper, then this attitude is helpful in the positive transfer.
- **Understanding**: The transfer is very much dependent upon the understanding. The more the learning is purposeful and meaningful, the more it is possible that it will be transferred.
- **Degree of Mastery of Material:** Positive transfer of training is possible if the student has the mastery over the material. The greater is the mastery, the greater is the possibility of transfer.



Educational Implications for Transfer of Learning:

- Learning in one situation is capable of exercising positive or negative influence over the learning in another situation.
- As far as possible, efforts should be made to maximize positive transfer and minimize negative transfer.
- For seeking the maximum positive transfer, the teacher while teaching, should try to draw out proper view points in the following ways:
  1) Association, similarities and dissimilarities
  2) Building generalizations
  3) Developing proper understanding and insight
  4) Developing proper ideals

A teacher can take some efforts to maximize Positive transfer among the students. Some of them are as the following:

- **Linking with previous knowledge**: What is being learnt at the present should be linked with what has already been learnt in the past.
- **Integrate theoretical studies with practical experiences:** The teacher should integrate activities with studies.
- **Discourage rote learning**: The teacher should clarify the concepts and provide deep insights into the subject knowledge, and discourage rote learning among the students.
- **Use of Inductive Methods**: The teacher should make use of inductive methods of teaching whenever possible, to develop logical thinking and reasoning among the students.

- **Use of correlation**: The teacher should bring out relationships with various subjects of the curriculum. For example, Laws in science helps to understand land breeze and sea breeze, which are the topics covered in Geography.
- **Transfer in all activities of life**: The teacher should himself/herself imbibe desirable characteristics such as cleanliness through role play, and transfer it in all activities of their life.
- **Limit the use of Classical language**: Classical languages like Persian, Arabic, and Sanskrit have a little transfer value, as they are not used in day-to-day life. Therefore, the teacher should limit the use of such languages, and the school should modify the curriculum to bring out positive changes.
- **Include subjects related to life**: Certain subjects like social studies, functional arithmetic and biological science should find a due place in the curriculum.
- **Curriculum and transfer**: Subjects can be grouped into two categories:
  1) Subjects having a disciplinary value such as theoretical grammar, classical languages and theorems in geometry. These subjects have a little transfer value.
  2) Subjects having a social utility value such as social studies and applied arts. These subjects extend transfer of training to a maximum level.
- **Grouping school subjects**: The curriculum can also be divided into groups such as science group, commerce group etc. As these groups have common components, they lead to maximum transfer.
- **Imbibe ideas among students**: A teacher should encourage the students to draw neat diagrams and have a good handwriting, thus imbibing the quality of cleanliness in them.
- **Organize excursions**: Excursions may be organized for the students to impart firsthand knowledge of the subject discussed in the class.

CHECK YOUR PROGRESS

Q.5: Mention any two conditions of transfer.

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Q.6: What are the educational implications of transfer of training?

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Q.7: What are the two elements in Spearman's two-factor theory?

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4.8 TEACHING METHODS AND ROLE OF A TEACHER

A Teacher should not assume that transfer would automatically occur after the students acquire a sufficient base of information. To teach transfer, we need to consider two major factors: the time sequence and the complexity of transfer link in-between learning. The time sequence refers to the way the teacher will use time and transfer in the learning situation. Transfer can occur from past to present, or from present to future.

Transfer from past to present:

Past learning → Helps in → Present Learning

In this, teacher links in something from the learner's past that helps add sense and meaning to the new learning. It is important to select an

experience that is clear, unambiguous, and closely relevant (not just related) to the new learning. One example is given below:

- A science teacher asks the students to recall that they have learned about plant cells to study the similarities and differences in animal cells.

Transfer from present to future:

Present learning ⟶ Helps in ⟶ Future Learning

The teacher makes the present learning situation as similar as possible to a future situation to which the new learning should transfer. For the transfer to be successful, the students must attain a high degree of original (current) learning, and be able to recognize the critical attitudes and concepts that make the situations similar and different. For example,

- Students learn safe personal and interpersonal hygiene practices to protect their health throughout their lives.

Principles of choosing methods are as follows:

- Fix the goals beforehand, and choose the methods accordingly.
- Keep in view the individual differences.
- Follow the principle of correlation.
- Choose a method, which leads to mental development.
- Provide scope for practical application.

Role of the Teacher:

- The teacher should keep in view the final goal of the subject matter that he/she is going to impart to the child.
- The teacher should give various examples while teaching a particular topic or skill. The teacher should inspire the students to excel in it in future.
- The teacher should proceed from simple to complex. Children should master the simple aspect of learning, and then come to the difficult or complex aspects.
- The teacher should proceed from general to particular. The students should understand the general rules, and only then, the teacher should proceed with particular activity of learning.

- The teacher should write the views of his pupils when they are busy in learning a particular activity, as a feedback and improvise on his/ her teaching skills.

4.9 TEACHING AND CONSTRUCTIVISM

The proper and frequent use of transfer greatly enhances the constructivist approach to learning .Constructivist teacher are those who:

- Use student responses to alter their instructional strategies and content.
- Foster student dialogue.
- Question student understands before sharing their own.
- Encourage the students to elaborate on their initial responses.
- Allow the student's time to construct relationships and create metaphors.

Thus, to become teachers, we should know the concept of transfer of learning, and use that knowledge to maximize positive transfer among the students to make learning insightful.

CHECK YOUR PROGRESS

Q.8: Mention the methods used by the teachers for transfer of training.

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Q.9: What is the role of a teacher for transfer of training?

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Q.10: How will you connect constructivism to transfer of training?

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4.10 LET US SUM UP

- Knowledge of a subject is not confined to it only. It helps in the knowledge of other subjects as well. This is called Transfer of Training.
- Transfer may be defined as "the partial or total application or carryover of knowledge, skills, habits, attitudes from one situation to another situation".
- Thematic units and an integrated curriculum enhance the transfer process.
- Past learning always influences the acquisition of new learning.
- Teachers are frequently the provokers of transfer for their students.
- When learning in one situation *facilitates* learning in another situation, it is known as positive transfer. It is stated to be positive, when the learning or training carried out in one situation proves helpful to the learner in another situation.
- When past learning *interferes* with learner's understanding of new learning, resulting in confusion or error, it is known as negative transfer. Here, the learning of one task makes the learning of another task harder.
- When learning of one activity neither facilitates nor hinders the learning of another task, it is a case of neutral transfer. It is also called as zero transfer.
- Theory of Formal Discipline, Theory of Identical Elements, Theory of Generalization of Experience, Spearman's Two Factor Theory are the theories of transfer of training.
- Teacher should take various efforts to maximize positive transfer among the students.

- There is a connection between constructivism and transfer of training.
- The greatest amount of transfer is based on the similarity between the two tasks or two contexts (practising games or real life activity).
- The use the transfer helps to identify activities that will promote positive transfer.
- Spatial and timing changes from previously learnt skills to new skills will produce negative transfer.
- If you confuse the learner, it will produce negative transfer. The negative transfer is temporary.

4.11 FURTHER READING

1) Baldwin, T. T., & Ford, K. J. (1988). *Transfer of Training: A Review and Directions for Future Research*. *Personnel Psychology*, 41, 63-105.
2) Broad, M. L., & Newstrom, J. W. (1992). *Transfer of Taining: Action-Packed Strategies to Ensure High Payoff from Training Investments*. New York: Addison-Wesley Publishing Company.
3) Holton, E. F., Bates, R. A, Ruona, W. E. A. (2000). *Development of a Generalized Learning Transfer System Inventory*. Human Resource Development Quarterly.

4.12 ANSWERS TO CHECK YOUR PROGRESS

Ans. to Q. No. 1: There are six types of transfer of training. They are– Negative: One skill hinders another, Positive: One skill helps learning of another, Proactive: Effect on future skill, Retroactive: Effect on previous skill, Bilateral: Limb to limb (side to side), Zero: No transfer available. Among the six types, three most important types are– Positive, Negative, and Zero transfer.

Ans. to Q. No. 2: When learning in one situation *facilitates* learning in another situation, it is known as positive transfer. It is said to be

positive when the learning or training carried out in one situation proves helpful to the learner in another situation. For example, Skills in playing violin facilitate learning to play piano.

Ans. to Q. No. 3: Sometimes, past learning *interferes* with learner's understanding of new learning, resulting in confusion or error. When learning of one task makes the learning of another task harder, it is known as negative transfer. For example, speaking regional language hindering the learning of national or foreign language.

Ans. to Q. No. 4: When learning of one activity neither facilitates nor hinders the learning of another task, it is a case of neutral transfer. It is also called as zero transfer. For example, knowledge of history in no way affects the learning of driving a car or a scooter.

Ans. to Q. No. 5: Two important conditions of transfer are: generalization and proper attitude.

Generalization: The more it is possible to find out general rules on the basis of experiences, the more it is possible to transfer the knowledge of one subject to the learning of the other subject.

Proper attitude: If the attitude of the student with regard to the subject that he wants to transfer is proper, then this attitude is helpful in the positive transfer.

Ans. to Q. No. 6: Transfer of training has educational implications. For seeking maximum positive transfer, the teacher while teaching, should try to draw out proper view-points with the help of associations, similarities and dissimilarities, building generalizations, developing proper understanding and insight and by developing proper ideals.

Ans. to Q. No. 7: Two elements in Spearman's two-factor theory are– General ability and Special ability.

Ans. to Q. No. 8: The teacher should use various methods for maximizing transfer of training. The various methods used by the teacher are– transfer from past to present, and transfer from present to future.

Ans. to Q. No. 9: A teacher plays the most pivotal role in transfer of training. The teacher should proceed from simple to complex. Children should master the simple aspect of learning and then come to the difficult

or complex aspects. The teacher should proceed from general to particular. Students should understand the general rules first, and only then, the teacher should proceed with particular activity of learning.

Ans. to Q. No. 10: There is a close connection of constructivism with transfer of training. The teacher should encourage the students to elaborate on their initial responses. The teacher should allow the students to construct relationships and create metaphors.

4.13 POSSIBLE QUESTIONS

A) Short Questions (Answer each question in about 150-300 words)

Q.1: What do you mean by transfer of training? What are the two processes of transfer?

Q.2: Mention the various types of transfers. Explain with examples the positive, negative and zero transfer.

Q.3: "Thematic units and integrated curriculum enhance the transfer process." Do you agree with this statement? Give reasons.

B) Long Questions (Answer each question in about 300-500 words)

Q.1: Discuss the various theories of transfer of training and their educational implications.

Q.2: Elaborate the role of a teacher for enhancing transfer of training or learning during teaching.

Q.3: Explain various efforts taken by the teacher for maximizing positive transfer and minimizing negative transfer.

Q.4: What are the reasons of negative transfer of training? How does the curriculum play a major role in minimizing negative transfer?

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UNIT 5: MOTIVATION

UNIT STRUCTURE

5.1 LEARNING OBJECTIVES

After going through this unit, you will be able to–

- explain the meaning of motivation;
- discuss the techniques of motivation;
- identify the factors of motivation; and
- explain the Maslow's Self-actualization theory of motivation.

5.2 INTRODUCTION

Since ancient times, motivation has been recognised as an important determiner of behaviour. Motive induces a man to act in a particular way in relation to the situation. It may be described as the native spring of action and behaviour. Motivation is very important in education because education aims at finding out the means which may make learning things easier. The utilisation of motivation in the teaching-learning process helps the students to do their work with greater ease and efficiency. As such, research has been conducted on the psychology of motivation. This unit deals with the meaning of motivation, the factors affecting motivation, the role of motivation in learning, and Maslow's Self-Actualisation theory of motivation.

5.2 MEANING OF MOTIVATION

From our daily experience, we know how difficult it is to lead or guide a person from one activity to another or stop him from engaging in an activity. That way, even animals indulge in an activity of their choice. Thus, we observe behavioural differences in both humans and animals in one or many situations. Now, the important question is why do people behave as they do, and how to explain this fact of behavioural differences from one situation to the other. The explanatory construct of motivation is used to answer such a question.

The word "motivation" has been derived from the Latin word 'motun' which means "doing something and for which there is an external stimuli." In the field of education, it is believed that an individual's action and behaviour is determined by some internal stimuli. Thus, it can be said that motivation is that force which imples or incites.

Motivation is said to be essential or sine-qua-non of learning in the sense that it provides economy of learning and attainment. In modern education, learning is described as a self–activity of the learner. In this process of self–learning, the teacher is supposed to create necessary conditions for enhacing the mental readiness of the learner in achieving the objectives of learning. This act of the teacher is by nature psychological and to be called motivation.

Motivation is a psychological state through which activation of the motive in the individual mind can be effected. Motive by itself indicates an inactive mental state that needs to be activated through certain psychological devices or by using necessary conditions. In simplified from, motivation may be said to be the activation of the mind to work out the motive or objective. Motive implies the presence of the aims and objectives in mind, whereas motivation activates it by creating the necessary conditions. It should be noted that in order to activate the individual, external stimulation, arousal of feeling, emotion and sentiment in mind, strengthening and reorganisation of the will force etc. may be needed. Motivation comprises all such extrinsic and intrinsic factors for activation of the individuals. The

different social psychologists have defined motivation and the need of motivation in different ways. Soem of them are as the following:

- According to Crow and Crow, “Motivation is considered with the arousal of the interest in learning which is essential for learning.”
- According to Good, “Motivation is the process of arousing, sustaining and regulaling activity.
- According to Lowell, “Motivation may be defined more formally as a psychological internal process initiated by some needs, which lead to the activity and which will satisfy needs.”
- According to Berelson and Stereir, “Motivation consists of all those desires, drives, needs impulses etc. It is an inner state that energizes, activates or moves, and directs or channels behaviour towards goals.’’

CHECK YOUR PROGRESS

Q.1: What is meant by the term motivation?

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5.4 TECHNIQUES OF MOTIVATION

According to the psychologists, motivation is the Sine Qua Non of learning, which is very important for learning. The success of learning depends to a great extent on the motives which are utilised for the education of the child. The aim of education is to achieve maximum learning in a minimum time. Therefore, it is important that the children are properly motivated. A teacher can adopt certain techniques in the teaching-learning situation to motivate a child. Some of them are given below:

- **Clearness of goal:** The teaching learning activity should be goal-oriented and the learners should have clear objectives of their learning

and doing. Education should not be super imposed on the learners on the pretext of the conventionality and compulsion.

- **Knowledge of success and failure:** Mental readiness in learning may be created through communicating the knowledge of one's success in the previous attempt may be a source of inspiration for subsequent attempts to be made. It is here that Thorndike's law of effect acts as a motivating factor in learning.
- **Praise and Blame:** The teacher may make use of praise, appreciation, and recognition of the students achievement without any reserve. He may also appreciate or reproof undesirable behaviour of the students for negative motivation. Everybody wants praise that stimulates the activity with more vigour and positive motivation. The teacher is an ideal person in the eye of the students may have its powerful impact in this regard.
- **Use of reward and punishment:** A popular and commonly used device of teacher's motivation is the use of reward in recognition and punishment on disapproval of him. Although for effective motivation, he should be aware of the appropiate time, situation, and the sense of promotion in giving such reward and punishment.
- **Cooperation and Competition:** An environment of cooperation to work together in schools may be created. It may promote the sense of involvement and the sense of belongingness to the students. It amy promote corporate life in school. Similarly, the teacher should create situations of group competition among the students both inside and outside the classroom as well as in the play ground. Programmes like debate, group discussion, quiz competition etc. may prove to be very effective.
- **Use of audio-visual aids:** Audio–visual aids may prove to be the more effective means of motivation for the students who are usually unable to make use of abstract thoughts in verbal learning. These aids may have the double effect of seeing and hearing at a time. That may act as a extrinsic factor of motivation.
- **Unconscious motives made Conscious:** The students normally have certain hopes, desires, and motives cherished in their unconscious

mind. Such motives do not find expression and the students are rather ashamed of them. The teacher may help in giving suitable expression to them by creating appropriate situation, and relieving their pent-up feelings and emotion. They may include organising execursion picnic, playing games and sports by the boys and girls together.

- **Formation of Positive attitude:** Attitude may be either positive or negative. Positive attitude means the formation of healthy outlook in mind. The teacher should always be conscious of the formation of positive attitude in the students' mind. He may do so by virtue of his ideal thought, feeling, and activity. It may create an ideal situation for the student's incentive to motivation. It may urge the students to readily accept his thought, feeling, and activity, and create an ideal situation for motivation.
- **Providing real life situation:** Contents of learning should be closely related to real life situation of the learner so that they may be useful and helpful. Correlation between theory and practice in life may naturally make learning purposive and productive that create motivation. Learning content disconnected from life may make learning aimless.
- **Teacher's personality:** The act of motivation in students largely depends on the attractive personality of the teacher. His behaviour, conduct, manners, his art of talking, simplicity, amiability and helpfulness, his personlaity are the characteristics that go a long way in making the students motivated. The teacher's personality itself is a powerful source of motivation to the students.

CHECK YOUR PROGRESS

Q.2: What are the techniques that may be used for motivating the students in the schools?

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5.5 FACTORS OF MOTIVATION

The student's educational motivation may be different from pupil to pupil, depending on the age or even on the mood of the child. Children cannot truely understand why learning local history is important. An important task is then to figure out how a child's motivation can be raised. Elementary school programmes are focused on new knowledge adquisition and learning process in general. By the end of elementary schooling, the interest in learning decreases due to a range of psychological factors.

It is ncessary to define the factors affecting motivation. Some of the factors of Motivation are as the following:

- **Higher level of Intrest:** High level of both personal and situational intersts are associated with more cognitive engagement, more learning, and higher level of achievement.
- **Classroom environment:** Qualities of a classroom envrionment may impact on the motivation and student's subjective perceptions of the same environmental conditions. There are stronger links between achievement and objectively defined classroom qualities. Thus, it appears that the teachers can influence the learning processes and outcomes by structuring the learning environments.
- **Home Situations:** The situation at home affect the pupils' motivation in the classroom. If children come from homes where they are loved and encouraged, they will approach the classroom work with eagerness and with a willingness to learn. If the pupils do not have a positive home environment, they attend school with a dissatisfaction and a lack of motivation because of physical or emotional problems.
- **Teaching approach:** Learning can be more enjoyable and be tailored to a larger degree when the pupils become part of the learning process. The Students can be motivated when the teachers help them to see what they are learning in a different context. If the pupils are currently learning about a historical figure or event, then, it could be motivating to read novels or short stories that take place in the same time period.

- **Interactive activities:** Using interactive activities can be a motivating factor for positive classroom participation. Besides, the use of puzzles, games, special speakers and visiting museums may also motivate the pupils to go beyond the official and predefined teaching routine and take steps into the larger world to learn more about the subject than what is taught in the school.
- **Higher levels of value:** Task value refers to students' opinion about and the utility or about how interesting they find a given task and the goals that are being pursued. Clearly, students' perceptions of task value are predicated on their interpretation of tasks. Pupils must understand how important it is to do well on the task. The parents and teachers need to provide support to the pupils' understanding of value. Higher value of upcoming results increases the sense of responsibility and the overall interest in the task.
- **Attributions and Controlled beliefs:** The basic construct refers to the belief about the causes of success and failure, and how much perceived control one needs to affect the outcomes or to control one's behaviour. The students must believe that their efforts will lead to success. This assurance enables them to manage their activities and emotions. The students who believe they are in control of their own learning and behaviour are more likely to do well and perform at higher levels than the students who do not feel in control.

CHECK YOUR PROGRESS

Q.3: Identify the factors that affect motivation.

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5.6 ROLE OF MOTIVATION IN LEARNING

The new conception about education is that it should take place in and through the situations in life, that is, through occupational activities which

are true of life and are carried out on the basis of cooperation and responsibility necessary for human-beings bound together in a community. It encourages cooperation, and does not encourage exaggereted competition. However, in the schools, marks, divisions, degrees, scholarships, contests etc. are considered to be much reputable incentives for stimulating intellectual endeavour. Much of the school learning, therefore, suffers on account of these false incentives, and progress in social adjustment is much hampered.

Motives have great educational significance. But, their proper use at the right momement is essential. False incentives or too much importance on extranuous factors hamper school learning to a great extent. They are to be avoided.

So, motivation is important. Infact, it is the most important factor in learning. The teacher cannot arouse the interest of children without motivation, because without motivation, no learning is possible. Motivation is important in learning due to the following reasons:

- **Moulds the Behaviour:** Motivation helps to mould the behaviour of the child. It also helps to energise him and make him active in a natural way. Praise, blame, reward, punishment etc. act as powerful incentives for the actions of the children. They are, therefore, of great use in the learning process.
- **Selection of Behaviour:** Motive is of great help in selecting a particular type of behaviour. It also determines how we react to a particular situation.
- **Satisfaction of Motives:** Our behaviour is directed by motives in such a manner, that we feel satisfied after a particular type of behaviour. Therefore, a teacher should make the child motivated to direct his energies towards specific goals.
- **Creates Interest:** A proper use of motivation leads to motivation which creates interests leading to maximum learning. The learners should be encouraged to study in library, ake interest in doing things, and the teachers should create confience in the learners.
- **Development of Personality:** Motivation also leads the children to show varied interest and develop their personality in the right manner. They excel both in the academic and social fields.

- **Maintenance of Discipline:** Proper motivation helps to maintain discipline in the class.
- **Caters to Individual Differences:** The problem of individual differenes can be solved by proper motivation. Every child learns according to its intensity of motivation.
- **Sublimation of Instincts:** Small children are mostly directed by their innate instincts and impulses. Curiosity, construction, self–assertion are some of the driving factors which form the basis of all kinds of their activities. A child is always attracted towards new things. An efficient teacher should be able to stimulate their impulse of curiousity. A teacher should also encourage children in counstucting and creating things and letting their creativity and imagination develop.
- **Real life Situation:** The teacher must create psychological and social needs for learning in his students. Classroom learning must be related to the future life of the individuals, and must corelate with real life situations.
- **Avoid Stressful Procedures:** Mild tension accelerates the problem solving efforts of students. However too much anxeity and stress may disorganize the congestive process and hinder the performance level of the learners. Too much stress may bring down the individual's level of motivation in his efforts to get closer to his goal.

CHECK YOUR PROGRESS

Q.4: Why is motivation important for learning? Explain briefly.

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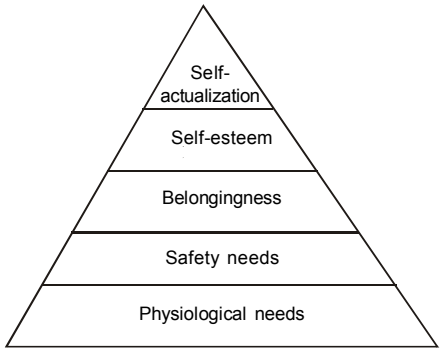
5.7 MASLOW'S SELF ACTUALISATION THEORY

Maslow describes how motives develop stage by stage from purely psysiological drives to complex social purposes. His hierarchy of need is as follows: (i) Gratification of bodily needs, (ii) safety, (iii) love, (iv) Self-esteem, and (v) Self-actualization.

The theory of self-actualization was developed by Abraham Maslow (1908-1970) a professor of Psychology. He was a humanist who believed that man can work out a better world for others as well as for himself. His approach to understand human personality and motivation is different from behaviourism and psychoanalysis. He critically examined the traditional approach of pain, avoidance and pleasure seeking, and tension reduction as the major sources of motivating behaviour. He has consistently argued that the needs are arranged in a hierarchy. As one general type of need is satisfied, another higher order need will emerge and become operative in life. He developd his own system of needs and categorized them into two dimisions, (a) deficit needs and (b) growth needs. The needs of the first category include psysiological needs, such as hunger and thirst. Once these needs are satisfied, the person seeks to satisfy safety needs. Love needs belongingness need and esteem needs. Under the second category, there is only one general need called self–actualization.

The second important concept of Maslow is that each individual has different nature which should be supported and encouraged. He criticized the views of those psychologists who believed that man is selfish, evil, and anti–social. Maslow believed that there are degrees of human manners. He went slightly beyond other need theorists by postulating an order of potency or priority with regard to the structuring of needs within the person.

Maslow developed a hierarchical order of needs from physio-logical to self–actualization needs. The order of needs starts from basic survival or lower order needs to higher order needs. The heirarchy is as follows:



Hierarchy of Needs: Maslow developed a hierarchical order of needs from physiological to self-actualization needs. The order of needs starts from basic survival or lower order needs to higher order needs. The hierarchy is follows:

- Physiological needs
- Sefety needs
- Belongingness and love needs
- The esteem needs
- Self actualization need

The hierarchical structure of needs may be discussed as the following:

- **Physiological needs:** The most potent needs of all the needs, yet the least significant for the self–actualizing person, are the physiological needs. According to Maslow, when these physiological needs are deprived for a long period, all other needs fail to appear or recede in the background.
- **Safety needs:** When the physiological needs are successfully fulfilled, then safety needs become the dominant forec in the personality of the individual. Sefety needs are mainly concerned with maintaing order and security. People feel the need of structure, law and order, and to be under someone's direction.
- **Belongingness and love needs:** The needs of this category emphasize the basic psychological nature of human beings to identity with the group life. These are the needs of maknig intimate relationship with other members of the society, being an accepted member of an organized group needing a familiar environment as family etc.

These needs are dependent on the fulfilment and satisfaction of previous categories of needs. The modern developing society, with all its material advantages, is doing a great harm of disintegrating the family and social life of the people.

- **The esteem needs:** Esteem needs are divided into two categories: (1) Self-esteem, self-respect, self-regard, and self-valuation. (2) Relating to respect from others: reputation, status, social success, and fame. The need of self-evaluation occurs in those persons who are comfortably situated. They are quite secure in the satisfaction of lower needs. A professor who has established a high reputation and does not worry about getting work, may become quite discriminating about what type of works he accepts. Such a professor may accept only those assignments which may challenge his skills. The quality of work is a matter of some concern to him, it fulfils a need for self-respect, a need to feel good for himself.
- **Self-actualizalition:** The highest need, in the hierarchical system proposed by Maslow, is self-actualization. It means to fulfil one's individual nature in all its aspects, being what one can be. The person, who is talented in music, may experience tension if he does not attain the perfection. The man who is interested in nature wants to spend much of his time in the midst of nature. People can be motivated towards self-actualization only when their lower order needs have been statisfied.

CHECK YOUR PROGRESS

Q.5: Explain briefly the Self Actualisation Theory given by Maslow.

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5.8 LET US SUM UP

- Motivation is an important condition of learning.
- Successful learning takes place only when we are motivated to learn a particular subject.
- Good says, “Motivation is the process of arousing sustaining and regulating activity”.
- Motivation is of great importance in learning. Therefore, the teachers should adopt certain techniques to arouse the interest of the children, thus motivating them to learn.
- A teacher can adopt certain techniques in the teaching learning situation to motivate a child.
- Motives have great educational significance, but their proper use at the right moment is very essential.
- A teacher cannot arouse the interest of the children without motivation, without which no learning is possible.
- Maslow describes how motives develop stage by stage from purely psychological drives to complex social purposes.
- Maslow has developed a hierarchical order of needs from psychological to self-actualization needs.
- Motivation is said to be essential or Sine-Qua-Non of learning, in the sense that it provides economy of learning and attainment.

5.9 FURTHER READING

1) Atkinson, J. W. (1964). *An Introduction to Motivation*. Princeton: Van Strand.
2) Bolles Robert, C. (1967). *Theory of Motivation*. New York: Harper & Row.
3) Hall, J. F. (1961). *Psychology of Motivation*. Chicago: Lippincot.

5.10 ANSWERS TO CHECK YOUR PROGRESS

Ans. to Q. No. 1: Motivation is an external stimuli that helps the learners to create the state of mind to know something or to learn. Motive implies the presence of the aims and objectives in mind, whereas motivation activates it by creating necessary condition. In order to activate the individual, external stimulation, arousal of feeling, emotion and sentiment in mind, strengthening and reorganisation of the will force etc. may be needed. Motivation comprises all such extrinsic and intrinsic factors for activating the individuals.

Ans. to Q. No. 2: Clearness of goal, knowledge on success and failure, praise, use of reward and punishment, cooperation and competition, positive thinking or attitude, use of audio-visual aids etc. are some of the techniques that helps the learners to develop the motivation to learn.

Ans. to Q. No. 3: The belief system, higher level of interest, condition of the family or home, teaching approaches, interactive activities among the learners are some of the factors that affect motivation.

Ans. to Q. No. 4: Motivation plays a significant role in motivating the learmers or students to learn. It helps the learners to mould the behaviour, develop interest and personality, arousing the positive attitude or stimuli to learn, provide the individual spaces to cater their individual differences and so on.

Ans. to Q. No. 5: The highest need, in the hierarchical system proposed by Maslow, is self-actualization. It means to fulfil one's individual nature in all its aspects, being what one can be. The person, who is talented in music, may experience tension if he does not attain the perfection. People can be motivated towards self-actualization only when their lower order needs have been statisfied.

5.11 POSSIBLE QUESTIONS

A) Short Questions (Answer each question in about 150-300 words)

Q.1: What is meant by motivation?

Q.2: How would you like to define motivation.

Q.3: Explain some techniques of motivation.

Q.4: What are the factors that are responsible for motivating the children to learn?

B) Long Questions (Answer each question in about 300-500 words)

Q.1: How will you motivate children in classroom teaching? Explain.

Q.2: Why do you think that motivation is important for learning? Explain the role of motiavtion in learning.

Q.3: Discuss the hierarchical order of needs given by Maslow.

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UNIT 6: INTELLIGENCE AND ITS THEORIES

UNIT STRUCTURE

6.1 LEARNING OBJECTIVES

After going through this unit, you will be able to–

- define the meaning, definition, nature and characteristics of intelligence;
- classify theories of intelligence;

- describe role of heredity and environment upon intelligence;
- explain Binet Simon Scale;
- describe classification of intelligence test; and
- list out various uses of intelligence test.

6.2 INTRODUCTION

It is a common observation in schools that some students learn readily while others in the same class, reading the same books, being taught by the same teachers face great difficulty. Some solve problems more easily, whereas, some others find it difficult. It is acknowledged by all teachers that one of the most important single variable that affects schooling is Intelligence Now the question arise as to what is Intelligence. What is the nature of Intelligence? In this unit, we shall discuss the concept, definition and nature of intelligence, and its theories.

6.3 MEANING OF INTELLIGENCE

Intelligence is one of the most controversial topics in psychology. The psychologists for defining intelligence provide different views. It has been defined as the ability to learn, to solve problem, to carry an abstract thinking, to adapt to new situation etc. The concept of intelligence affects the content and organization of the intelligence tests. Hence, it is necessary to examine some of the definitions of intelligence in order to have a clear idea about the nature of intelligence. In this regard, the following definitions may be taken into consideration.

- In the words of Binet, Intelligence is, “Judgment of good sense, initiative, ability to comprehend and to reason well and to adapt one’s self to circumstances.” Thus, intelligence is the capacity to judge well, to reason well, and to comprehend well. It is the capacity to adapt oneself to new situations and conditions of life.
- According to Stern, “Intelligence is the general mental adaptability to new problems and conditions of life.”
- According to Terman, “An individual is intelligent in proportion as he is able to carry on abstract thinking.”

- According to Wells, "Intelligence means precisely the power of so rebinding our behavior patterns as to act better in a novel situation."

However, the most comprehensive and acceptable definition of intelligence is given by Wechsler.

- According to Wechsler, "Intelligence is the aggregate or global capacity of the individual to act purposefully, to think rationally, and to deal effectively with his environment."

All the definitions stress the following aspects of intelligence.

i) **Ability to learn:** Intelligence is the ability to learn. The more intelligent a person is the more extensive is his ability to learn.

ii) **Ability to adjust to a new situation:** Intelligence is the capacity to behave effectively according to novel situation. It is the capacity of an individual to act more effectively and more appropriately in novel situations.

iii) **Ability to carry on abstract thinking:** Intelligence includes the ability to abstract thinking. This means the effective use of concepts and symbols in dealing with situations.

6.3.1 Nature of Intelligence

On the basis of our reading the definitions of Intelligence, we can derive certain important points about intelligence and its functioning. These are:

- Intelligence is a native capacity.
- It is independent of training and acquired experiences.
- It is the comprehensive term used for such behaviour as understanding, thinking, remembering, reasoning etc.
- It has no organic entry. It is a way of behaving.
- Intelligence is using knowledge rather than storing knowledge. Intelligence is intellect put to use.
- It is the ability to deal with abstraction.
- Learning ability of a person depends upon intelligence.
- In is the mental capacity or mental energy available with an individual at a particular time in a particular situation.

- This capacity, available with an individual can be judged only in terms of the quality of behaviour or performance.

Thus, intelligence is a construct, which psychologists have evolved to explain differences in behavior in various field of activity.

6.3.2 Characteristics of the Intelligence

The characteristics of intelligence are as the following:

- Intelligence is an inborn natural power.
- With the help of the power of intelligence, a man is capable of facing the difficult circumstances, problems, difficulties and complicated situations.
- It helps a man in learning things.
- It helps a man to solve even the complicated problems and situations.
- There is no difference in intelligence due to differences in sex.
- Heredity exercises a good deal of influence on intelligence.
- The study of the development of the intelligence has proved that if a child is brought up in a healthy and proper environment, than his IQ shall be more than a child brought up in a different environment.
- There is difference between intelligence and knowledge.

6.4 THEORY OF INTELLIGENCE

It is apparent from the definitions of intelligence that psychologists have different ideas about intelligence. Hence, in order to understand the nature of intelligence, one has to go through the different theories of intelligence. Alfred Binet in France, Spearman in Britain, and Thurstone, Thorndike, Thompson, Vermon etc, in America propounded different theories of intelligence. Therefore, the educationists have enumerated the following theories of intelligence:

- Binet's Uni-Factor Theory
- Spearman's Two Factor Theory
- Thorndike's Multifactor Theory

- Thompson's Group Factor Theory
- Thurston's Multifactor Theory
- Vernon and Burt's Hierarchical Theory
- Guildford's Three Dimensional Theory

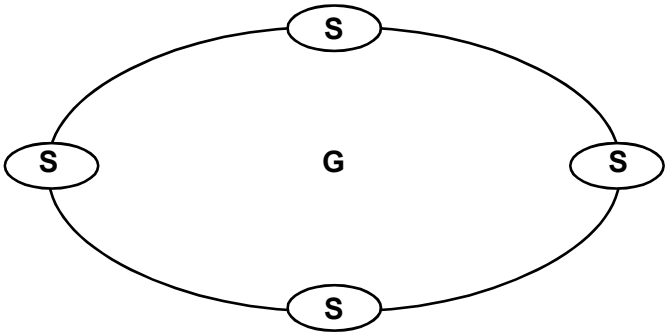
- **Binet's Uni Factor Theory:** The theory was originally developed by Binet. The supporters of the theory considered intelligence as the faculty, which affects all the mental activities. According to this theory, if a person is proficient in one area, he should also be in the order.
- **Spearman's Two-Factor Theory:** Spearman was the founder of this theory. His opinion was that there are two elements in the intelligence of every individual:
  - General factor, which is generally called 'G', is the factor which is present in all the intellectual exercises. The following may be remembered about the factor 'G'–
    a) The factor 'G' is omnipresent.
    b) It is obtained by a human being from birth.
    c) Different things are necessary for every action for every action of the factor.
    d) The 'G' varies with the individual's ability.
  - Specific factor is known as factor 'S'. It is present in special action only. The readers are advised to remember the following about the factor 'S'–
    a) It is not in-born.
    b) This factor is obtained by various exercises.
    c) This specific factor varies with the individuals.
    d) The factors are different for different actions.
    e) A person would be an expert according to the proportion of specific factor in him.

  Spearman's two-factor theory includes two things.

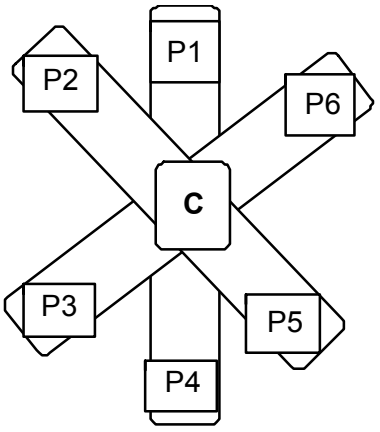
  (a) Educations of Relations and **(b) Educations of Correlates.**

  Education of relations means the knowledge of relation among two things or parts of things. Education of correlates means to think another related thing, when the relation between two things is

apprehended. Later on, Spearman talked about group factor as well; e.g.-mechanical ability, mental speed, etc. Thus, indirectly, there are three elements in Spearman's theory: (a) 'g' or general factor, which on entail is doing all activities. (b)'s' or specific ability, which is different in each activity, (c) group factor, which is in between these two factors, 'g' and 's' Spearman's theory can be understood well with the help of following figure. In this figure, the correlation among four school subjects is shown. As is apparent from the diagram, some subjects require more general ability as compared to others.



- **Thorndike's Multifactor Theory:** According to Thorndike, there is nothing like one intelligence, but there are several intelligences, which overlap each other. The correlation in different tests can be obtained because some characteristics of one text are found in another, i.e. both the activities involve some common factors. Thus, Thorndike rejecting Spearman's 'g' factor, introduced 'Common factor'. According to him, this common factor is essentially involved in all activities in some quantity. Thorndike has mentioned in his book 'Measurement of Intelligence' that individuals differ, in two directions in doing two things: (a) number of items (b) difficulty levels of items. There are individuals, who know several things about different subjects, but their knowledge is not made with regard to one subject. On the other hand, there are such individuals who have deep knowledge of one subject as compared to other subjects. Such individuals are unaware of many such things, which are known to a common man. Thus, Thorndike regarded intelligence as knowledge. This fact can be shown through the following diagram:



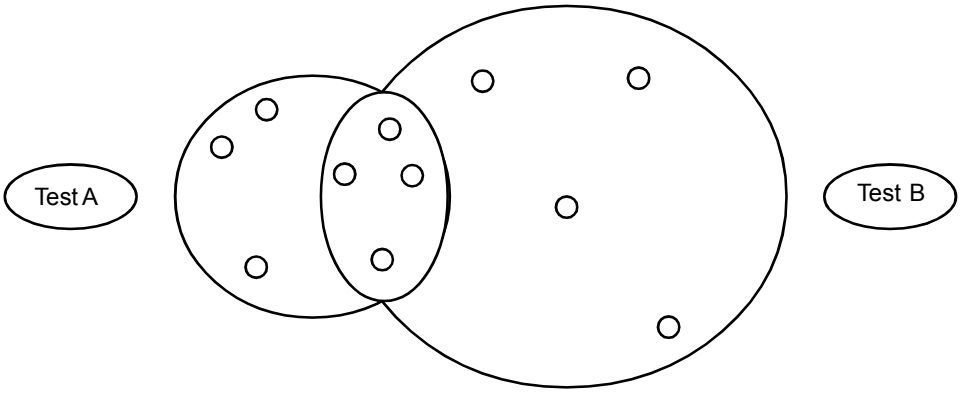
C = Common factor

P1 = Verbal Ability P4 = Memory

P2 = Reasoning Ability P5 = Spatial Ability

P3 = Numerical Ability P6 = Word Fluency

- **Thompson's Group Factor Theory:** According to Thompson, the mind consists of various independent powers. A test measures only a few of these powers. If two tests measure the same power, then some common factors exist between the two. The theory is also known therefore as common factor or group factor theory. The theory can be presented diagrammatically as in the following figure.



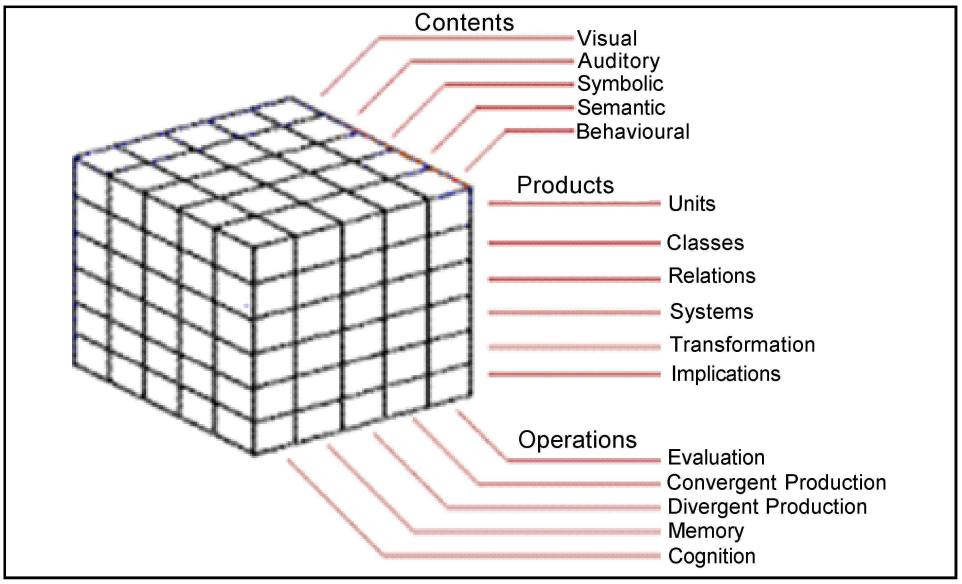
Small circles represent factors, and large circles are representative of tests. In both the test 4's' factors are common. Both tests are positively correlated.

- **Thurston's Multifactor Theory:** Thurston's multifactor theory, in fact, is mid way, between Spearman's two-factor theory and Thorndike's ability theory. Thurston is famous for his factor analytic approach. He showed about 12 primary mental abilities for the

structure of intelligence. Some of them combined together for group factor, which reveal the intelligence of an individual for a specific area, main among them used by Thurston and other investigators.

1) Verbal Ability (V)
2) Word Fluency (W)
3) Number Ability (N)
4) Spatial Ability (S)
5) Memory (M)
6) Perceptual Speed (PS)
7) Reasoning Ability (R)
8) Ability to solve Problems (P)

- **Vernon's and Burt's Hierarchical Theory:** This is a new theory in the field of intelligence. Vernon and Burt have given a new plan of factor's arrangement. In this system, a hierarchical importance is given to mental abilities. The shape of this plan is like a tree, which starts from 'g' factor of Spearman. On the second stage, are two broad factors: (1) Practical Ability, and (2) Academic Ability. Further division of factor takes place at next step. Practical ability is divided into perceptual, mechanical, and spatial ability, while academic ability is divided into reasoning, numerical and verbal ability. The theory is propounded on the basis of the factor analysis approach.
- **Guildford Three Dimensional Theory:** On the basis of 20 years of research work, Guildford (1967) gave a box model of intelligence. It is known as structure of Intellect Model. The model classifies cognitive traits on three dimensions:
  1) **Operations:** It includes cognition, memory, divergent production, convergent production, and evaluation.
  2) **Contents:** The information about the nature on which operations are to be done.
  3) **Products:** The form of its formations in the mind of the subject is explained under the dimension.



Guildford classifies the intellect into operations, which it can perform; different contents of these operations and different products; by taking all possible interactions we obtain 120 cells corresponding to different mental abilities.

CHECK YOUR PROGRESS

Q.1: Give one standard definition of Intelligence.

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Q.2: Mention any two characteristics of intelligence.

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Q.3: What do you mean by Spearman's two-factor theory?

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6.5 ROLE OF HEREDITY AND ENVIRONMENT UPON INTELLIGENCE

Like most aspects of human behavior and cognition, intelligence is a complex trait that is influenced by both genetic and environmental factors.

Intelligence is challenging to study, in part because it can be defined and measured in different ways. Most definitions of intelligence include the ability to learn from experiences and adapt to changing environments. The elements of intelligence include the ability to reason, plan, solve problems, think abstractly, and understand complex ideas. Many studies rely on a measure of intelligence called the intelligence quotient (IQ).

Researchers have conducted many studies to look for genes that influence intelligence. Many of these studies have focused on similarities and differences in IQ within families, particularly looking at adopted children and twins. These studies suggest that genetic factors underlie about 50 percent of the difference in intelligence among individuals. Other studies have examined variations across the entire genomes of many people (an approach called **genome-wide association studies** or GWAS) to determine whether any specific areas of the genome are associated with IQ. These studies have not conclusively identified any genes that underlie differences in intelligence. It is likely that a large number of genes are involved, each of which makes only a small contribution to a person's intelligence.

Intelligence is also strongly influenced by the environment. Factors related to a child's home environment and parenting, education and availability of learning resources, and nutrition, among others, all contribute to intelligence. A person's environment and genes influence each other, and it can be challenging to tease apart the effects of the environment from those of genetics. For example, if a child's IQ is similar to that of his or her parents, is that similarity due to genetic factors passed down from parent to child, to shared environmental factors, or (most likely) to a combination of both? It is clear that both environmental and genetic factors play a part in determining intelligence.

Measurement of Intelligence: Men have always been interested in measuring the abilities of their fellow men. To the Psychologists, intelligence

is the ability to perform certain type of tasks. We can measure observable manifestation of the ability. An intelligence test is a general measure of current cognitive abilities. The development of Intelligence testing may be attributed to the study of individual differences. The Psychologists for the measurement of Intelligence have developed many tests. The very first taste of Intelligence was intended for schools and thus it stressed the aptitudes involved in primary education. It was published in 1905 by Alfred Benet. Let us therefore discuss the Binet Intelligence Test in the following section.

6.6 BINET SIMON INTELLIGENCE TEST

The French psychologist Alfred Binet along with Theodore Simon devised the first intelligence test, which was first published in 1905. Binet originally developed his test to identify slow learners in Paris schools. The three important aspects were:

- Using complex tasks as test items
- Using age standards
- Measuring general mental ability

Binet's first scale, which was published in 1905, consisted of 30 items arranged in the ascending order of difficulty. This scale was designed to measure a wide variety of functions and special emphasis on judgment, comprehension and reasoning, which Binet regarded as essential components of intelligence. Although sensory and perceptual tests were included, the test content was basically verbal.

After working with the scale for three years, Binet published a second scale in 1908. The number of test items is increased from 30 items to 59 items. Some unsatisfactory items were eliminated from the earlier scale. All items were grouped into age levels from 3 to 13 years. It was for the first time that the scale introduced the concept of mental age. Mental age was established by testing large samples of each age group.

A third revision of the Binet-Simon scale appeared in 1911. In this scale, no fundamental changes were introduced. The scale was extended to adult level. However, no tests were provided for the 11, 13 and 14 years levels. The Binet Simon scale attracted attention of the psychologists

throughout the world. Translations and adaptations appeared in many languages. The first and most famous adaptation was done in 1916 by L. M. Terman, and his associates at Stanford University and known as the Stanford Binet Test. It was the first test to provide detailed administrative and scoring instructions. Stanford Binet intelligence test was the healthiest and the direct descendent of Binet's original scale. The last revision of Stanford Binet Test was done in 1960.

6.7 CLASSIFICATION OF INTELLIGENCE TESTS

A large number of intelligence tests have been developed after Binet's intelligence test scale. These tests are classified into various types on the basis of the nature of administration and on the basis of scoring procedure involved as can be found in the following.

a) Classification on the basis of **form**-Verbal test and Non verbal/ Performance test.

b) Classification on the basis of **administration**-Individual test and Group tests.

c) Classification on the basis of **scoring**-Age Scale tests and Point Scale test.

Different specific types of intelligence tests are discussed below.

Intelligence Test

Individual	**Verbal Non-Verbal Individual Verbal**	**Performance or Individual Non-Verbal**
Group	**Group Verbal**	**Group Non-Verbal**

Illustration: Types of Intelligence Tests.

6.7.1 Verbal Test of in Intelligence

Verbal tests are comparatively older than the other kinds of tests. Intelligence can be measured in terms of exercise of individual thoughts, judgments, observations, reasoning, comparison, analysis, and problem solving which find expression in verbal and spoken

responses. In these test the subject makes use of language. Instructions are given in words-written, oral or both. The testes are required to use language verbal or written for their responses. Thus, the content is loaded with varieties of verbal materials, such as:

- **Vocabulary Tests:** In this test, the subject is required to give the meanings of words or phrases.
- **Memory Tests:** These are designed to test the subject's immediate and long-term memory and included recall and recognition type of items.
- **Comprehension Tests:** In this type of tests, the subject is tested for the ability to grasp, understand and react to a given situations.
- **Information Tests:** In these tests, the subject's knowledge about the things around is tested.
- **Association Tests:** Through these test items, the subject is tested for his ability to point out similarities and dissimilarities between two or more concepts.
- **Reasoning Tests:** In these tests, the subject is asked to provide answers, which demonstrate his ability to reason-logically, analytically, synthetically, inductively, or deductively.

Verbal tests may be individual or group, spoken or written, but their main characteristic is that they are linguistic. Binet Simon Tests and its revisions are examples of verbal test.

6.7.2 Nonverbal Test of Intelligence

A child who has a serious speech defector that language development is retarded will be handicapped in such tests. For the benefit of these groups, some tests have been developed that do not require language. These are known as nonverbal language. Items of nonverbal tests are figure, analogies figure, classification, following directions, diagram, form of pictures, geometric figure etc. Consequently, illiterate individuals may also be tested with the help of nonverbal tests. In these tests, the subject may use paper and

pencil but he does not need to know words or numerical figures. Some tests belonging to this category are:

- **Chicago Nonverbal Tests:** This nonverbal has proved most useful for young children aged 12 and13 years.
- **Raven's Progressive Matrices Tests:** It is a very popular nonverbal group test of intelligence. It was developed in the UK. The test has been designed to evaluate the subjects' ability-(a) to see the relationship geometric figures or design; and (b) to perceive the structure of a design in order to select the appropriate part for completion of each pattern.
- **Army Beta Tests:** It was developed in World War I in the USA for testing the intelligence of soldiers who were either illiterate or were not familiar with the English language. It was developed as a substitute of Army Alpha Test, which was a group verbal test (we will discuss later). It is a paper- pencil test. In this scale, scoring is done in a point scale. Army Beta test consisted 7 sections of subtests.

6.7.3 Performance Test of Intelligence

Performance tests are a typical form of nonverbal tests. They are similar to the nonverbal tests of intelligence**.** In performance tests, the use of language is eliminated from test content and response, although directions are generally given orally. Performance test consist of a variety of items. Maze drawing, block design are some examples of performance test. The content of the tests are in form of material objects. The directions or instruction to the subject are conveyed by the tester through oral instructions or pantomimes and signs. There are two types of performance tests—Battery and Omnibus. In Battery type performance tests, all items of one kind are put together in a subtest with its own instruction and practice sample and with its own time limits. In Omnibus type, all items are put together for the whole test as a single test.

6.8 INDIVIDUAL TEST

Individual test of intelligence: An individual test is administered to one person at a time. Individual testing was originally designed by Alfred Binet. An individual test can be verbal, non verbal or performance. Thus, individual tests are again subdivided as

- Individual verbal test
- Individual nonverbal / performance test

6.8.1 Individual Verbal Test

The Stanford Binet scale is the well known example of individual verbal tests. The French psychologist Alfred Binet along with Theodore Simon developed the original Binet Simon test to identify the slow learners in Paris schools.

Wechsler Bellevue Intelligence Test: David Wechsler is another name associated with the construction of individual verbal intelligence test after Binet. Wechsler pointed out that the assumption that the I.Q. should remain constant was not found to be true. There is great variability of I.Q. for different ages. David Wechsler developed a scale for measuring adult intelligence, known as Wechsler Bellevue Intelligence Scale in 1939. In 1955, the scale was modified and re-standardized on the Wechsler Adult Intelligence Scale (WAIS). The latest edition of WAIS was prepared in 1981. Wechsler Adult Intelligence Scale (WAIS) consists of 11 subtests-6 subtests in the verbal scale and 5 in the performance scale.

Wechsler Intelligence Scale for Children (WISC): Wechsler Intelligence Scale for Children (WISC) was an extension of the Wechsler Bellevue to lower age levels. The test is similar to that of adults. Only one WISC subtest (Maze) did not appear in the adult form. WISC scales were constructed by eliminating some of the difficult items and adding easier items to the adult scale. In 1974, a revised version of the WISC was published.

6.8.2 Individual Nonverbal Test

Nonverbal or non-language tests of intelligence for testing one individual at a time come under this category. In these tests, language is not used and it includes items, which require responses in terms of motor activities. These tests are developed to overcome the difficulties, which are faced while using the verbal tests. These tests require the child to do 'something' rather than reply a question. Generally, these tests include items of the following types block designs, mazes, object assembly or puzzles, picture arrangement, picture completion etc. In these tests, no language is used; even instruction can be given through demonstration or action. Some of the better-known scales are:

a) Alexander's pass-along,
b) Koh's Design test,
c) Pinter-Patterson Scale etc. (this test is discussed above)

6.9 GROUP TEST OF INTELLIGENCE

Group intelligence tests were originally designed to be economical substitute for individual tests. Group tests can be administered to more than one individual of a given age at a time by one examiner. These can ensure more uniformity of procedure. Individual test was developed in French, and Group test was developed in America, and its 'mother was necessity of war'.

Group test was the test used in America in 1917-18 for quick recruitment of war officials and soldiers. Arthur Otis was the originator of this type of test. Group intelligence tests are composed of several type of items– vocabulary, general information, arithmetic, reasoning etc. Group test are easy to administer. The directions and manuals for examiners have been worked out, so that even a layman can administer these tests. Group tests are scored more rigidly. Simplicity of responses is regarded as an asset as an asset in Group tests. Group tests are of both verbal and nonverbal types. Thus, they are classified as:

- Group Verbal Intelligence Test
- Group Nonverbal Intelligence Test

6.9.1 Group Verbal Intelligence Test

The tests, which require the use of language and are applied to a group of individuals at a time come under this category. Verbal group tests are the language tests-questions of which are arranged in a small booklet. They are heavily weighted with vocabulary items either in traditional form or in variations. The testees are to answer the items the items by 'yes' or 'no' or in brief words. There are precise instructions to the testees. Army Alpha Tests is the example of Group Verbal Intelligence test.

Army Alpha Tests: Army Alpha Test is the most widely known group verbal test. At the time of first World War in 1917, it was required to select persons for recruitment in the American army. Army Alpha Test was a paper pencil test. After the World War, the test was also used for general purposes with some revisions. Army Alpha Test was composed of 8 subtests.

6.9.2 Group Nonverbal Intellgence Test

These tests do not necessitate the use of language and are applicable to a group of individuals at a time. These are designed to test intelligence without the use of language. The test items contain pictures, diagrams, and geometrical figures etc. printed in a booklet. The subject is required to fill in some empty spaces, to draw some empty figures, to point out similarities etc. In case of group nonverbal tests, the test materials are provided in booklets and require the use of paper and pencil on the part of the testees. Army Beta Test is an example of group nonverbal intelligence tests.

Comparison of Individual and Group Tests: We can draw the following distinctions between individual and group tests.

- Individual tests are administered on an individual at a time; but group tests are administered on many individuals at the same time.
- Individual tests are time and money consuming. But, group tests are economical as it saves time, money and energy.

- Individual tests require trained testers to administer the test. But, no trained examiners are needed to administer group tests. Detailed manuals and instructions are provided with the test so that, anyone can administer the test.
- The examiner can study the behavior of the individual directly in individual testing, as there is face-to-face interaction. However, in case of group test, there is no face-to-face interaction and behavior of individuals cannot be studied directly.

6.10 AGE SCALE AND POINT SCALE TEST

Age scale tests are organized on either year-basis, or age units. In these tests, the items are selected on the basis of success at various ages. Test items are varied, unrelated, and ungraded. In these tests, scoring is done on the basis of mental age. These tests provide qualitative evaluation of the general mental ability of a person. Measurements are not fully subjected to statistical treatment in case of age scale test of intelligence. However, the point scale tests have single homogeneous graded scale. Here tests are selected in terms of functions measured. It is a scale, which gives a point score and not a mental age. In point scale tests; age wise organization of items is dropped. However, a point scale may be converted into an age scale or an age scale into a point scale. In point scale test, the test items are graded as to be available for wide range of ages. These tests provide quantitative evaluation. Measurement of different ages is comparable in case of point scale tests. Items are weighted unequally in these tests. All analysis of the test scores is possible in case of point scale tests.

CHECK YOUR PROGRESS

Q.4: What is Wechsler Intelligence Scale for Children (WISC)?

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Q.5: What is the difference between Army Alpha test and Army Beta test?

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Q.6: State any two differences between group intelligence test and individual intelligence test.

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6.11 USES OF INTELLIGENCE TEST

Intelligence tests are used for a variety of purposes, such as–

- **Use of Classification:** Intelligence tests find their greatest use in classification and grading of pupils according to their ability. Only then, their course of study, nature of treatment, and method of instruction may be planned according to their abilities and fitness.
- **Use for Selection:** Intelligence tests can be properly used for the purpose of selection of suitable candidates for different purposes such as admission to an educational program or course of instruction, to offer a scholarship to gifted students, to select students for giving special responsibilities in the school's academic and co curricular programmes, selection of trainees for a vocational programmes or job etc.
- **Use of Diagnosis:** Intelligence tests are used to diagnose and discriminate the differences in the mental functioning of an individual. These are utilized for:
  - Identifying exceptional children like gifted, backward, feeble minded.

- Assessing the degree of mental retardation or extent of giftedness.
- Diagnosing the cause of problematic behaviour and suggesting remedial measures.

- **Use of Prediction:** There is a close relationship between intelligence and school achievement. Intelligence test results indicate the success and failure of the students in their academic career. Besides these, such test can also be used in deciding success in their chosen professions and social careers.
- **Use in Educational Guidance:** Intelligence tests are good predictors of academic achievement because of high correlation between the two. It can be judged on the basis of the results of intelligence test, what subjects a particular student should study, how one should proceed on one's course of learning etc.
- **Use in Research Work:** Intelligence tests are very much needed for research in the field of education, psychology, and sociology. In short, intelligence tests give the most valuable objective measurements about the levels and qualities of mental abilities of children. These tests can be utilized for identifying and assessing the degree of mental retardation or extent of giftedness, suggesting possible remedial action, and for providing suitable educational programmes. These are suitable tools for research.

6.12 LET US SUM UP

- The concept of intelligence affects the content and organization of the intelligence tests. Hence, it is necessary to examine some of the definitions of intelligence in order to have a clear idea about the nature of intelligence.
- Intelligence is the aggregate or global capacity of the individual to act purposefully, to think rationally, and to deal effectively with his environment.
- There is no difference in intelligence due to differences in sex. Heredity exercises a good deal of influence on intelligence.

- There is a great role of heredity and environment upon intelligence.
- There are various theories of intelligence such as– Binet's Uni-Factor Theory, Spearman's Two Factor Theory, Thorndike's Multifactor Theory, Thompson's Group Factor Theory, Vernon and Burt's Hierarchical Theory, Guildford Three Dimensional Theory.
- French psychologist Alfred Binet along with Theodore Simon devised the first intelligence test, which was first published in 1905. Binet originally developed his test to identify slow learners in Paris schools.
- Intelligence test can be classified on the basis of form, administration and scoring.
- Classification on the basis of form– Verbal test and Non verbal/ Performance test.
- Classification on the basis of administration– Individual test and Group tests.
- Classification on the basis of scoring– Age Scale tests and Point Scale test.
- Individual tests require trained testers to administer the test. But, no trained examiners are needed to administer group tests. Detailed manuals and instructions are provided with the test so that, anyone can administer the test.

6.13 FURTHER READING

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5) Gardner, H. (1998). *Frames of Mind: The Theory of Multiple Intelligence*. New York: Basic Books.

6.14 ANSWERS TO CHECK YOUR PROGRESS

Ans. to Q. No. 1: According to Stern, "Intelligence is the general mental adaptability to new problems and conditions of life."

Ans. to Q. No. 2:
- It helps a man to solve even complicated and comprehended problems and situations.
- There is no difference in intelligence due to differences in sex.

Ans. to Q. No. 3: Spearman's opinion was that there are two elements in the intelligence of every individual– 'G ' factor and 'S' factor. General factor, which is generally called 'G', is the factor, which is present in all the intellectual exercises. Specific factor is known as factor 'S'. It is present in special action only.

Ans. to Q. No. 4: Wechsler Intelligence Scale for Children (WISC) was an extension of the Wechsler Bellevue to lower age levels. The test is similar to that of adults. Only one WISC subtest (Maze) did not appear in the adult form. WISC scales were constructed by eliminating some of the difficult items and adding easier items to the adult scale.

Ans to Q. No. 5: The difference between Army Alpha test and Army Beta test is: Army Alpha Test is the most widely known group verbal test. At the time of first World War in 1917, it was used to select persons for recruitment in American army. Army Beta test was also developed in World War I in the USA. It was used for testing the intelligence of soldiers who were either illiterate or were not familiar with the English language. It was known as group non-verbal test.

Ans. to Q. No. 6: The differences between group intelligence test and individual intelligence test are:
- Individual tests are administered on individual at a time; but group tests are administered on many individual at the same time.
- Individual tests are time and money consuming. However, group tests are economical saving time, money and energy.

6.15 POSSIBLE QUESTIONS

A) Short Questions (Answer each question in about 150-300 words)

Q.1: What is intelligence? Give some characteristics of intelligence.

Q.2: Explain the nature of intelligence.

Q.3: What is Intelligence Test? Describe any one of the standardized verbal test of intelligence.

Q.4: Discuss the importance of intelligence tests in educational evaluation.

Q.5: Write short notes on:

a) Army Alpha Test

b) Army Beta Test

c) Thurston's Multifactor theory

d) Age scale and point scale test

e) Wechsler Intelligence Scale for Children

B) Long Questions (Answer each question in about 300-500 words)

Q.1: Classify intelligence tests and bring out the distinctive features of each type.

Q.2: Mention the various theories of intelligence. Explain in detail about any two theories of intelligence.

Q.3: Distinguish between individual and group test of intelligence. Explain various types of group and individual tests of intelligence.

Q.4: Describe the nature of Stanford–Binet test and make a comparative study of Wechsler scales and Binet scales.

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UNIT 7: CREATIVITY

UNIT STRUCTURE

7.1 LEARNING OBJECTIVES

After going through this unit, you will be able to–

- define creativity;
- describe the characteristics of creativity;
- explain creativity as a process and a product;
- describe the steps involved in creativity;
- identify the characteristics of a creative person;
- explain the relationship between creativity, intelligence, and education;
- discuss the role of home and school on creativity; and
- describe how to nurture creativity among people.

7.2 INTRODUCTION

This unit on Creativity will introduce you to the concept of creativity, its characteristics as a psychological attribute, the characteristics of a

creative person, and the role of home and school in promoting creativity. Creativity is one of the distinguishing characteristics of human beings. However, it is a controversial topic in the field of psychology. People have been trying to understand it—starting from the concept of Almighty as the greatest creator to every human being having some amount of creativity, whether it is inborn or nurtured, and so on. There are different theories to understand it. Let us in this unit try to understand it in the educational context.

7.3 CONCEPT OF CREATIVITY

As you know, creativity is one of the most valued qualities of human beings which enormously affect all spheres of life. It is an important contributor in changing history and in moulding the world. Creativity is the act of turning new and imaginative ideas into reality. It is characterised by the ability to perceive the world in new ways, to find the hidden patterns, to make connections between the seemingly unrelated phenomena, and to generate solutions.

Creativity essentially relates to the potentials of an individual for generating new ideas, forms and practices. It is the result of the convergence of the basic cognitive processes, core domain knowledge, and environmental, personal, and motivational factors. It is the capacity to produce something that is both new and adaptive. It is a complex phenomenon as it is determined by a wide range of factors. It requires a multifaceted approach to understand it. However, the degree and quality of creative expression is relative. It varies from individual to individual and from age to age, as one grows in terms of years, experience and maturity.

Let us now, try to understand the concept of creativity in the light of some of the definitions provided by some famous psychologists.

In 1980, Guilford stated, “of all the qualities that man possesses, those that contribute to his creative thinking have been most important for his wellbeing and his advancement.” According to him, “Creativity sometimes refers to creativity potential, sometimes to creative production, and sometimes to creative productivity.”

According to Skinner, “Creative thinking means that the conclusions or predictions of an individual are new, original, ingenious and unusual.”

According to Simpson, “Creative thinking involves new forms of thinking away from the traditional forms.” Therefore, creativity includes curiosity, imagination, research, novelty, etc.

The above definitions point out that creativity means original thinking, new types of associations, divergent thinking and behaviour, new solutions of old problems, flexibility and a new approach in different fields of life. The creative individual is very much aware of new problems. His thinking is dynamic, flexible, original and novel. He has more than average curiosity and is always busy in finding out new solutions to the traditional problems. Creativity is a very precious and unique quality in an individual as it enables him to solve the complicated problems in the different walks of life. Suppression of creativity of the child leads to learning disabilities, behaviour problems, dropouts and mental conflicts, and above all, a great loss to mankind. In the words of C.V. Good, “the factors of creativity are tentatively described as associate and ideational fluency, originality, adaptive and spontaneous flexibility that make logical evolution.

7.4 CHARACTERISTICS OF CREATIVITY

Creativity is considered a highly particularized and substantive capacity. After understanding the concept of creativity, let us now enumerate its characteristics:

- ***Universal:*** Creativity is universal in nature. It is not confined to any person or any particular group of people. Everyone has creative ability to some or the other extent.
- ***Novelty:*** Creativity is characterized by novelty, i.e. the ability to produce something new. However, it is not necessary to be entirely new. It can be a combination of new and old ideas in a new framework which never existed before. Novelty also implies that the expression should not be repetition or reproduction of something already done.
- ***Divergence:*** Creativity involves divergent thinking, more than convergent thinking. It is regarded as one of the most important

characteristics of creativity. Divergent thinking refers to ability of a person to evolve a general multiple possible solutions when any problem arises.

- ***Requires free Atmosphere:*** Creativity requires a free environment to be fostered. Restrictions and rigid atmosphere hinders the development of creativity. The teacher should allow adequate freedom to the 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.
- ***Wide Scope:*** Creativity has very wide horizons. It includes all the aspects of human life. It is not restricted by any limits or boundaries. It may find expression through poetry, literature, science and technology, leadership, business, art and fine arts and even through some day-to-day activities.
- ***Innate as well as Acquired:*** Creativity is a natural endowment. One's creativity may be the function of natural endowment as well as its nurturing. Thus, creativity is innate as well as acquired. It can be located through psychological investigations and need to be properly nourished.
- ***Relationship with Intelligence:*** Though creativity cannot be separated from intelligence, it is not necessary that only the persons with IQ can create something new. The individual of average intelligence can also bring forward a new idea, a new object or a new discovery. Intelligence and creativity are not the essential condition of each other however, a certain level of intelligence is necessary for successful creative expression.
- ***Adventurous and Open Thinking:*** Creativity is adventurous and open thinking. It challenges stereotyped and closed thinking. It encourages and demands complete freedom to accept and express the multiplicity of responses, choices and lines of action. It involves out of the box thinking rather than the routine activities.
- ***Process as well as Product:*** Creativity is both a process and a product. It is a process from which the product comes and it is the

process of hypothesis formation, hypothesis testing, and communication of result. It refers to both the process of writing a piece of poetry as well as the poem itself.

- ***Individualistic as well as Socialistic:*** Creativity is individualistic approach in the beginning and later on it is accepted by all. That is, the process of creativity is individualistic; however the product of creativity has social implications.

The above discussion has clearly stated that creativity is the quality which leads to the production of something new and desirable. It is the rearrangement of concepts so as to produce something which had not previously existed. Creativity is so personal involving intuition and imagination to a great extent.

7.5 FACTORS INFLUENCING CREATIVITY

Though creativity is universal, you see differences in the degree of creativity among people. This difference may be attributed to various factors affecting creativity.

- **Motivation:** One of the most influential factors of creativity is motivation. The motivation or the urge to create something new or to innovate is necessary to bring out the creative potentials of the children.
- **Courage:** Courage is another major factor influencing creativity. Creativity is thinking against the flow. Therefore, it requires courage to defy the trend and propose a new trend without the fear of failure.
- **Experiences:** Experience is a key player in creative thinking. The more you experience the more one can influence. These experiences define one's ideas and creativity, which are presented through your work.
- **Resources:** The range of resources that a person is exposed to also affects the development of creative abilities. Wide and varied resources provide more opportunities for the promotion of creativity.
- **Management/Governance:** This refers to the administrative environment of the individual. It may be at school, home, or any

organization. A rigid, strict and routine type of governance mars the creativity and a flexible management or administration promotes it.

- **Pressure/Challenge:** The type of pressure or challenges that a person faces also affect the development of creativity. However, the nature of pressure or the challenge should be positive. It should lead to stretching of the person's ability but not to the breaking point.
- **Space and Time**: Creativity requires an appropriate space and right amount of time to carry out the creative process and for creative expression. It takes time to get into your creative mode. You must realize that it will take time to achieve something truly original and creative.

7.6 STEPS INVOLVED IN CREATIVITY

As a process, it is believed that creative expressions go through some stages. Different psychologists have divided these stages into different ways. Some have divided it into 4 stages, others into 5 stages, and some into 7 stages. In general, creativity is believed to follow the following stages:

- **Preparation:** The first stage is preparation. It involves formulation of a problem, collection of information, survey of relevant work in the area, preliminary knowledge of the subject, trial, and error. For this, an individual makes thorough preparation with the help of his previous learning. For e.g. if you are a musician you are absorbing a lot of the music that is inspiring you to create this new piece.
- **Incubation:** This stage is characterized by absence of any activity related to the problem. The problem is set aside for a while. In this stage, an individual instead of understanding overt activities displays covert behaviour. The creative thinker is not consciously thinking about his creation, and the problem is being solved without his awareness.
- **Illumination:** After incubation, the creative ideas, the solution of the problem comes to the mind all of a sudden, with flashes of insight and thoughts. The ideas, which come up with flash, are very crucial and significant from the point of view of creative thinking.

- **Verification:** This is the final stage, where an individual tests, evaluates and verifies the situation. It is determined whether the solution found in the illumination stage is correct and feasible or not. If the solution is found to be correct, it is accepted. If it is wrong, the creative thinking again starts from the beginning.

7.7 CHARACTERISTICS OF A CREATIVE PERSON

In day-to-day life, it may be very easy for you to identify the people who are creative. For example, a poet, songwriter, innovator, storywriter, scientists, etc. are considered having creative abilities. You will find some common characteristics of the creative persons in any field, which have been identified by a number of researchers like Cattell, Torrance Mackinnon, Foster etc. These are as follows:

- Originality of ideas and expression.
- Adaptability and a sense of adventure.
- Independent in thinking.
- Independent judgement.
- A high degree of awareness, enthusiasm, and concentration.
- An investigative and curious nature.
- Fluency in expression.
- Flexibility in thought, perception and action.
- Good Memory and general knowledge.
- An ambitious nature.
- Diversity and divergence of thought.
- Spontaneity and ease of expression.
- Awareness of obligations and responsibilities.
- Respect for the other's opinion.
- Self-respect, self-discipline and impartial justice.
- Ability to make unusual associations or connections between seemingly unrelated or remote ideas.
- Have a large number of ideas or solutions to problems.
- Display intellectual playfulness, fantasize, imagine, and daydream.
- Have a keen or unusual sense of humour.

- Courageous to go against the trend, but may still be emotionally hurt by non-acceptance.
- Frequently challenge the existing facts or authority or experts.

It is significant for you to remember that it is not necessary that every creative person exhibits all these characteristics. However, most of these traits are found in the creative persons in one way or the other.

CHECK YOUR PROGRESS

Q.1: Give one definition of creativity.

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Q.2: Mention the steps of creativity as a process.

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Q.3: State any two characteristics of a creative person.

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7.8 RELATIONSHIP BETWEEN CREATIVITY AND INTELLIGENCE

You have learnt that both intelligence and creativity are psychological attributes. The researchers have found that there is no positive correlation between intelligence and creativity. None of these is an essential prerequisite of the other. It means high intelligence does not imply high creative abilities. Also higher creative abilities do not imply higher intelligence. Intelligence certainly plays a part in creative thinking, but not how you might expect. Your IQ is generally measured by an ability to interpret information and provide solutions, no matter the circumstance. Being able to come up with creative ideas isn't something you need an overly-high IQ to accomplish. Once you've got a level of knowledge gathering and utilization that's about average, you are considered having the creative potential. However, it may be concluded

that a certain level of intelligence is necessary for successful creative expression. Kitano & Kirby (1986) explains this relationship as “an individual can be extremely bright but uncreative, or highly creative but not necessarily intellectually gifted”. Thus, creativity is very different thing from intelligence. You can be a high I.Q. person but a very clumsy one, when it comes to creativity. So you can be intelligent but not creative. You cannot be a fool and yet creative. But a creative person cannot be called an intelligent.

7.9 RELATIONSHIP BETWEEN CREATIVITY AND EDUCATION

Though creativity is a natural endowment, appropriate opportunities, proper training and education is necessary for creative expression. This is not restricted only to great persons in the fields of science, arts, music, etc. As you have already learned that creativity is universal but its degree may vary, it is important to realize that everyone should be provided with a conducive environment for the full development of his or her creativity. The grain of creativity is universal, and it might be inherent in any individual in any sphere of activity. Education, as you understand, is the all round development of the child. Creativity is considered a significant component of an individual’s personality. So education also encompasses development of creative abilities when it indicates all round development.

It is therefore, essential that education should provide the children conditions and opportunities for the full growth and development of their creative abilities. However, education is not confined only to schools. Both the home and the school play an equally important role in fostering creativity in the children. Let us now see the role of home and school in fostering creativity.

7.9.1 Role of School in the Promotion of Creativity

The teachers at schools can give proper stimulation and nurturing of the traits which help to develop creativity, namely originality, flexibility, enthusiasm, independence, divergent thinking, self-confidence etc. in his pupils.

There are some positive steps through which the teacher can foster creativity among the children–

- The teacher should provide opportunities to children to derive satisfaction from identifying themselves as the causes of a product.
- Sufficient opportunities should be given to the children for artistic expression which will ultimately culminate in some novelties.
- A healthy atmosphere for creative expression should be provided in such a way so as to stimulate and develop creative thinking among the children.
- The children should be encouraged to imbibe good qualities like self-confidence, self-reliance, self-feeling etc. They should be made aware of the criticism of their creative expression.
- Always avoid rigid attitudes towards the problems of children. The factors like conservation, faulty habits of work, anxiety and frustration, authoritarian attitude of the teachers etc. should be avoid as far as possible.
- The school curriculum should be so organized that it provides opportunities for creative work by children. The curriculum should also cater to the individual needs of each student for fostering creativity among them.
- For fostering creativity among the children, the teacher should apply different special techniques and methods like brain storming, gaming techniques, teaching models like Bruner's concept attainment model etc.
- The teacher should help pupils apprehend and think over the eventualities of their own actions. They should be encouraged to draw inferences of their own accomplishment which provide them avenues for mental exercises.

For fostering creativity among children, the tradition-oriented memorization by role and fixed and rigid system of evaluation should be avoided. The students should be encouraged to think themselves about the various view points and act accordingly.

7.9.2 Role of Home in the Promotion of Creativity

You have seen that home is the second school for the children. The home environment of a child greatly influences the creativity aspect. It includes the physical, emotional, and social environment of home. Physical environment implies the physical resources available and accessible for the children; social environment include the familial relationship between parents and children and among the siblings or other members of the family; and the emotional environment indicates the emotional safety and comfort provided to the children at home. Home can play a significant role in promoting creativity by consciously designing the home environment. The following matters may be pointed out regarding home environment:

- The children should be provided with stimulating materials at home. This can be done by making appropriate type of toys, games, and reading materials available to them.
- Use of resources like TV, computer, mobile, internet, etc. by the children should be seriously monitored and should be directed towards educational experiences.
- The creative expressions of the children should be encouraged and appropriate time and space should be provided at home for their display.
- Home can also play an important role in exposing children to various forms of creative expressions. For example, you may take them to some cultural events, art exhibition, story time in library, etc.
- Another way to provide opportunity for promoting creativity is sharing of hobbies and interests among the family members. For e.g., kite flying, doing puzzles, sports, painting, etc. may be shared with the children.
- Reading aloud to the children or taking turn to read aloud is another way to introduce them to the creative world. Doing different characters' voices is a great way to get creative.

- You should take care that too much love and too much fear will not promote creativity. So, the emotional environment of the family should ensure emotional safety for the children to express their creativity freely in a constructive way.
- The natural curiosity among the children leads them to ask a lot of questions. They should be permitted to ask questions freely without any hesitation. Also care should be taken to give an appropriate reply to their question.
- You should allow children to make mistakes and take chances, within reason. Making mistakes is an excellent way to learn. Not getting an opportunity to experiment or to fail is a barrier to promotion of creative abilities.
- Any kind of creative activity by the children should be allowed and encouraged through emotional support and resources should be made available as far as possible.

CHECK YOUR PROGRESS

Q.4: What is the relationship between intelligence and creativity?

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Q.5: How can the home environment be made physically resourceful for promoting creativity?

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7.10 LET US SUM UP

- Creativity is one of the distinguishing characteristics of human beings.
- Creativity is the act of turning new and imaginative ideas into reality. It is characterised by the ability to perceive the world in new ways, to

find hidden patterns, to make connections between the seemingly unrelated phenomena, and to generate solutions.

- The degree and quality of creative expression is relative. It varies from individual to individual and from age to age, as one grows in years, experience and maturity.
- Creativity means original thinking, new types of associations, divergent thinking and behaviour, new solutions of old problems, flexibility and a new approach in different fields of life.
- Creativity is considered a highly particularized and substantive capacity. It is characterized by universal, novelty, divergence, requires free atmosphere, wide scope, innate as well as acquired, relationship with intelligence, adventurous and open thinking.
- Creativity is both a process as well as product.
- Creativity, as a process, follows certain stages, which are— preparation, incubation, illumination and verification.
- Some common characteristics of the creative persons in any field are– originality of ideas and expression, adaptability and a sense of adventure, independent in thinking, independent judgement, a high degree of awareness, enthusiasm and concentration, an investigative and curious nature, fluency in expression, flexibility in thought, perception and action, good memory and general knowledge, an ambitious nature, diversity and divergence of thought, spontaneity and ease of expression, awareness of obligations and responsibilities, respect for the other's opinion, ability to make unusual associations, multiple solutions to problems, intellectual playfulness, fantasize, have a keen or unusual sense of humour, courageous.
- Regarding the relationship between creativity and intelligence, it was found that there is no positive correlation between intelligence and creativity. None of these is an essential prerequisite of the other.
- Appropriate opportunities, proper training and education are necessary for creative expression.
- It is therefore, essential that education should provide the children conditions and opportunities for full growth and development of their creative abilities.

- Both home and school influence the development of creativity among the children.
- Some ways to develop creativity in schools have been discussed like providing opportunities to children to derive satisfaction from identifying themselves as the causes of a product, providing opportunities for artistic expression, a healthy atmosphere for creative expression, applying techniques and methods like brain storming, gaming techniques, teaching models like Bruner's concept attainment model etc.
- The home (physical, emotional and social) environment of a child also influences the creativity aspect. The home environment may foster creativity by providing stimulating learning materials, monitoring use of resources like TV, computer, mobile, internet, etc. by the children, providing time and space for creative expression at home, exposing them to various forms of creative expressions, ensuring emotional safety for the children to express their creativity, addressing to their curiosity, allowing them to make errors, etc.

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7.12 ANSWERS TO CHECK YOUR PROGRESS

Ans. to Q. No. 1: According to Skinner, "Creative thinking means that the conclusions or predictions of an individual are new, original, ingenious and unusual."

Ans. to Q. No. 2: The steps of creativity are preparation, incubation, illumination and verification.

Ans. to Q. No. 3: A creative person has originality of ideas and expression and has independent thinking.

Ans. to Q. No. 4: There is no positive correlation between intelligence and creativity. None of these is an essential prerequisite of the other.

Ans. to Q. No. 5: The home environment can be made physically resourceful by making various creativity stimulating materials at home. For example, appropriate type of toys and reading materials, games, etc. may be made available to them.

7.13 POSSIBLE QUESTIONS

A) Very Short Questions (Answer each question in about 50 words)

Q.1: State any five characteristics of creativity.

Q.2: Mention the factors affecting creativity.

Q.3: What is the role of parents in ensuring emotional environment for promoting creativity?

B) Short Questions (Answer each question in about 150 words)

Q.1: Define creativity in the light of definitions given by various psychologists.

Q.2: Why is it said that the scope of creativity is very wide?

Q.3: Why is the incubation stage important in creativity?

Q.4: How is ego related to creativity?

C) Long Questions (Answer each question in about 300-500 words)

Q.1: Explain with appropriate examples how creativity is both a process as well as a product.

Q.2: Describe the role of school in promoting creativity.

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