

18MPS15E-EDUCATIONAL PSYCHOLOGY

UNIT-1

Psychology is the scientific study of behavior and mental processes. **Educational psychology** is the branch of psychology that specializes in understanding teaching and learning in educational settings. Educational psychology is a vast landscape that will take us an entire book to describe.

HISTORICAL BACKGROUND

The field of educational psychology was founded by several pioneers in psychology in the late nineteenth century. Three pioneers—William James, John Dewey, and E. L. Thorndike—stand out in the early history of educational psychology.

William James

Soon after launching the first psychology textbook, *Principles of Psychology* (1890), William James (1842–1910) gave a series of lectures called “Talks to Teachers” (James, 1899/1993) in which he discussed the applications of psychology to educating children. James argued that laboratory psychology experiments often can’t tell us how to effectively teach children. He emphasized the importance of observing teaching and learning in classrooms for improving education. One of his recommendations was to start lessons at a point just beyond the child’s level of knowledge and understanding to stretch the child’s mind.

John Dewey

A second major figure in shaping the field of educational psychology was John Dewey (1859–1952), who became a driving force in the practical application of psychology. Dewey established the first major educational psychology laboratory in the United States, at the University of Chicago in 1894. Later, at Columbia University, he continued his innovative work. We owe many important ideas to John Dewey. First, we owe to him the view of the child as an active learner. Before Dewey, it was believed that children should sit quietly in their seats and passively learn in a rote manner. In contrast, Dewey (1933) argued that children learn best by doing. Second, we owe to Dewey the idea that education should focus on the whole child and emphasize the child’s adaptation to the environment. Dewey reasoned that children should not be just narrowly educated in academic topics but should learn how to think and adapt to a world outside school. He especially thought that children should learn how to be reflective problem solvers. Third, we owe to Dewey the belief that all children deserve to have a competent education. This democratic ideal was not in place at the beginning of Dewey’s career in the latter part of the nineteenth century, when high-quality education was reserved for a small portion of children, especially boys from wealthy families. Dewey pushed for a competent education for all children—girls and boys, as well as children from different socioeconomic and ethnic groups.

E. L. Thorndike

A third pioneer was E. L. Thorndike (1874–1949), who focused on assessment and measurement and promoted the scientific underpinnings of learning. Thorndike argued that one of schooling's most important tasks is to hone children's reasoning skills, and he excelled at doing exacting scientific studies of teaching and learning. Thorndike especially promoted the idea that educational psychology must have a scientific base and should focus strongly on measurement.

Diversity and Early Educational Psychology

The most prominent figures in the early history of educational psychology, as in most disciplines, were mainly White males, such as James, Dewey, and Thorndike. Prior to changes in civil rights laws and policies in the 1960s, only a few dedicated non-White individuals obtained the necessary degrees and broke through racial exclusion barriers to take up research in the field (Koppelman & Goodhart, 2011; Spring, 2010). Two pioneering African American psychologists, Mamie and Kenneth Clark, conducted research on African American children's self-conceptions and identity (Clark & Clark, 1939). In 1971 Kenneth Clark became the first African American president of the American Psychological Association. In 1932 Latino psychologist George Sanchez conducted research showing that intelligence tests were culturally biased against ethnic minority children. Like ethnic minorities, women also faced barriers in higher education and so have only gradually become prominent contributors to psychological research. One often overlooked person in the history of educational psychology is Leta Stetter Hollingworth. She was the first individual to use the term *gifted* to describe children who scored exceptionally high on intelligence tests (Hollingworth, 1916).

The Behavioral Approach

Thorndike's approach to the study of learning guided educational psychology through the first half of the twentieth century. In American psychology, B. F. Skinner's (1938) view, which built on Thorndike's ideas, strongly influenced educational psychology in the middle of the century. Skinner's behavioral approach, which is described in detail in Chapter 7, involved attempts to precisely determine the best conditions for learning. Skinner argued that the mental processes proposed by psychologists such as James and Dewey were not observable and therefore could not be appropriate subject matter for a scientific study of psychology, which he defined as the science of observable behavior and its controlling conditions. In the 1950s, Skinner (1954) developed the concept of *programmed learning*, which involved reinforcing the student's behavior after each of a series of steps until the student reached a learning goal. In an early technological effort, he created a teaching machine to serve as a tutor and reinforce students' behavior for correct answers (Skinner, 1958).

The Cognitive Revolution

However, the objectives spelled out in the behavioral approach to learning did not address many of the actual goals and needs of classroom educators (Hilgard, 1996). In reaction, as early as the 1950s, Benjamin Bloom created a taxonomy of cognitive skills that included remembering, comprehending, synthesizing, and evaluating, which he suggested teachers should help students develop. The cognitive revolution in psychology began to take hold by the 1980s and ushered in a great deal of enthusiasm for applying the concepts of cognitive psychology—memory, thinking, reasoning, and so on—to helping students learn. Thus, toward the latter part of the twentieth century, many educational psychologists returned to an emphasis on the cognitive aspects of learning advocated by James and Dewey at the beginning of the century. Both cognitive and behavioral approaches continue to be a part of educational psychology today (Anderman & Dawson, 2011; Veenman, 2011). We have much more to say about these approaches in Chapters 7 through 11. More recently, educational psychologists have increasingly focused on the socioemotional aspects of students' lives. For example, they are analyzing the school as a social context and examining the role of culture in education (Campbell, 2010; Spring, 2010). We explore the socioemotional aspects of teaching and learning in many chapters of this book.

TEACHING: ART AND SCIENCE

How scientific can teachers be in their approach to teaching? Both science and the art of skillful, experienced practice play important roles in a teacher's success. Educational psychology draws much of its knowledge from broader theory and research in psychology (Bonney & Sternberg, 2011; Danielson, 2010). For example, the theories of Jean Piaget and Lev Vygotsky were not created in an effort to inform teachers about ways to educate children, yet in Chapter 2 you will see that both of these theories have many applications that can guide your teaching. The field also draws from theory and research more directly created and conducted by educational psychologists, and from teachers' practical experiences. For example, in Chapter 13 you will read about Dale Schunk's (2008) classroom-oriented research on *self-efficacy* (the belief that one can master a situation and produce positive outcomes). Educational psychologists also recognize that teaching sometimes must depart from scientific recipes, requiring improvisation and spontaneity (Borich, 2011; Parkay & Stanford, 2010).

As a science, educational psychology's aim is to provide you with research knowledge that you can effectively apply to teaching situations and with research skills that will enhance your understanding of what impacts student learning (Alexander & Mayer, 2011; Harris, Graham, & Urdan, 2011). But your teaching will still remain an art. In addition to what you can learn from research, you will also continually make important judgments in the classroom based on

your personal skills and experiences, as well as the accumulated wisdom of other teachers (Ryan & Cooper, 2010) Some experts in educational psychology emphasize that many effective teachers use both a constructivist *and* a direct instruction approach rather than either exclusively (Darling-Hammond & Bransford, 2005). Further, some circumstances may call more for a constructivist approach, others for a direct instruction approach. For example, experts increasingly recommend an explicit, intellectually engaging direct instruction approach when teaching students with a reading or a writing disability (Berninger, 2006). Whether you teach more from a constructivist approach or more from a direct instruction approach, you can be an effective teacher.

THE ROLE OF EDUCATIONAL PSYCHOLOGY

For as long as the formal study of educational psychology has existed—over 100 years—there

have been debates about what it really is. Some people believe educational psychology is simply

knowledge gained from psychology and applied to the activities of the classroom. Others believe

it involves applying the methods of psychology to study classroom and school life (Brophy, 2003).

A quick look at history shows that educational psychology and teaching have been closely linked since the beginning.

In the Beginning: Linking Educational Psychology and Teaching

In one sense, educational psychology is very old. Issues Plato and Aristotle discussed—the role of

the teacher, the relationship between teacher and student, methods of teaching, the nature and order of learning, the role of emotion in learning—are still topics in educational psychology today.

But let's fast forward to recent history. From the beginning, psychology in the United States was

linked to teaching. At Harvard in 1890, William James founded the field of psychology and devel

oped a lecture series for teachers entitled *Talks to Teachers about Psychology*.

These lectures were given

in summer schools for teachers around the country and then published in 1899.

James's student,

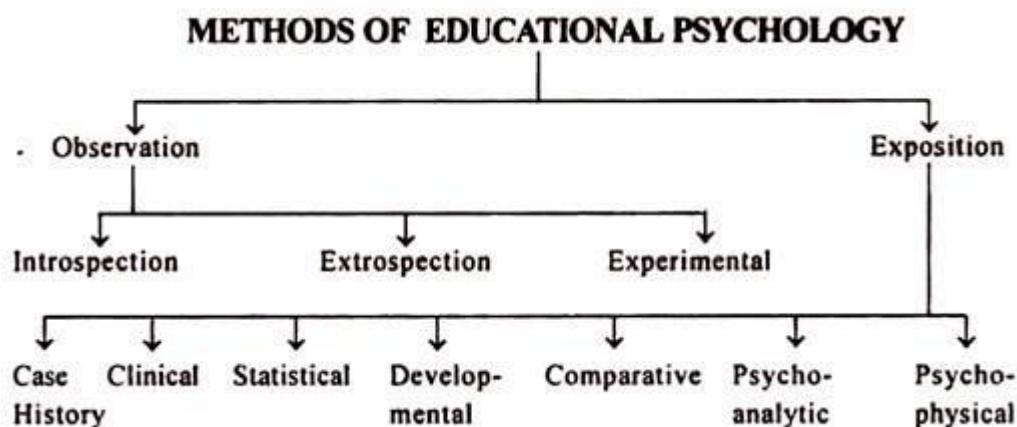
G. Stanley Hall, founded the American Psychological Association. His

dissertation was about chil

dren's understandings of the world; teachers helped him collect data. Hall

encouraged teachers to

make detailed observations to study their students' development—as his mother had done when she was a teacher. Hall's student John Dewey founded the Laboratory School at the University of Chicago and is considered the father of the progressive education movement (Berliner, 2006; Hilgard, 1996; Pajares, 2003). Another of William James's students, E. L. Thorndike, wrote the first educational psychology text in 1903 and founded the *Journal of Educational Psychology* in 1910. In the 1940s and 1950s, the study of educational psychology concentrated on individual differences, assessment, and learning behaviors. In the 1960s and 1970s, the focus of research shifted to the study of cognitive development and learning, with attention to how students learn concepts and remember. More recently, educational psychologists have investigated how culture and social factors affect learning and development and the role of educational psychology in shaping public policy (Anderman, 2011; Pressley & Roehrig, 2003).



Method # 1. Introspection:

(a) The Method:

Introspection is one of the older methods and is peculiar to psychology. It means looking within, looking into the working of our own minds and reporting what we find there. In other words, it is a method of “self-observation “—

observation by an individual of his own mental states directly by directing attention towards a particular experience with a particular purpose.

This kind of self-observation, therefore, is not a vague, unsystematic or haphazard observation. For example, a student has been asked to answer a question. He has to recall certain facts learned by him to organise them in a particular manner and then to report what way he tried to recall, what he thought and felt when trying to recall. Thus, it is a method in which the individual observes, analyses and reports his own feelings, thoughts or all that passes in his mind during the course of a mental act or experience.

(b) Advantages:

The method has many advantages. It enables us to understand one's mental set at a certain time and thus throws light on behaviour, which is reflective of mental experience. Mere objective and direct observation of a person is not enough. We need to know what is going on in the mind of that person. An artist is painting a picture. We observe him carefully and find that, he is sitting absorbed in a certain posture, that he makes certain gestures or that he is mixing such and such colours.

But how he is doing it, what feelings and thoughts are passing his mind, we can learn only when he introspects his own mind and reports. Then alone, we are in a position to understand fully his act or behaviour of painting. Again, the method does not entail any expenses. There is no need for any laboratory or apparatus. We obtain a direct knowledge of the mental experience of the individual.

(c) Objections:

Several objections have been raised against this method by later psychologists i.e., after Titchner. It is a purely private affair. The results of introspection are only subjective. Something is going on in another person's mind; it is not accessible to me or to you. Hence, it cannot be verified by other observers. What cannot be verified or repeated by others lack scientific validity. The essence of science is controlled observation under experimental conditions. Scientific results are always verifiable. Hence, introspection is regarded as an unscientific method.

Another difficulty of the method is that it may destroy the very experience or process it aims at studying. Our immediate memory can come to our rescue and

we can recall the process to a large extent. Thus introspection actually becomes retrospection. Besides, this method cannot be found useful in studying children, animals, insane people and mental defective or those who are not good at linguistic expression. This is a limitation of the method.

(d) Forms:

One of the forms of introspection that is used in educational psychology is the anecdotal method. It consists of the recording of personal impressions about some aspect of pupil behaviour which seems significant to the observer. According to Brown and Martin, “anecdotes are descriptive accounts of episodes or occurrences in the daily life of the student.” These accounts are written out of memory of the teacher or observer.

The method is open to criticism since the teacher or observer may have missed certain things or may not remember accurately. He may also be influenced by suggestion.

The questionnaire is another form of the introspective method, which is used in the appraisal of personal qualities, attitudes, opinions and beliefs of individuals. Galton used this method in his study of individual differences and Stanley Hall in his study of childhood and adolescence.

A questionnaire is a series of printed or written questions which the individual is supposed to answer. It is a useful device, which is frequently used by educational and vocational counsellors. But the usefulness of this method depends on how specific and clear the instructions are. In framing a questionnaire, one should be clear about the objectives in hand.

Questions should be so framed that the answers can easily be given or the right answer easily checked. The answers obtained are then compiled, classified and analysed or categorised and interpreted. The questionnaire is a type of introspective method because the answers of various questions evoke ‘retrospective processes’ as in pure introspection.

Method # 2. The Observational Method:

1. The Method:

It is one of the most popular of methods used in psychology for collection of data. This method is also called the method of ‘objective observation’ as against introspection which is a method of self-observation. The individual’s behaviour is observed by somebody other than that person himself. The behaviour

observed may be expressed in the form of bodily changes, bodily action, gestures, facial expression and speech.

The psychologist may sit down and take notes of the behaviour of a subject under particular conditions. The method was used widely by child psychologists who would prepare running records of all that the child did during a certain period and in a certain situation. These observations enabled them to make certain generalisations about human behaviour in general.

2. Difficulties:

Psychologists found that they could not keep pace with the speed of subjects' behaviour and thought as expressed by them. This problem was solved to a large extent by the introduction of type-recording, photographic films or by employing a number of stenographers to record the behaviour.

There was another problem besides the speed of behaviour. It was felt that the subject's behaviour can be affected by the presence of the psychologist in the room. The subject may become self-conscious and may not behave naturally, which he would have done had been alone in the room. This introduced the use of one-way screens and the system of observation-booths.

The subject would behave in the most natural manner without knowing that he was being observed or studied. Child development centers and child guidance clinics are generally fitted with one-way glass screens or observations booths. Direct observation however, can be quite effective once the subject or subjects get used and adjusted to the presence of the psychologist.

3. Precautions:

In order to have reliable and correct observations, there are certain precautions that should be borne in mind:

Firstly, the observer must adopt an objective attitude. Our observations should be free from our own biases, prejudices and result from sustained attention.

Secondly, it is necessary that before we form an estimate of an individual's behaviour, we should have made a number of observations of the same behaviour in similar conditions,

Thirdly, if needed. We should pool our observations with those made by others.

Fourthly, the problem that has to be observed, is well-defined and observers are trained to distinguish between what is observed and what is interpreted.

Fifthly, to ensure accuracy of observation and to reduce the effect of bias, the behaviour may be observed for a specific period of time, after it has been analysed into its various aspects.

This device is called “time sampling” i.e., the behaviour is sampled for a short and definite period of time and it is regarded as representative of the behaviour in general covered by the various analysable elements together. This device has been used by Iver James Robertson in his study. “A Two-year Old Goes to Hospital”. He has observed the reactions of a hospitalised child to various situations and persons of suitable intervals, for a short period every time, with the help of a carefully drawn-up proforma to be filled in by the observer.

Method # 3. The Experimental Method:

The experimental method in psychology was made popular first by a German psychologist named Wundt who opened the first psychological laboratory at Leipzig in 1879. The tremendous progress which psychology has made during the last 50 years is due to the use of this method.

Experimental investigations has thrown light on different ways of memorisation, the effect of different factors on learning, mental fatigue, image and imagination, span of attention, the effects of giving children practice or coaching on intelligence tests, transfer of training, the role of maturation in learning and the like.

According to Chapin “An experiment is an observation under controlled conditions.” Festinger says, “The essence of an experiment may be described as observing the effect on a dependent variable of the manipulation of an independent variable.”

Historical Background:

The experimental method was first of all introduced by William Wundt in 1879 at Leipzig Laboratory. In 1880, Ebbinghaus conducted many experiments on memory. Rice and Common conducted many experiments on spelling achievements. Thorndike, Juad, Freeman, Kohler, Pavlov and Skinner etc. conducted many experiments in various fields.

The use of this method has raised psychology to the status of an experimental science like physics, chemistry and physiology, although the former cannot attain the degree of objectivity and verifiability that we can in the latter.

It will be desirable here to understand the essentials of the experimental method. “The essence of an experiment consists in controlling the conditions under which a phenomenon occurs, then varying those conditions systematically and noting the results. In observation, we are content to take facts as we find them; but in an experiment we are not. We interfere with them and arrange them for ourselves in order to see what will happen..... An experiment is thus a question asked from nature”.

Thus, in this method all conditions or variable affecting the behaviour are held constant or unchanged or controlled: only one single specific condition is changed. This specific condition or variables is called “an independent variable”; other conditions or variables are called “dependent variables”.

Supposing we want to study experimentally the day-to-day influence of room temperature on a group of students who are learning. We will have to use the same group at the same hour, with always a similar task to be done, with always the same conditions of seating, lighting, absence from distractions, interests or purposes, and direction giving; but with varying room temperature from sitting to sitting.

Thus, we will be able to state with confidence, after carrying out this experiment for a few days, that the most efficient mental work is accomplished, at least for those subjects, with room temperature, say at 70° F.

Another important technique of experimentation in educational psychology is the use of control-group method. Suppose we want to study the effect of a period of intellectual activity after memorising a prose passage, on the amount of material remembered. We can have two groups of students or subjects. They will be equated in age, intelligence socio-economic or cultural status and also in their memorising ability.

The later will be ascertained through various tests and observations. Both these groups will be then given the task of memorising a prose passage. The passage having been memorised, group ‘A’ will be given some rest-pause for a certain

period whereas group 'B' will be given some other intellectual task, say, of working out some mathematical problems during this interval.

At the end of the interval, the two groups will be compared in regard to the amount of material they can remember from the passage originally learned. Group 'A' is the control group and group 'B' is the experimental group. The comparison will either prove or disprove our hypothesis i.e., that the period of intellectual activity after the passage has been memorised improves or increases the amount of material remembered.

The same technique could be used to prove or disprove the hypothesis that the administration of glutamic acid, if given at a certain age and for a certain period, will increase the intelligence level of mentally deficient children. Subjects constituting the control group do not receive the drug whereas those of the experimental group do get it. Proving or disproving a hypothesis is technically described as 'testing' a hypothesis. A hypothesis is formed on the basis of available general knowledge insight and research inferences.

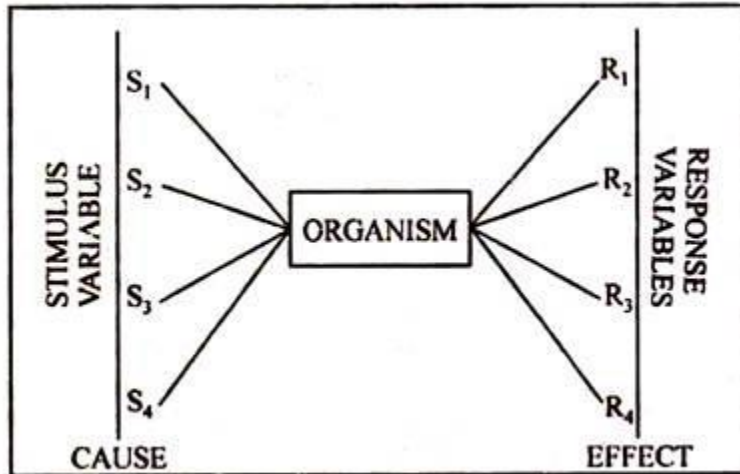
The following Characteristics of an experiment will further highlight the meaning of experimental method:

1. Observation under controlled conditions:

An experiment consists of objective observation of actions performed under rigidly controlled or laboratory conditions. Control is the basic element in experimentation. In it the influence of extraneous factors that are not included in the hypothesis are prevented from operating and confusing the outcome which is to be appraised. Three types of control, namely (i) Physical control, (ii) Selective control, (iii) Statistical control are operated in an experiment.

2. Randomisation:

As it is very difficult to exercise complete control, efforts are made to assign cases in the experimental and control groups randomly.



3. Replication:

Replication implies conducting a number of sub- experiments within the framework of an overall experimental design.

The following are the essential features or requirements underlying the experiment:

1. Psychological laboratory:

There should be psychological laboratory fully equipped with apparatus.

2. Experimenter:

There is an experimenter or experimenters.

3. Subject:

There is a subject or subjects on whom the experiment is performed. In physical sciences, experiments are performed on inorganic or dead subjects, whereas in psychology experiments are performed on living subjects.

4. Stimulus:

By “stimulus”, we mean any physical force in the environment which impinges (strikes) the organism to behave, or to react.

5. Response:

Response is reaction to the stimulus. It can also be defined as change in behaviour which can be observed. So observable change in behaviour is known as response.

6. Variables:

The term “variable” means that which can be varied or changed or that which changes or varies itself. The stimulus is changed and the response changes. The former represents one type and the latter another type of variable. The first variable (stimulus variable) can be changed by the experimenter at will and is deliberately and systematically varied to find out how this is accompanied by changes in the second set of variables (response variables). The variation in the response variable is known to follow changes in the stimulus variable. However, there is no such definite relation in reverse direction.

In the worlds of James N. Shafer, the word ‘variable’ itself refers to any event or process that may assume different values. A person’s height and weight would be examples of physical variables while intelligence and personality would be considered psychological variables.

There are mainly three types of variables:

(a) Stimulus Variables (Independent variables):

Independent variable is one which is systematically and independently varied or manipulated by the experimenter. For example, if we want to study the effect of noise on mental activity, then in this example noise is an independent variable since it is the variable from which we predict changes in mental activity.

Independent variables in psychology can be classified into following groups:

(i) Environmental variables:

Perhaps the most common type of independent variable studied by psychologists is the variation of some aspect of the environment. In the above example, noise is an independent variable. Noise is an environmental condition.

(ii) Instructional variables:

A second type of variable often studied by psychologists is the kind of instruction given to the subjects. Depending on the instructions, a subject may have a set to respond in different ways. Instruction may influence his response. For example, student typists who work under instructions to emphasize accuracy may become better typists than students who are introduced to emphasize speed.

(iii) Task variables:

The experimenter may be interested in knowing the effect of manipulating aspect of the task itself. Difficulty of the task, length of the task, similarity of

the task, meaningfulness of the task, pleasantness of the task may serve as independent variables.

(iv) Subject variables:

Subject variables involve characteristics of the individuals such as age, sex, intelligence, race and fatigue.

(b) Organismic Variables:

Organismic variables are those variables which are within the organism.

Some of the organismic variables are following:-

(i) Habit strength, the strength of association between a certain S and certain R, based on previous learning.

(ii) Drive such as hunger.

(iii) Incentive like reward or punishment expected.

(iv) Inhibition tending to diminish the momentary readiness for a response. Fatigue, satiation, distraction, fear and caution may cause inhibition.

(v) Individual differences due to age, sex, intelligence, interests, aptitudes, health and organic state.

(c) Response variables (Dependent variables):

The dependent variable is the variable that we predict will change with changes in the independent variable. In other words, dependent variable or response variable is that variable on which the effect is being studied. For example, we want to study the effect of punishment on learning. Here 'punishment' is stimulus variable and 'slow or quick speed of learning' is known as response variable.

Response variables can vary in the following ways:-

(i) Accuracy:

Measure of accuracy is almost inevitably a measure of errors.

(ii) Speed or quickness:

It can be measured in terms of:

(a) Time limit:

How much is done in the same time allowed?

(b) Amount limit:

b How long does it take to do the assigned amount ?

(iii) Probability or frequency:

When a particular response occurs sometimes but not on every trial. If there are two or more competing responses to the same stimulus or situation, the probability of each competitor can be determined in series of trials. The percentage or frequency of correct responses or errors is an index of discrimination.

(iv) Strength or energy response:

The lesser the energy is consumed in attaining a certain result, the greater is the efficiency.

(v) Response latency:

Response latency is the interval between a stimulus change and the occurrence of a response.

It must be noted that in experiment, we hold all stimulus variables of influence constant except one and this one we can change and vary. The effects of these changes are observed, measured and recorded.

From the description of an experiment given above it will be clear that certain condition must be borne in mind for its success:

(a) We have to understand the organism and its nature fully. The human subjects on which the experiment is being performed may be an adult or a child or an adolescent.

(b) The maturation level reached by the organism must not be ignored.

(c) The state of the organism at the time of experiment must be considered. It is important to know if the organism is hungry, fatigued or bored.

(d) If the experiment involves danger to human subjects, it must be performed on the species close to human beings i.e., chimpanzees rather than rats.

(e) The condition or variable that affect the behaviour should be controlled and defined as perfectly as possible. These controls are called experimental controls. However, where experimental controls are not possible, various types of statistical controls may be used instead.

Characteristics of Experimental Method:

1. It enables us to study behaviour under controlled conditions.
2. It is scientific in nature.
3. The experimental method can be repeated without any difficulty.
4. The results or conclusions arrived at by this method are reliable.
5. Randomization.

Steps of Experimental Method:

- (1) Statement of the problem.
- (2) Formulation of hypothesis.
- (3) Designing the independent and dependent variable.
- (4) Controlling the conditions of experiment.
- (5) Selection of experimental design.
- (6) Analysis of the result.
- (7) Verification and confirmation of the hypotheses by the result of the experiment.

Merits (Advantages) of Experimental Method:

1. Reliable and valid:

Experimental method is most reliable, most valid, most systematic, most precise and most objective method of psychology.

2. Exact science:

It is the experimental method which has made psychology a science and put it on scientific footing. As Woodworth states, “**Experiment has made psychology an exact science.**” It gives us the exact results, as statistical techniques and calculations are used in it.

3. Universal application:

This method has universal application. It can be applied in case of children as well as adults. Even animals can be studied with the help of this method. It becomes difficult to study all types of people with the help of other methods.

4. Wide applications:

(a) It has wide applications in all the branches of psychology especially in the intelligence measurement, personality measurement, attitude formation, individual differences and mental disorders.

(b) Experimental investigations have been thrown light on different methods and laws of learning and memory, effect of different factors of learning, memory, attention, interest, motivation, transfer of training, growth and development and finally development of personality.

5. Quantitative measurement:

It has introduced quantitative measurement in psychology. Individual is studied internally by this method in a quantitative manner like the study of emotion, motivation, learning and perception etc.

6. Special activities:

There are some special activities which can be studied only with the help of experimental method. For example, phenomena of conditioning can be studied only with the help of experimental method. Similarly reaction time of the subject cannot be tested with the help of any method except the experimental method.

7. Pre-planned:

It can be pre-planned and the experimenter can be fully prepared for the accurate observation.

8. Variation and repetition:

The experimenter can control and create the conditions himself which influence the fact under investigation and can vary them systematically. He can repeat them as often as he wants. In observation, he has to wait for the natural phenomenon to occur. The experimenter can repeat the experiment for many times without any wait.

9. Verification:

It is given to verification. Results of the experiment can be verified.

10. Utility in education:

Experimental method has been widely used in almost all the aspects of education i.e., in:

(1) determining the aim of education,

- (2) curriculum,
- (3) methods of teaching,
- (4) framing the timetable,
- (5) recruiting teachers,
- (6) measuring the achievements of the pupils and
- (7) in guidance programme.

Demerits (Limitations) of Experimental Method:

1. Lengthy and time consuming:

It is very lengthy, time consuming and energy consuming.

2. Expensive:

It is very expensive or costly as it requires well equipped laboratory or apparatus and experts to handle them. Prof. Woodworth says, "Experiment is a very costly affair."

3. Difficulty in controlling variables:

All the variables cannot be completely controlled. Experiments on heredity cannot be conducted on human beings under controlled conditions.

4. Problem of measuring dependent variable:

Supposing that a suitable observable dependent variable is settled, still, there is the problem of measuring them. We do not have anything like a thermometer or an inch scale or weight box. We cannot say that such and such person has so much of anxiety. We can only say that such and such person is more worried today than yesterday or he is more worried than another individual. Our measures are purely ordinal and comparative. This also limits the scope of our generalisations.

5. Artificiality:

There is certain amount of artificiality of laboratory conditions and this artificiality does curb our results.

6. A gulf between laboratory and life:

In the laboratory, we control all other variables and arrive at a finding regarding the relation between a specific stimulus and a specific response. In actual life, several stimuli act at the same time and several responses appear. Hence there is a gulf between the laboratory experiments and life.

A man who is hungry, thirsty, sick and has no money whose child has died and whose wife is in the hospital is a cold fact we get in life. But no laboratory has studied such a man and perhaps no laboratory will be able to do that though we may succeed in studying individually the effect of each one of the above facts.

7. Every phenomena cannot be studied:

Every phenomena cannot be studied in the laboratory e.g., to study the causes of abnormality and abnormal behaviour we cannot make our subject mad. Similarly, we cannot retard the growth of a child to find out the causes of retardation.

8. Restriction of time and place:

In method of introspection and observation there is no restriction of time and place. But in experimental method, there is restriction of time and place. An experiment cannot be conducted at all times and all places. As Prof. Murphy states, **“The restrictions of time, place and laboratory are a great obstacle in the study of human behaviour.”**

Method # 4. The Clinical Method:

The clinical method is also called case study method. It is used by clinical psychologists, psychiatrists, psychiatric social works and teachers in child guidance clinics or mental hygiene centers or in ordinary school situations. Generally, we use this method when we want to understand the causes and sources of people's fears, anxieties, worries, obsessions, their personal, social, educational and vocational maladjustments.

A couple of students in your class are showing poor scholastic achievements or some behaviour problems. You want to understand the causes so that you may plan some treatment procedures. This method will be useful in such conditions. It may be noted that the clinical methods or “procedures are not designed to discover general behavioural trends, laws or relationships. Rather they are concerned with a unique individual who is trouble in and interest is focussed on the immediate, practical question of how to best help him. The starting point of a clinical investigation is an individual who needs or seeks help and the

procedure ideally terminates with the better adjustment of the individual.”
(Sawney and Telford).

The clinical investigator may start with some hypothesis about the probable causes of the difficulty or troublesome behaviour. The tentative hypothesis is supported or disproved by the data collected through the use of case-history, interviews, visits to the home or school and psychological testing. From the data collected, certain deductions are made as to probable treatment. The employment of this method includes the use of case histories, interviews and psychological testing.

A case history traces the family and health, history, hereditary factors, classifies the developmental data, the educational progress, interpersonal and inter-parental or intra-parental relationships, and thus makes us understand the major forces and influences, which have developed and shaped the individual's personality.

The clinical method, in itself, cannot claim to the objectivity attained by the experimental method, but it may afford fruitful new hypothesis which can be tested by the better controlled experimental procedures.

Method # 5. The Genetic or Developmental Method:

This method, by laying emphasis on the developmental aspects of behaviour, seeks to find out the causes of that behaviour in its crude beginnings. It assumes that a full appreciation of such behaviour patterns of an adult requires the study of simple behaviour patterns in his childhood. These simple behaviour patterns grow more complex gradually as the individual grows in age.

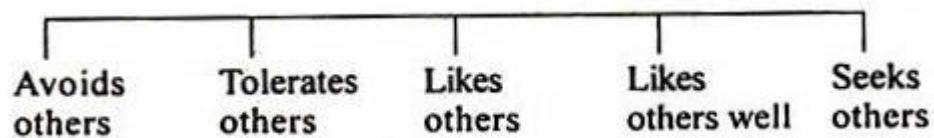
An understanding of an adult can be facilitated if we begin with the learning behaviour in his childhood, go on to the study of such behaviour in his preadolescence and adolescence. This back-ground should help us to arrive at some conclusions about the learning behaviour in adulthood.

The same can be said about the development of imagination, thinking and reasoning. This method seeks to answer such questions as: How do we become what we are? What do we inherit? How is inheritance modified in childhood, adolescence and adulthood? What changes take place in thought and behaviour at different stages of life? How does the perception develop?

Method # 6. The Testing Methods:

The testing methods comprise psychological tests, educational measurements, rating scales, checklists and questionnaires. Some writers characterise rating scales, checklists and questionnaires as field investigation methods as different from the testing methods. We know that the use of questionnaires as a form of the introspective method. Rating scales and checklists are often used as important devices of observing and evaluating personality or behaviour traits. In rating scales we rate or judge an individual on the possession or absence of certain traits. The individual is given a place on the scale or a score which indicates the degree to which a person possesses a given behaviour trait.

For example, if we want to rate teacher- trainees on their sociability we might ask three or four supervisors to point out the place of each teacher trainee on the scale which may be as follows:



This scale has five degrees of the trait to be rated: This is a five point scale. Some scales have three or seven degrees. The descriptive words or phases used in the scale may be also given marks or scores, from zero to five.

In a checklist, examiners may be provided with a list of traits or qualities and may be asked to point out or checkup ones that apply to particular persons.

The psychological tests are carefully devised and standardised tests for measuring aptitudes, interests, achievement, intelligence and personality traits. Intelligence tests measure the intellectual capacity of an individual and achievements tests throw light on the achievement of students in various subjects they are studying. Aptitude tests will enable us to evaluate the nature and degree of aptitude of a person for a certain subjects or profession.

In many teacher training colleges such test have been developed for selecting candidates for teacher training courses. Personality tests which are of various types shed light on general personality patterns, cluster of traits, moods temperament, emotionality, interpersonal relationships, needs and pressure and other qualities.