UGC NET

Study Material

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UGC NET PAPER-I

TEACHING APTITUDE

DEFINITION:

"Teaching is an intimate contact between a more mature personality and a less mature one which is designed to further the education of the later"_**H C Morison**

NATURE AND CHARACTERISTIC OF TEACHING:

I. ***Teaching is Giving Information*** :There are many things that the students cannot find out for themselves. There are many things that they never know unless they are told. One essential par tof teaching is communicating knowledge.

II. ***Teaching is Causing to Learn***: Knowledge will be received only when he students are prepared to receive it

III. ***Teaching is helping to adjust the Environment***: A child is reacting in some way or the other to his physical and social environment ,from his very birth. His reactions are both fruitful and harmful. Teaching should help the child to make successful adjustment with environment.

IV. ***Teaching is stimulation and Encouragement***: Teaching should be fire the enthusiasm of the child. It is to encourage the child in the development of his nature desires to work and to be active

V. ***Teaching is Guide***: Teaching is to guide the pupils to learn the right things in the right manner and at the right time .Teaching is to guide the students to do in such away that time, material and energy area not wasted.

VI. ***Teaching is formal as well as informal***: Formal teaching is deliberately planned, systematically organised and is always purposive. Teachers are just formal agents of teaching. Informal teaching is carried on by the family at home.

FUNCTIONS OF TEACHING:

- Creating learning situations
- Motivating the child to learn
- Arranging for conditions which assist in the growth of the child's mind and body
- Utilizing the initiative and play urges of the children to facilitate learning
- Turning the children into creative beings

- Inspiring children with the nobility of thoughts, feelings and actions
- Giving information and explaining it
- Diagnosing learning problems
- Making curricular material
- Evaluating, recording and reporting

STRUCTURE OF TEACHING:

Structure of teaching consist of three variables which operate in the process of teaching and create learning conditions or situations.

I.Teacher as Independent Variable(Teacher): Independent variable can be manipulated according t our will. By the manipulation of this variable, we can manipulate the dependent variable .Teacher is an independent variable in the class. If he modifies his behaviour ,the behaviour of student is also expected to change.

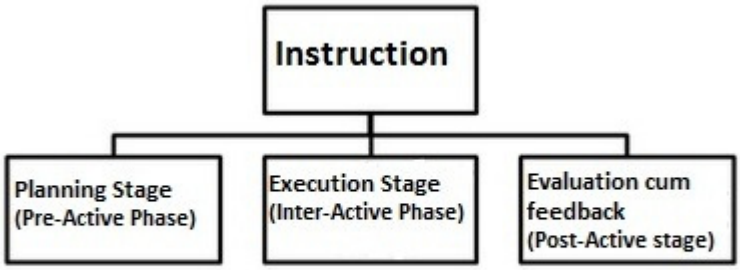
II.Student as Dependent Variable(Student): Independent viable is applied to this variable to bring about desirable changes in the behaviour of learners. Students are dependent variable in the class .A teacher can not manipulate this variable directly.

III.Intervening Variable(Constant and Strategy): The intervening variables lead to interaction between the teacher and the students the content determines the mode of presentation oral, visual and doing etc.

PHASES OF TEACHING:

Teaching is a complex task. For performing this task, a systematic planning is needed. Teaching is to be considered in terms of various steps and the different steps constituting the process are called the phases of teaching.

The teaching can be divided into three phases:



Phases of teaching

Pre – Active Phase of Teaching:

In the pre-active phase of teaching, the planning of teaching is carried over. This phase includes all those activities which a teacher performs before class-room teaching or before entering the class- room.

Pre-teaching consists essentially of the planning of a lesson. The planning of lesson needs to be seen in broader terms, not merely the designing of a lesson plan. Planning includes identifying the objectives to be achieved in terms of students learning, the strategies and methods to be adopted, use of teaching aids and so on.

It is the planning phase of instructional act. The foundation of this phase is set through the establishment of some kind of goals or objectives, and discovering ways and means to achieve those objectives.

Planning is done for taking decision about the following aspects-

1) Selection of the content to be taught

2) organization of the content

3) Justification of the principles and maxims of teaching to be used

4) Selection of the appropriate of methods of teaching

5) Decision about the preparation and usage of evaluation tools.

Suggested activities in the Pre-active phase of teaching-

1. Determining goals / objectives: First of all, the teacher determines the teaching objectives which are then defined in terms of expected behavioral changes. Thus, he ascertains the teaching objectives and what changes he expects in the students by achieving those objectives. These objectives are determined according to the psychology of the pupils and needs of the school and society , In the form of entering behaviours of the pupils and in the form of terminal behaviours of the students.

2. Selection of the content to be taught: After fixing the teaching objectives, the teacher makes decisions about that content which is to be presented before the pupils and as a result he wants to bring the changes in their behaviours. This decision is taken by the teacher by considering o the following points-

- Level need and importance of the curriculum proposed by the teacher for the students.
- The expected terminal behaviour of the students
- Level and mode of motivation be used for the students
- Selection of appropriate instrument and methods the teacher should use to evaluate the knowledge related to the contant.

3. Sequencing the elements of content for presentation: After making selections regarding the contents to be presented to the students, the teacher arranges the elements of content in a logical and psychological manner, so that this arrangement of content may assist in transfer of learning.

4. Selection about the instructional methodology : After sequencing the contents, the teacher makes decisions regarding the proper methods and strategies by keeping in view the contents , entering behaviour and the level of the students.

5. How and when of teaching strategies: Decision-making regarding the teaching methods and strategies for presenting the sequenced contents to the students is not sufficient. So the teacher should also decide how and when he will make use of the previously selected method and strategy during the class-room teaching.

Interactive Phase Of Teaching:

The second phase includes the execution of the plan, where learning experiences are provided to students through suitable modes.

As instruction is the complex process by which learners are provided with a deliberately designed environment to interact with, keeping in focus pre-specified objective of bringing about specific desirable changes. Whether instruction goes in a classroom, laboratory, outdoors or library, this environment is specifically designed by a teacher so that students interact with certain specific environmental stimuli, like natural components (outdoor), information from books, certain equipment (laboratory) etc. Learning is directed in pre-determined directions to achieie certain pre-specific goals. This does not, however, mean that, in the pre-determined environment no learning other than what a teacher has decided upon as instructiohal objectives does not take place. The variety of experiences that students go through with a teacher, among them- selves provide learning opportunities.

All those activities which are performed by a teacher after entering in a class are clubbed (to combine together) under inter-active phase of teaching. Generally these activities are concerned with the presentation and delivery of the content in a class. The teacher provides pupil verbal stimulation of various kinds, makes explanations, ask questions, listen to the student's response and provide guidance.

The following activities are suggested for the inclusion in the inter-active phase of teaching-

1. Sizing up of the class: As the teacher enters the classroom, first of all he perceives the size of the class. He throws his eyes on all the pupils of the class in a few moments. He comes to know the pupils who can help him in his teaching and the pupils who can create a problem for him as a result of this perception.

In the same way, the studrnts can feel the personality of the teacher . Hence, at this stage, the teacher should look like a teacher. He should exhibit of course in a veiled manner all those characteristic which are supposed to be present in a good teacher. In nut-shell the teacher should appears as an efficient and impressive personality.

2. Knowing the learners: After having a feeling of class-size, the teacher makes efforts to know how much the new comers or pupils have previous knowledge. He tries to know the abilities , Interests and attitudes and academic background of learners.

The teacher starts teaching activities after diagnosing, by questioning regarding action and reaction: two types of activities are involved here in the teaching-

a. Initiation,

b. Response.

Both these activities are known as verbal interaction. Both these activities occur between the teacher and the students. In other words, when a teacher performs some activities, the student reacts or when students perform some activities, the teacher reacts .This way the inter-action in the teaching take place.

The teachers performs the following activities in order to analyze the nature of verbal and non-verbal inter-action of teaching activities-

a. Selection and presentation of stimuli.

b. Feedback and reinforcement.

c. Deployment of strategies.

a. Selection and presentation of stimuli: The motive or new knowledge is a process of

teaching. It can be verbal or non-verbal. The teacher should be aware of the motive which would prove effective and which would not be so for a particular teaching situation.

The teacher should select the appropriate stimulus as soon as the situation arises and an effort should be made to control the undesired activities to create the situation and for desired activities.

After selecting the stimuli, the teacher should present them before the students. The teacher should present that form of the stimulus which can motivate the students for learning. During such presentation of stimuli, the teacher should keep in mind the form context and order of the stimuli.

b. Feedback and reinforcement: Feedback or reinforcement is that condition which increases the possibility for accepting a particular response in future. In other words those conditions which increase the possibility of occurrence of a particular response are termed as feedback or reinforcement. These conditions may be of two types which are as follows-

- Positive reinforcement: These are the conditions which increase the possibility of recurrence of desired behavior or response.

- Negative response: These are the conditions in which the possibility of recurrence of the undesired behavior or response is decreased, such as punishment or reprimanding etc.

Reinforcement is used for three purposes. These are –

- For strengthening the response.
- For changing the response, and
- Modifying or correcting the response.

c. Deployment of strategies: The teaching activities are directly related to the learning conditions. Therefore, at the time of interaction the teacher produces such activities and conditions by the reinforcement strategies which effect the activities of the pupils.

The development of the teaching strategies turns the pupil-teacher interaction impressive. From the very moment, the teacher starts the teaching task and till the movement, the teacher starts the teaching task and till the movement that task goes on, the verbal and non-verbal behaviours of the pupils are controlled by the reinforcement strategies and cooperates in presenting the contents in an impressive way.

In the deployment of the teaching strategies, three areas should be considered. These are –

- Presentation of subject-matter,
- Levels of learning.
- Level or context of learners, their background, needs, motivation, attitudes, cooperation and opposition.

In the interactive stage, these activities are carried on not only by the teacher, but also carried on by the students. The students also feel about the teacher and diagnose his personality as a teacher. In order to be impressed themselves and to improve the teaching, they deploy the various strategies by selecting the different stimuli.

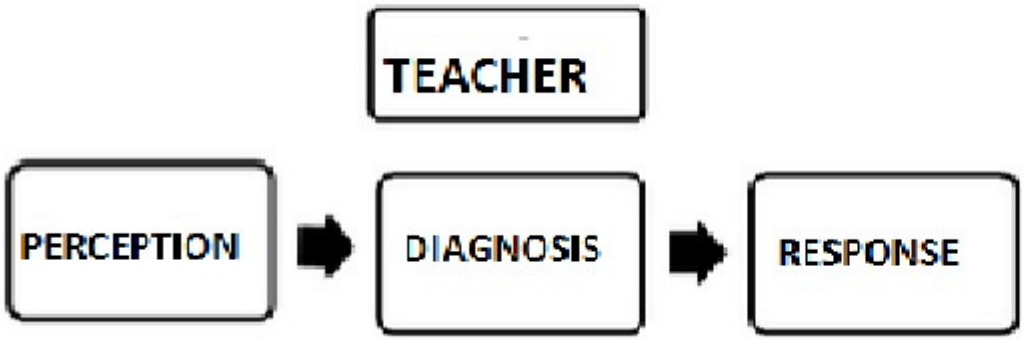
Operations at the interactive phase

We can present the activities of the interaction through the following chart-

Teacher	Student
P———D———A	P———D———A
(Perceptual)(Diagnostic)(Achievement)	(Perceptual)(Diagnostic)(Achievement)

This second phase of teaching is concerned with the implementation and carrying out what has been planned or decided at the planning stage.It is the stage for actual teaching.

Major operations in the phase are-



1) Perception-

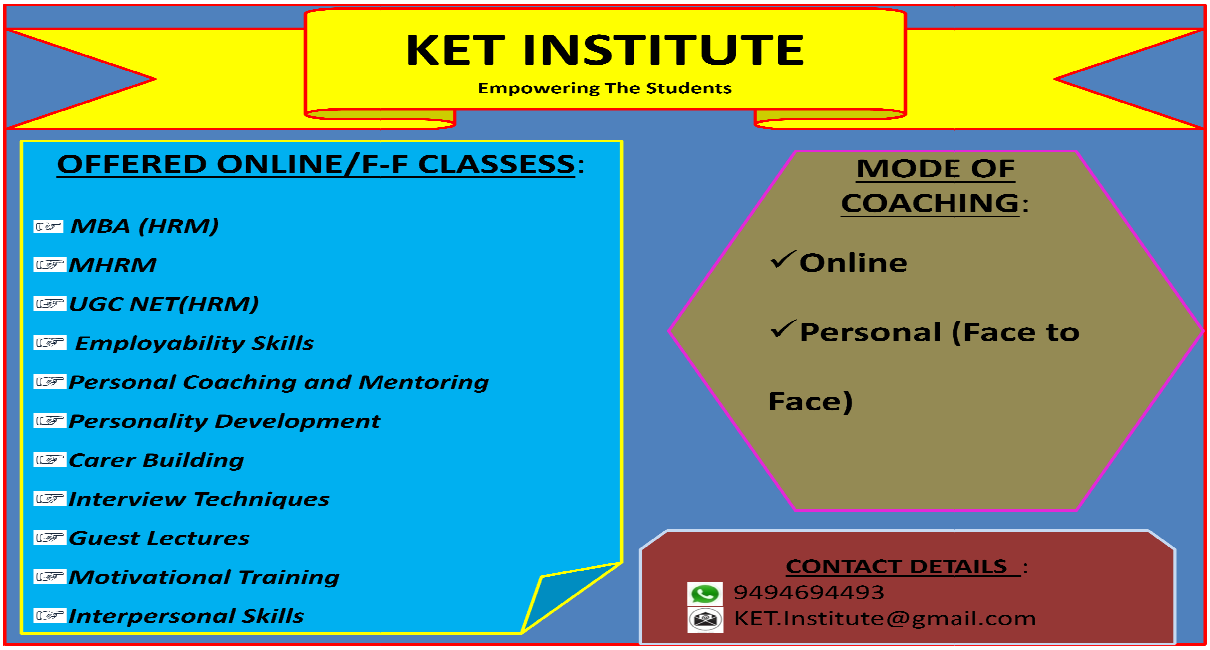
Interaction process demands an appropriate perception on the part of teacher as well as the studennts. When a teacher enters the class, his first activity is concerned with a parceptionof classroom climate. He tries to weigh himself ,his abilitiesfor teaching against the class group.Similarly students also tries to have perception of the abilities, behaviour and personality characteristics of the teacher.

2) Diagnosis-

A teacher tries to access the achievement level of his students with regards to their abilities, interest and aptitude. The teacher can asks several questions to know how far students know about the topic.

3) Reaction Process-

Under this stage teacher observes the students that how they response to the teacher's questions. The student has to learn the proper way of reacting and responding to the various stimuli and teaching techniques presented to it. This phase is responsible for establishing appropriate verbal and non verbal class room interaction between teacher and pupils.



Post-Active Phase of Teaching:

Post-teaching phase, , is the one that involves teacher's activities such as analysing evaluation results to determine students' learning, especially their problems in understanding specific areas, to reflect on the teaching by self, and to decide on the necessary changes to be brought in the system in the next instructional period.

The Post-active Phase this phase concerns with the evaluation activities. This can be done in number of ways including tests or quizzes or by observing student's reaction of questions, comments ,structures and instructured situations.

In this phase, as the teaching task sums up, the teacher asks the questions from the pupils, verbally or in written form, to measure the behaviours of the pupils so that their achievements may be evaluated correctly.

Therefore, evaluation aspect includes all those activities which can evaluate the achievements of the pupils and attainment of the objectives. Without evaluation teaching is an incomplete process. It is related with both teaching and learning. The following activities are suggested in the post-active of teaching-

1. Defining the exact dimensions of the changes caused by teaching.

2. Selecting appropriate testing devices and techniques.

3. Changing the strategies in terms of evidences gathered.

PRINCIPLES OF TEACHING:

1. **Principle of Motivation:** It creates curiosity among students to learn new things.
2. **Principle of Activity (learning by doing):** Froebel's Kindergarten (KG) system is based on this principle. It includes both physical and mental activities. For example, students are asked to make charts and models.
3. **Principle of Interest:** By generating genuine interest among the learner's community, the effectiveness of the teaching-learning process can be increased.
4. **Principle of linking with life:** Life is a continuous experience, and learning linked with life can be more enduring.
5. **Principle of definite aim:** This is important for optimum utilization of teaching resources and making learning more focused.
6. **Principle of recognizing individual differences:** Every student is unique in term of intelligence, attitude, abilities and potentialities, socio-economic background. The teaching method should be devised in such a manner to make all the students to avail equal opportunities in life.
7. **Principle of Selection:** The horizon of knowledge is expanding each day. The teacher should be able to pick contents that can be more relevant and update to the learner's objectives.
8. **Principle of Planning:** Every teacher has certain time-bound objectives, and hence, teaching should be systematic to make optimum use of resources within the time limit.
9. **Principle of Division:** To make learning easier, the subject matter should be divided into units, and there should be links between the units.
10. **Principle of Revision:** To make learning enduring, the acquired knowledge should be revised immediately and repeatedly.
11. **Principle of Certain and Recreation:** This Principle is a must to make classroom environment humorous and creative.
12. **Principle of Democratic dealing:** It entails students in planning and executing different activities; It helps in developing self-confidence and self-respect among the learner's.

LEARNING:

"Learning is the acquisition of new behaviour or strengthening or weakening of old behaviour as a result of experience"_**Henry ,P Smith**

***The Nature of Learning*:**

A new born child is helpless at birth. He depends upon others. But in due course, he learns a number of things. He learns to crawl, stand, walk, run, eat, speak, dress etc. The process of learning continues till death. Even an adult during the course of his daily routine goes on learning and adding to his experience. Why does a person learn? He learns because he has to make adjustment in the changing environment. The stimulus from the environment is there on the one hand.

On the other hand, there are innate dispositions – instincts and emotions. Guided by these dispositions a person goes on learning i.e., constructing and reconstructing his experience throughout his life, at all its stages.

Characteristics of Learning:

On the basis of analysis of various definitions of learning Yokam, Simpson and Mursel have given the following characteristics of learning:

1. Learning is Growth.

2. Learning is Adjustment.

3. Learning is Intelligent.

4. Learning is Active.

5. Learning is the product of Environment.

6. Learning is both Individual and Social.

7. Learning is Purposeful.

8. Learning is organising Experience.

9. All living is Learning.

10. True Learning affects the conduct of the learner.

11. Learning is Universal.

12. Learning is Change.

13. Learning is a Process not a product.

14. Learning is transferable.

15. Learning is total reaction of the individual to total situation.

In brief, we may enumerate the following facts about the learning process:

1. In its simplest form, learning means acquisition of experience.

2. In its complex form, it means acquisition, retention and modification of experience.

3. It means establishing new relationship between stimulus and response.

4. It means development of method of problem solving.

5. It is motivated by adjustment to environment.

6. It includes all activities which leave a permanent effect on the individual.

7. The process of learning includes the following:

(i) Acquisition of new experiences,

(ii) Retention of new experiences in the form of impressions or engrams or skill,

(iii) Development of the experiences, step by step,

(iv) Synthesis and organisation of the old and the new experiences, resulting in a novel pattern.

8. Learning is possible both on the cognitive, affective and conative side. Acquisition of knowledge is cognitive, modification of emotions is affective, and acquisition of skills and habits is conative.

TYPES OF LEARNING*:*

Learning is of the following types:

(a) Skill Learning:

Right from the birth, the child acquires skill. His bodily organs learn to handle the things. He moves his legs and begins to crawl. In source of time, he learns other motor, skills, like walking, speaking, drawing, writing, reading, playing music, cycling and swimming etc.

(b) Perceptual Learning:

The child gets sensations through his organs of sense, and he attaches meaning to each sensation. The earliest sensations of the infant are undifferentiated to the extent that he cannot differentiate between one object and another. In course of time, he recognises specific objects, and perceives these separately.

Indian psychologists have given explanation of perceptual learning its types and processes. They define conceptual learning as sense object contact. Pure sensation is indeterminate perception, and is the first stage in perceptual learning. The second step is determinate perception, where in the object is revealed as endowed with its attributes and characteristics.

(c) Conceptual Learning:

As concrete thinking leads to abstract thinking perceptual learning is followed by conceptual learning. A concept is a general idea, universal in character. A child sees a particular cow, and forms some ideas of a cow, with some particular characteristics Here the ideation is on the basis of one particular cow.

This is the particular percept but when the a child sees number of cows, with some common characteristics, he locates certain general qualities in all the cows, and on the basis of these he forms a conception of ‘cow’. This is on the basis of percept which is made general.

Thus the child proceeds from particular to general and forms, in course of time, innumerable concepts, sometimes concrete and sometimes abstract. This is the basis of all thinking and ideational learning. When a few concepts are learnt, this forms the basis of

raising the super-structure of knowledge and education, through association and assimilation.

(d) Associative Learning:

Conceptional learning is helped by associative learning in amassing a wealth of knowledge. New concepts are tagged with the past concepts through association, and as such knowledge.

(e) Appreciational Learning:

While conceptual learning is on the affective side. A child, from the very beginning, utilises his inborn trait of aesthetic sensibility, and acquires concepts coloured by appreciation.

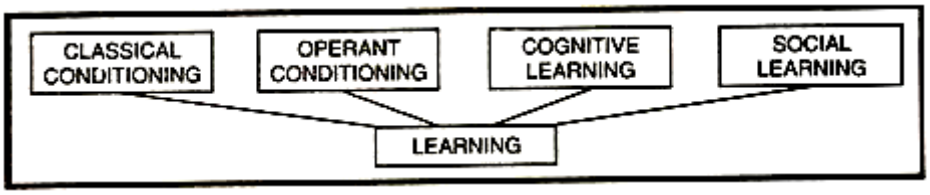
(f) Attitudinal Learning:

Attitudes are generalised dispositions for certain particular concepts, things, persons or activities. A child develops an attitude of affection towards his mother, an attitude of reverence towards the teacher, and an attitude of belongingness towards the family. His attitude towards play is most favourable. All this he learns and adopts gradually.

THEORIES OF LEARNING :

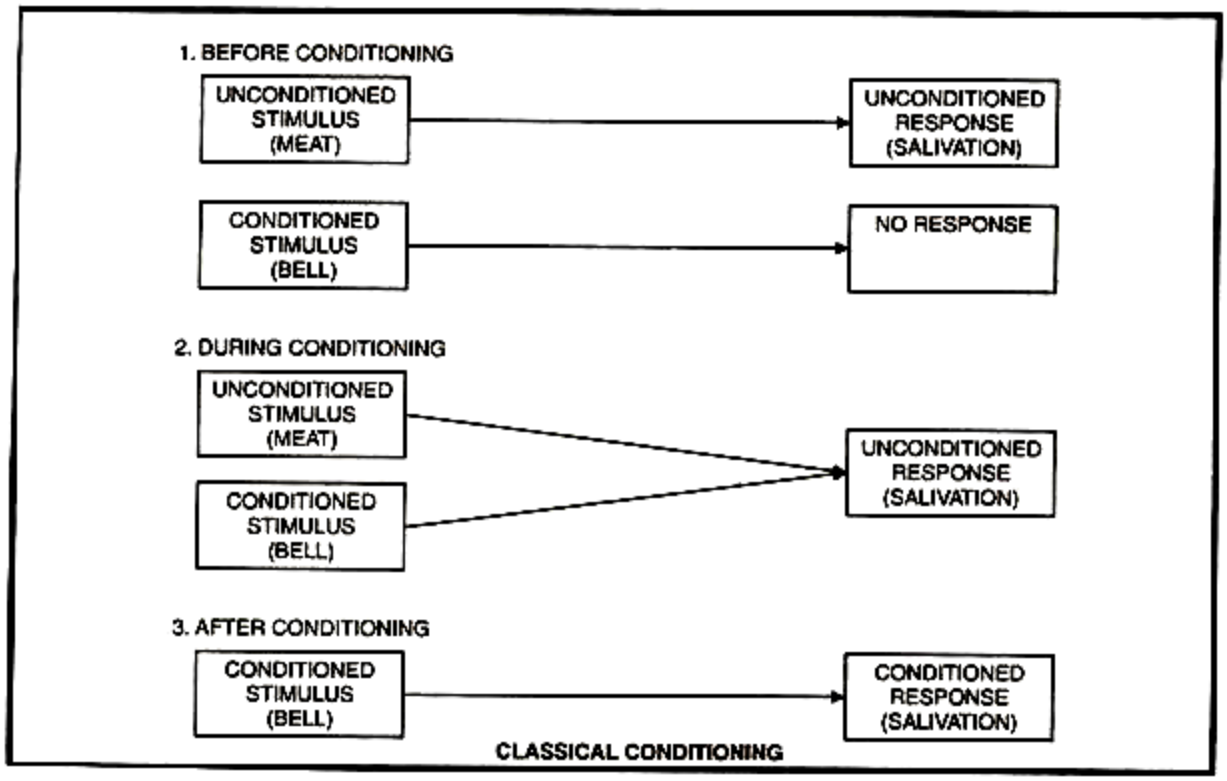
There are five important theories of learning, i.e, 1. classical conditioning, 2. operant conditioning, 3. cognitive learning, and 4. social learning.

Each of these theories is explained in detail as following:



***1. Classical Conditioning*:**

Classical conditioning is the association of one event with another desired event resulting in a behaviour. The most well known experiments on classical conditioning were conducted by Ivan Pavlov, the Russian psychologist, who won the Nobel Prize for his experiments on this subject. Pavlov conducted an experiment on dogs and tried to establish a Stimulus-Response (S-R) connection. He tried to relate the dog's salivation and the ringing of the bell. In his experiments, he put some meat in front of dogs.



The dogs responded to this stimulus by salivating. This response was instinctive or unconditioned. Pavlov next began to ring a bell at the same time as the meat was presented. Ringing the bell in itself, without the presentation of meat, was not connected to any responses. But by ringing the bell at the same time as presentation of meat, Pavlov established a relationship between the two stimuli-the bell and the meat- in the mind of the dogs. By continuing this process, the ringing of bell alone was sufficient stimulus to elicit a response of salivating, even when no meat was presented. Thus, the bell became a conditioned stimulus, resulting in conditioned or learned response.

The above diagram explains that the meat was an unconditioned stimulus. It caused the dog to react in a certain way i.e. noticeable increase in salivation. This reaction is called the unconditioned response. The bell was an artificial stimulus or conditioned stimulus. But when the bell was paired with the meat (an unconditioned stimulus), it eventually produced

a response. After conditioning, the dog started salivating in response to the ringing of the bell alone. Thus, conditioned stimulus led to conditioned response.

In an organisational setting we can see classical conditioning operating. For example, at one manufacturing plant, every time the top executive from the head office would make a visit, the plant management would clean up the administrative offices and wash the windows. This went on for years.

Eventually, employees would turn on their best behaviour and look prim and proper whenever the windows were cleaned even on those occasions when the cleaning was not paired with the visit from the top brass. People had learnt to associate the cleaning of the windows with the visit from the head office.

Classical conditioning represents only a very small part of total human learning. So it has a limited value in the study of organisational behaviour. Classical conditioning plays only a passive role. We will react in a particular way only if something happens. But in reality, the behaviour of people in organisations is voluntary rather than being reflexive. Their behaviour is not elicited in response to a specific, identifiable event but it is generally emitted. The learning of complex behaviour can be better understood by looking at operant conditioning.

***2. Operant Conditioning*:**

Operant is defined as behaviour that produces effect. Operant conditioning is based on the work of B.F. Skinner who advocated that individuals emit responses that are rewarded and will not emit responses that are either not rewarded or are punished. Operant conditioning argues that behaviour is a function of its consequences. Behaviour is likely to be repeated if the consequences are favourable. Behaviour is not likely to be repeated if the consequences

are unfavorable. Thus the relationship between behaviour and consequences is the essence of the operant conditioning.

Based upon this direct relationship between the consequences and the behaviour, the management can study and identify this relationship and try to modify and control behaviour. Hence, certain types of consequences can be used to increase the occurrence of a desired behaviour and other types of consequences can be used to decrease the occurrence of undesired behaviour.

One can see examples of operant conditioning in the organisations. For instance, working hard and getting the promotion will probably cause the person to keep working hard in the future. On the other hand, if a boss assures his subordinate that he would be suitably compensated in the next performance appraisal, provided the employee works over time.

However, when the evaluation time comes, the boss does not fulfill his assurance to his subordinate, even though the latter had worked overtime. Next time, the subordinate coolly declines to work overtime when the boss requests him to do so. Thus, it can be concluded that the behaviour consequences that are rewarding increase the rate of response, while the aversive consequences decrease the rate of response. Operant conditioning techniques are extensively used in clinical and educational research, control of alcoholism and control of deviant children in a class room.

***3. Cognitive Learning*:**

The pioneer of cognitive learning theory is Edward Tolman. He developed and tested this theory through controlled experiments. Using rats in his laboratory, he showed that they learnt to run through a complicated maze towards their goal of food. It was observed that rats developed expectations at every choice point in the maze. Thus, they learnt to expect

that certain cognitive cues related to the choice point could ultimately lead to food. The learning took place when the relationship between the cues and expectancy was strengthened because the cues led to expected goals.

The cognitive theory recognizes the role of an organism in receiving, memorizing, retrieving and interpreting the stimulus and reacting to it. The cognitive explanation of learning differs from classical conditioning (stimulus response learning) and operant conditioning (response stimulus learning). According to Tolman, cognitive approach could be termed as stimulus approach i.e. one stimulus leads to another.

Cognitive learning is achieved by thinking about the perceived relationship between events and individual goals and expectations. Cognitive theory of learning assumes that the organism learns the meaning of various objects and events and learned responses depend upon the meaning assigned to stimuli.

Cognitive theorists argue that the learner forms a cognitive structure in memory, which preserves and organizes information about the various events which occur in a learning situation. When a test is conducted to determine how much has been learned, the subject must encode the test stimulus and scan it against his memory to determine an appropriate action. What is done will depend upon the cognitive structure retrieved from memory.

Today, the cognitive theory is very much alive and relevant. In organisational behaviour the cognitive approach has been applied mainly to motivation theories. Expectations, attributions and locus of control and goal setting are all cognitive concepts and represent the purposefulness of organisational behaviour. Many researchers are currently concerned about the relationship or connection between cognitions and organisational behaviour.

***4. Social Learning*:**

Individuals can also learn by observing what happens to other people and just by being told about something, as well as by direct experiences. Much of what we have learned comes from observing and imitating models-parents, teachers, peers, superiors, film stars etc. This view that we can learn through both observation and direct experience has called social learning theory.

This theory assumes that learning is not a case of environmental determinism (classical and operant views) or of individual determinism (The cognitive view). Rather it is a blending of both. Thus, social learning theory emphasizes the interactive nature of cognitive, behavioural and environmental determinants. The influence of model is central to the social learning view point. Four processes have been found to determine the influence that a model will have on an individual.

a. Attention Process:

People learn from a model only when they recognize and pay attention to its critical features. We tend to be most influenced by models that are attractive, repeatedly available, important to us or similar to use in our estimation.

b. Retention Processes:

A model's influence will depend upon how well the individual remembers the model's action after the model is not longer readily available.

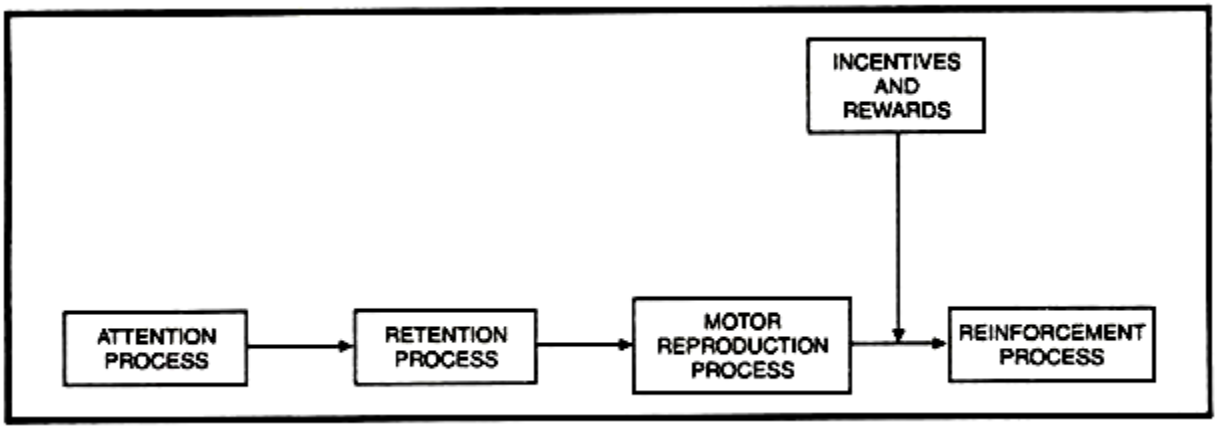
c. Motor Reproduction Processes:

After a person has seen a new behaviour by observing the model, the watching must be converted to doing. This process then demonstrates that the individual can perform the modelled activities.

d. Reinforcement Processes:

Individuals will be motivated to exhibit the modeled behaviour if positive incentives or rewards are provided. Behaviours that are positively reinforced will be given more attention, learned better and performed more often.

The following diagram illustrates the effect of the social learning model on the individual:



Shaping Behaviour:

The learning process of individuals takes place on the job as well as prior to the job. In any organisation, managers will be concerned with how they can teach employees to behave in the ways that are most beneficial to the organisation. When an attempt is made by the managers to mould individuals by guiding their learning in graduated steps he is shaping their behaviour.

A manager can shape the behaviour by systematical reinforcing each successive step that move the individual closer to the desired response. For example, an employee who chronically leaves the office half hour early starts leaving the office only twenty minutes early, the manager can reinforce his behaviour so that it comes more close to the desired behaviour to leave the office in time. The first theoretical treatment given to reinforcement in learning and the framework that still dominates today is E.L. Thorndike's classic law of effect.

The Law of Effect:

In Thorndike's own words, the law of effect simply states that, "Of several response made to the same situation, those which are accompanied or closely followed by satisfaction (Reinforcement)-will be more likely to recur, those which are accompanied or more closely followed by discomfort (Punishment- will be less likely to recur." The operant conditioning or learning approach to behaviour is based on the law of effect.

FACTORS AFFECTING LEARNING:

1. Intellectual factor:

The term refers to the individual mental level. Success in school is generally closely related to level of the intellect. Pupils with low intelligence often encounter serious difficulty in mastering schoolwork. Sometimes pupils do not learn because of special intellectual disabilities.

A low score in one subject and his scores in other subjects indicate the possible presence of a special deficiency. Psychology reveals to use that an individual possess different kinds to intelligence. Knowledge of the nature of the pupil's intellect is of considerable value in the guidance and the diagnosis of disability.

The native capacity of the individual is of prime importance in determining the effectiveness of the, learning process.

2. Learning factors:

Factors owing to lack of mastery of what has been taught, faulty methods of work or study, and narrowness of experimental background may affect the learning process of any pupil. If the school proceeds too rapidly and does not constantly check up on the extent to which

the pupil is mastering what is being taught, the pupil accumulates a number of deficiencies that interfere with successful progress.

In arithmetic, for instance, knowledge of basic addition is essential to successful work in multiplication. Weakness in addition will contribute directly to the deficiency in multiplication. Likewise, failure in history may be due to low reading ability or weakness in English.

Similarly, because of faulty instruction, the pupil may have learned inefficient methods of study. Many other kinds of difficulty which are directly related to learning factors may interfere with progress.

3. Physical factors:

Under this group are included such factors as health, physical development, nutrition, visual and physical defects, and glandular abnormality. It is generally recognized that ill health retards physical and motor development, and malnutrition interferes with learning and physical growth.

Children suffering from visual, auditory, and other physical defects are seriously handicapped in developing skills such as reading and spelling. It has been demonstrated that various glands of internal secretion, such as the thyroid and pituitary glands, affect behavior. The health of the learner will likely affect his ability to learn and his power to concentrate.

4. Mental factors:

Attitude falls under mental factors attitudes are made up of organic and kinesthetic elements. They are not to be confused with emotions that are characterized by internal visceral disturbances. Attitudes are more or less of definite sort. They play a large part in the mental organization and general behavior of the individual.

Attitudes are also important in the development of personality. Among these attitudes aw interest, cheerfulness, affection, prejudice, -open mindedness, and loyalty. Attitudes exercise a stimulating effect upon the rate of learning and teaching and upon the progress in school.

The efficiency of the work from day to day and the rapidity with which it is achieved are influenced by the attitude of the learner. A favorable mental attitude facilitates learning. The factor of interest is very closely related in nature to that of symbolic drive and reward.

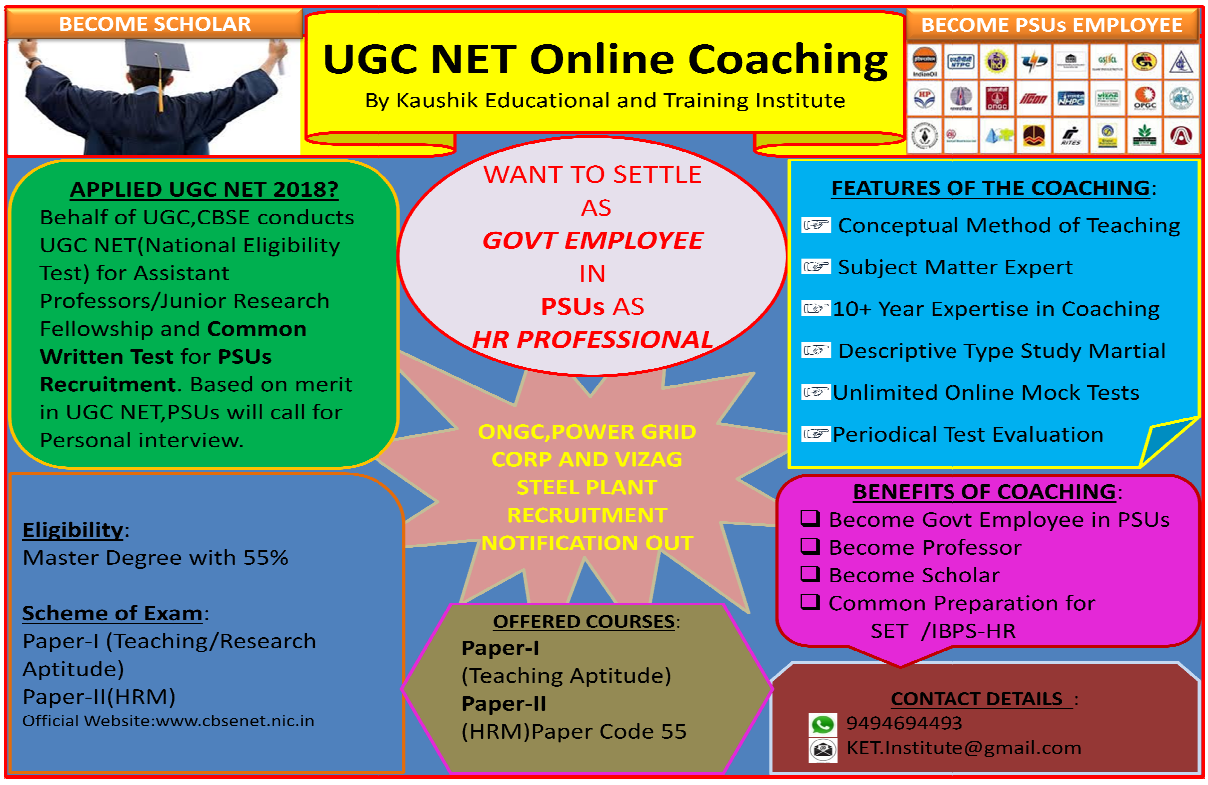
5. Emotional and social factors:

Personal factors, such as instincts and emotions, and social factors, such as cooperation and rivalry, are directly related to a complex psychology of motivation. It is a recognized fact that the various responses of the individual to various kinds of stimuli are determined by a wide variety of tendencies.

Some of these innate tendencies are constructive and others are harmful. For some reason a pupil may have developed a dislike for some subject because he may fail to see its value, or may lack foundation. This dislike results in a bad emotional state.

Some pupils are in a continuing state of unhappiness because of their fear of being victims of the disapproval of their teachers and classmates. This is an unwholesome attitude and affects the learning process to a considerable degree. This is oftentimes the result of bad training.

Social discontent springs from the knowledge or delusion that one is below others in welfare.



6. Teacher's Personality:

The teacher as an individual personality is an important element in the learning environment or in the failures and success of the learner. The way in which his personality interacts with the personalities of the pupils being taught helps to determine the kind of behavior which emerges from the learning situation.

The supreme value of a teacher is not in the regular performance of routine duties, but in his power to lead and to inspire his pupils through the influence of his moral personality and example. Strictly speaking, personality is made up of all the factors that make the individual what he is, the complex pattern of characteristics that distinguishes him from the others of his kind. Personality is the product of many integrating forces.

In other words, an individual's personality is a composite of his physical appearance, his mental capacity, his emotional behavior, and his attitudes towards others. Effective teaching and learning are the results of an integrated personality of the teacher.

Generally speaking, pupils do- not like a grouchy teacher who cannot control his temper before the class. It is impossible for a teacher with a temper to create enthusiasm and to radiate light and sunshine to those about him.

Pupils love a happy, sympathetic, enthusiastic, and cheerful teacher. Effective teaching and learning are the results of love for the pupils, sympathy for their interests, tolerance, and a definite capacity for understanding.

The teacher must therefore recognize that in all his activities in the classroom he is directly affecting the behavior of the growing and learning organism.

7. Environmental factor:

Physical conditions needed for learning is under environmental factor. One of the factors that affect the efficiency of learning is the condition in which learning takes place. This includes the classrooms, textbooks, equipment, school supplies, and other instructional materials.

In the school and at the home, the conditions for learning must be favorable and adequate if teaching is to produce the desired results. It cannot be denied that the type and quality of instructional materials and equipment play an important part in the instructional efficiency of the school.

It is difficult to do a good job of teaching in a poor type of building and without adequate equipment and instructional materials. A school building or a classroom has no merit when built without due regard to its educational objectives and functions.

OTHER FACTORS AFFECTING TEACHING:

1. ***Educational qualification of teacher***

Higher qualified teacher can provide high scholarly instructions which can effect than general graduate teacher. Many teachers hold different degrees which is the sign of their higher education qualification. A teacher is just B.A. and other teacher is M.A., M.Ed., PhD, if we compare both, then is sure that higher qualified teacher can cede good teaching result.

2. Skills

Skill is an ability to do any work with better way. If a teacher has teaching skill then he can provide effective teaching. Often says that teaching is God gifted but getting good education training and Psychologize best educational books, we can get this skill and create better result. In teaching talent we can include following skills

Þ Communication skill of teacher
Þ Taking teaching aids
Þ Technique of teaching
Þ Method of teaching
Þ Human relation skill

3. Experience of Teacher

Experience of teacher affects also the teaching. After increasing teaching experience, a teacher learns many new things in teaching experience which he can employ in next time teaching. First day teacher may not effect on students but after 5 years teaching, a teacher can more effect on students.

4. Class – room environment

Class room environment effects also on teaching. This environment is made both by

teacher and students.
Without both active participation in education, teaching never effects. If the concentration lives in class room and students listen teacher's voice and teacher also cares the activity of teacher doing interacting with students.

5. Economic Factor

Economic background of teacher and student is also affected teaching. Even salary of teacher effects on his thinking level. Poor and rich students can also classify economically and sometime these factors can effect on effective teaching.

6. Administrative policies of school or college or university

Administrative policies also effect teaching. Teacher wants to instruct with his way but administrative policies is not allowed, so the voice of teach can stop and effect of teaching may slow in class room.

7. Subject Matter

Sometime when a teacher teaches that subject in which he is not specialize , he can not create any effect through his teaching but same teacher can teaches his specialize subject with better way .

8. Parental expectations

What are the expectations of parent on students? This factor can be defined psychologically. If parent wants to frame up his children doctor or engineer and continually stress on student, sometime student may not at that rank, so mentally he can create depression and which can stop effective teaching of teacher.

TEACHING METHODS*:*

There area variety of teaching methods which can be used by teacher for teaching theory and skills in the classroom setting.These broadly classified as:

I. Teacher Centred Teaching Methods

II. Student/Learner Centred Methods

I.Teacher Centred Teaching Methods :In teacher-centered education, students put all of their focus on the teacher. You talk, and the students exclusively listen. During activities,

students work alone, and collaboration is discouraged.Teacher centred teaching method is classified into two.

a) ***Lecture Method of Teaching:***

Lecture method of teaching is the oldest teaching method applied in educational institution. This teaching method is one way channel of communication of information. Students' involvement in this teaching method is just to listen and sometimes pen down some notes if necessary during the lecture, combine the information and organized it.

One of the problems in this method is to grab the attention of students in class room. Another big problem is that many students in the class cannot follow the theme. Learning has a strong influence on method of teaching.

Advantages and Disadvantages of Lecture Method

Advantages of Lecture Method of Teaching

1. In this teaching method a large amount the topics can be covered in a single class period.
2. Using of this method exclude the using of any equipment or Lab.
3. Learning material is not required.
4. Student listening skills developed.
5. Logical arrangement of the material in order to present it orally
6. Help to learn languages

Disadvantages of **Lecture Method of Teaching**

1. Psychologically this method is acceptable because individuals are not alike. Teacher delivers the same lecture to both students without recognizing the individual differences.
2. Learning is an active process thus study should encourage to actively participate in the class room instead of just listening the teacher.
3. Language using in the lecture is above the standard of the students. They are not able get full advantage of the lecture.
4. Lecture are often forgotten by the students soon after while learning is retained if activities are experienced.
5. Attention level is not the same while student listening the lecture.

b)Demonstration Method of Teaching:

Demonstration method of teaching is a traditional classroom strategy used in technical and training colleges and in teacher education.

Focus, Structure and Principles

Demonstration Strategy focus to achieve psychomotor and cognitive objectives. If we talk about its structure, it is given in three successive steps:

1. **Introduction:** In this step objectives of the lesson are stated. The teacher may be called demonstrator. He demonstrates the activity before the student that is to be developed.
2. **Development.** Students try to initiate the demonstrated activity. If there is any query the teacher tries to satisfy them by further demonstration and illustrations.
3. **Integration.** At this step, the teacher integrates all the activities and then these activities are rehearsed revised and evaluated.

Principles

This teaching strategy is based on the following principles

1. Learning by doing maxim is followed
2. Skills can be developed by limitation
3. The perception helps in imitation

Advantages and Disadvantages of Demonstration Method of Teaching

Advantages of Demonstration Method

1. It helps in involving various sense to make learning permanent
2. Though, teacher behavior is autocratic, he invites **the cooperation of pupils in teaching learning process**
3. It develops interest in the learners and motivates them for their active participation
4. It helps in achieving psychomotor objectives
5. Any simple or complex sill becomes easy to understand

Disadvantages of Demonstration Method

1. It can be used only for skills subjects
2. Only the attention of the learners is invited towards the activity demonstrated. They are not free to discuss about it
3. Due to poor economic conditions of the government schools**, there is scarcity of audio-visual aids and equipment and the teachers are not so creative to produce handmade models for demonstration**
4. There is a general lack of sincerity and diligence among teachers who wish to complete the syllabus or syllabi at the earliest without putting sincere efforts

II.Student/Learner Centred Methods*:*

a) Project Method of Teaching:

Project method of teaching has evolved from the philosophy of programatists. It is experience-centered strategy related to life-situation. This teaching strategy focus on

1. To socialize a child
2. To achieve cognitive, affective and psychomotor objectives

This teaching strategy is based on the following principles

1. Principle of Utility. Choose those projects which are closer to the social life.

2. Principle of readiness. Involve the learners in finding the solution of the problem with their active participation.
3. Learning by Doing. Learner performs certain tasks and experiences new things. This adds to his knowledge and results in learning.
4. Socialization. It develops the feeling of cooperation and group work.
5. Inter-disciplinary Approach. To involve the knowledge of different subjects in solving the social problems.

Types of Project Method of Teaching

According to Kilpatric, "A project is a whole-hearted purposeful activity proceeding in a social environment. Kilpatric has classified the project method in four types.

1. **Constructive.** When learners have to construct some things related to social life. e.g. charts, models, maps, parcels etc.
2. **Artistic.** These projects are generally allotted in the aesthetic fields of life. e.g. in music, drawing, painting art and culture.
3. **Problem-Solving.** These projects are given to solve the problems related to any life-situation or related to any subject e.g. how to operate bank accounts? Or how to send an email or letter. These general problems if solved, will make a child efficient for social-life.
4. **Group-Work.** A team of students is assigned a work to be performed. e.g. to develop a garden in the school.

There are four basic elements of this teaching strategy which make it purposeful 1. Spontaneity, Purpose, Significance, and Interest or Motivation.

Advantages and Disadvantages of Project method of Teaching

Advantages

1. It helps in developing social norms and social values among the learners.
2. It provides invaluable opportunities for correlation of various elements of the subject matter and for transfer of training or learning.
3. It helps in growing knowledge very effectively as a results of their close cooperation on social participation in the spirit of democracy.

Disadvantages

1. The project cannot be planned for all subjects and whole subject matter cannot be taught by this strategy.
2. It is not economical from the point of view of time and cost.
3. It is very difficult for a teacher to plan or to execute the projects to the learners and supervise them.

b) Heuristic Method of Teaching:

The term "Heuristic" refers to Armstrong who was the exponent of this strategy. Pollion and Dankar (1945) called it "problem solving". It is based on the psychological principles of "trial and error" theory. Logical and imaginative thinking are perquisites for his type of teaching strategy. It is an economical and speedy strategy.

Meaning of Heuristic Method of Teaching

A problem is placed before the learners and they are asked to find the solution of the problem through various literacy means, like library, laboratory, and workshops etc. Teacher's role is to initiate the learning and pupils are active throughout the learning process. By using their creative thinking and imaginative power, they try to find out the relevant solutions based on some logic. They learn by self-experience. This teaching strategy is focused on:

1. To develop problem solving attitude
2. To develop scientific attitudes towards the problem
3. To develop power of self-expression

It basic principles are:

1. To each as little as possible at one time
2. To encourage learner to learn himself as much as possible

Advantages of Heuristic Teaching Method

Following are the advantages of this Heuristic teaching strategy

1. It helps in achieving cognitive, affective and psychomotor objectives i.e. it helps in all round development of the child.
2. Students are put into the situation to learn by self-experience. It certainly develops self-confidence and self-reliance in the learners.
3. It helps in developing scientific attitude and creativity in the learners.
4. Teacher encourages the learners to explore the environment in search of the solution of the problems. By doing so, some new knowledge is discovered by them.
5. Teacher is always ready to provide individual guidance regarding the solution of the problem. Thus interaction between the teacher and the learner takes place in a cooperative, conducive environment.

Disadvantages of Heuristic Teaching Method

1. It cannot be used at primary level of education
2. Higher intelligence and divergent thinking is required in the learners. But, there are some students who are below average and fail to succeed in discovering the solutions of the problems. It frustrates them.
3. In true sense, none of the teachers have patience for providing individual guidance to the learners. And learners, too, feel hesitation to approach the teacher for seeking his help.

c) Simulation Teaching Method:

The word 'Simulated' means to imitate exactly. Interest is aroused in the pupils through **'Role Playing'** while teaching. This skill is used by teachers and pupils in the classroom by playing some role without any preliminary training i.e. extempore or without any rehearsal. So, it can be safely concluded that simulation is a form of Role playing wherein pupil-teachers display this skill spontaneously.

In the simulated teaching method, the pupils are only acquainted with the conditions. Therefore they discuss and go ahead with the subject matter. Groups of four or five pupils are made in such a method.

Simulation in teaching has recently entered the field of education. It is used at different levels of instruction. The teacher is trained practically and also imparted theoretical learning. The pupil teacher needs to be trained in simulated situations before sending him to the school for teaching practice. He has to play the role of teaching in artificially created environment. After that he should be sent to the school. In this way the teacher will be able to teach in an excellent manner.

Simulated play is an area in which specific communication skill is developed or educational process is carried on in artificially created situations. Simulation skill which is a form of role playing is used in the subject of history science and literature. Imitation is done or some role in play with the help of various teachers.

Definition of Simulated Teaching
Simulated teaching is the technique of learning and training, which develops the ability in an individual regarding problem solving behaviour. It has been defined as a role playing strongly in which learner performs the role in an artificially created environment.

Significance of Simulation Teaching Method
Dr. Stone has pointed out the significance of this method in the following words.

"Simulation on techniques for all their artificiality can often be preferable to putting students in classroom to learn on their own or lecturing to them in classroom. In other spheres, pilots trained in the artificial circumstances of the link trainer or driving schools have their traffic simulators and the medical students their cadavers. And this is eminently sensible. By the same token classroom simulation removes the risk from the first steps of a new type and enable him to come to terms with demand of a complex skill learning without the stress of the real situation. At the same time it is to be preferred to merely 'telling' the student, for much the same reason as it is better to allow beginning pilot to practice operating the dummy controls rather than telling him how to do it when he finds himself in the air".

Therefore, it is clear that a pupil cannot become successful teacher till he acquires the teaching skill though 'role playing' in the classroom e.g. soldiers are put to face and fight artificial war. Stone has cited the example of a pilot under training who is made to face and pass through all the conditions, which he has to face in the air in artificially aircraft model in Air Force Training centre. "The pilot should be this, should do that" has no practical value. He is trained to understand and to control his problems in artificial air craft model. Same is the position of a teacher. Simulation in teaching pals a great role, instead of telling him does and do not he should be put to simulation or role playing so that he could prove to be a successful teacher. Therefore, following the **arts of simulation in teaching**

1. Solo-acting
2. Mimic
3. Development of expression
4. Development of all aspects
5. Emotional organization
6. Bodily expression

d)Induction and Deduction:

Inducting is that form of reasoning in which a general law is derived from study of particular objects or specific process. The child can uses activities, pattern etc.,to discover a relationship which he shall later formulate as a law or rule, the rule or definition formulated by child is the summation of all the particular or individual instance

I deduction the law is accepted and then applied to a member of specific examples. The child does not discover laws but develops skills in applying them. We proceed from the general to the particular or from the abstract to the concrete.

In actual practice the combination of induction and deduction is practiced. The discovered by pupils inductively are further verified deductively through applications to new situations.

e***)Analytical and Synthetic Methods***:

Analytic Method

(1) Analysis means breaking up into simpler elements.

(2) It proceeds from the unknown to the known facts.

(3) It is a method of discovery.

(4) It is a process of thinking (exploration).

(5) It is lengthy and laborious.

(6) It pulls apart or breaks up the statement under solution.

(7) It can be rediscovered.

(8) It is slow, round-about and involves trial and error.

(9) It answers satisfactorily and question that may arise in the mind of pupil.

(10) It is a general method; it is a method for the thinker and discoverer.

(11) The students can recall and reconstruct easily any step if forgotten.

(12) It develops originality.

(13) It is informal.

(14) It is formational.

(15) It is based on heuristic lines.

(16) It is fore-runner of 16.

Synthetic Method

(1) Synthesis means building up separate element and their combination

(2) It proceeds from the known to the unknown facts.

(3) It is a method of presentation of discovered facts.

(4) It is a product of thought.

(5) It is short and concise.

(6) It puts together or synthesizes known facts.

(7) Once forgotten, it cannot be recalled.

(8) It is quick, straight forward and does without trail and error.

(9) It does not satisfy doubts and questions arising in the mind of the leaner.

(10) It is a special device; it is a method for the crammer.

(11) It is not that easy to recall or reconstruct any forgotten step.

(12) It develops memory.

(13) It is informal.

(14) It is simply informational.

(15) There is no heuristic approach in it.

(16) It is the follower of analysis.

e) Discussion methods:

Discussion methods are a variety of forums for open-ended, collaborative exchange of ideas among a teacher and students or among students for the purpose of furthering students thinking, learning, problem solving, understanding, or literary appreciation. Participants present multiple points of view, respond to the ideas of others, and reflect on their own ideas in an effort to build their knowledge, understanding, or interpretation of the matter at hand.

Discussions may occur among members of a dyad, small group, or whole class and be teacher-led or student-led. They frequently involve discussion of a written text, though discussion can also focus on a problem, issue, or topic that has its basis in a "text" in the larger sense of the term (e.g., a discipline, the media, a societal norm). Other terms for discussions used for pedagogical purposes are instructional conversations (Tharp & Gallimore, 1988) and substantive conversations (Newmann, 1990).

A defining feature of discussion is that students have considerable agency in the construction of knowledge, understanding, or interpretation. In other words, they have considerable "interpretive authority" for evaluating the plausibility or validity of participants responses.

TEACHING AIDS:

The process of teaching - learning depends upon the different type of equipment available in the classroom. There are many aids available these days like, audio, visual and audio-visual aids. They have very much importance in TLP (Teaching Learning Process)

Meaning of Teaching Aids:

As we all know that today's age is the age of science and technology. The teaching learning programmes have also been affected by it. The process of teaching - learning depends upon the different type of equipment available in the classroom.

Need of Teaching Aids:

1) Every individual has the tendency to forget. Proper use of teaching aids helps to retain more concept permanently.

2) Students can learn better when they are motivated properly through different teaching aids.

3) Teaching aids develop the proper image when the students see, hear taste and smell properly.

4) Teaching aids provide complete example for conceptual thinking.

5) The teaching aids create the environment of interest for the students.

6) Teaching aids helps to increase the vocabulary of the students.

7) Teaching aids helps the teacher to get sometime and make learning permanent.

8) Teaching aids provide direct experience to the students.

Types of Teaching Aids:

There are many aids available these days. We may classify these aids as follows-

. Visual Aids

. Audio Aids

. Audio - Visual Aids

1) **Visual Aids**
The aids which use sense of vision are called Visual aids. For example :- actual objects, models, pictures, charts, maps, flash cards, flannel board, bulletin board, chalkboard, overhead projector, slides etc. Out of these black board and chalk are the commonest ones.

2) **Audio Aids**
The aids that involve the sense of hearing are called Audio aids. For example :- radio, tape recorder, gramophone etc.

3) **Audio - Visual Aids**
The aids which involve the sense of vision as well as hearing are called Audio- Visual aids. For example :- television, film projector, film strips etc.

Importance of Teaching aids:

Teaching aids play an very important role in Teaching- Learning process. Importance of Teaching aids are as follows :-

1) Motivation
Teaching aids motivate the students so that they can learn better.

2) Clarification
Through teaching aids , the teacher clarify the subject matter more easily.

3) Discouragement of Cramming
Teaching aids can facilitate the proper understanding to the students which discourage the act of cramming.

4) Increase the Vocabulary
Teaching aids helps to increase the vocabulary of the students more effectively.

5) Saves Time and Money

6) Classroom Live and active
Teaching aids make the classroom live and active.

7) Avoids Dullness

8) Direct Experience
Teaching aids provide

direct experience to the students

EVALUATION:

"Evaluation is process of ascertaining or judging the value or amount of something by careful appraisal"-Goods

Purpose of Evaluation:

Evaluation serves a number of purpose in education, some of the well known purpose are to grade, rank ,classify, compare and promote the students

The basic purpose of evaluation in educational setting has been to bring about quality improvement in education which it does by providing feedback regarding learning.

Type of Evaluation :

Specifically there are three types of evaluation used in the classroom.

Summative assessments: are used to evaluate student learning, skill acquisition, and academic achievement at the conclusion of a defined instructional period—typically at the end of a project, unit, course, semester, program, or school year. Generally speaking, summative assessments are defined by three major criteria:

- The tests, assignments, or projects are used to determine whether students have learned what they were expected to learn. In other words, what makes an assessment "summative" is not the design of the test, assignment, or self-evaluation, per se, but the way it is used—i.e., to determine whether and to what degree students have learned the material they have been taught.
- Summative assessments are given at the conclusion of a specific instructional period, and therefore they are generally evaluative, rather than diagnostic—i.e., they are more appropriately used to determine learning progress and achievement, evaluate the effectiveness of educational programs, measure progress toward improvement goals, or make course-placement decisions, among other possible applications.
- Summative-assessment results are often recorded as scores or grades that are then factored into a student's permanent academic record, whether they end up as letter grades on a report card or test scores used in the college-admissions process. While summative assessments are typically a major component of the grading process in most districts, schools, and courses, not all assessments considered to be summative are graded.

Formative assessment refers to a wide variety of methods that teachers use to conduct in-process evaluations of student comprehension, learning needs, and academic progress during a lesson, unit, or course. Formative assessments help teachers identify concepts that students are struggling to understand, skills they are having difficulty acquiring, or learning standards they have not yet achieved so that adjustments can be made to lessons, instructional techniques, and academic support.

The general goal of formative assessment is to collect detailed information that can be used to improve instruction and student learning *while it's happening*. What makes an assessment "formative" is not the design of a test, technique, or self-evaluation, per se, but the way it is used—i.e., to inform in-process teaching and learning modifications.

Diagnostic Assessment

Another type of assessment, which is given at the beginning of the course or the beginning of the unit/topic, is known as *diagnostic assessment*. This assessment is used to collect data on what students already know about the topic. Diagnostic assessments are sets of written questions (multiple choice or short answer) that assess a learner's current knowledge base or current views on a topic/issue to be studied in the course. The goal is to get a snapshot of where students currently stand - intellectually, emotionally or ideologically - allowing the instructor to make sound instructional choices as to how to teach the new course content and what teaching approach to use.

They are often used pre- and post-instruction, where students are given identical pre- and post-tests before and after the course. This method allows instructors and students to chart their learning progress by comparing pre- and post-tests results. Some disciplines, such as physics, have developed a set of diagnostic tests such as Force Concept Inventory opens in new window that can be used by instructors.

ADDITIONAL INFO:

i. The Producer type of project method-Project is concerned about out side the class

ii. The Consumer type of Project method-Direct or Vicarious experience ie reading stories

iii. The problem type of Project method-Involving to solve the problem

iv. The dill type of Project method-to attain a certain degree of skill in reaction as learning ie vocabulary

v. Black Board, Bulletin Board, Flannel Board, Charts, Graphs are visual non projected media

vi. Slides, Film Strips ,overhead projector are visual projected media

vii. Give the students some problem to solve for maintaining an effective discipline

RESEARCH APTITUDE

DEFINITION OF RESEARCH:

Research is defined as a careful consideration of study regarding a particular concern or a problem using scientific methods. According to the American sociologist Earl Robert Babbie, "Research is a systematic inquiry to describe, explain, predict and control the observed phenomenon. Research involves inductive and deductive methods."

Inductive research methods are used to analyze the observed phenomenon whereas, deductive methods are used to verify the observed phenomenon. Inductive approaches are associated with qualitative research and deductive methods are more commonly associated with quantitative research.

One of the most important aspects of research is the statistics associated with it, conclusion or result. It is about the "thought" that goes behind the research. Research is conducted with a purpose to understand:

- What do organizations or businesses really want to find out?
- What are the processes that need to be followed to chase the idea?
- What are the arguments that need to be built around a concept?
- What is the evidence that will be required that people believe in the idea or concept?

CHARACTERISTICS OF RESEARCH

1. A systematic approach is followed in research. Rules and procedures are an integral part of research that set the objective of a research process. Researchers need to practice ethics and code of conduct while making observations or drawing conclusions.

2. Research is based on logical reasoning and involves both inductive and deductive methods.

3. The data or knowledge that is derived is in real time, actual observations in the natural settings.

4. There is an in-depth analysis of all the data collected from research so that there are no anomalies associated with it.

5. Research creates a path for generating new questions. More research opportunity can be generated from existing research.

6. Research is analytical in nature. It makes use of all the available data so that there is no ambiguity in inference.

7. Accuracy is one of the important character of research, the information that is obtained while conducting the research should be accurate and true to its nature. For example, research conducted in a controlled environment like a laboratory. Here accuracy is measured of instruments used, calibrations, and the final result of the experiment.

WHAT ARE THE TYPES OF RESEARCH:

Following are the types of research:

Basic Research: Basic research is mostly conducted to enhance knowledge. It covers fundamental aspects of research. The main motivation of this research is knowledge expansion. It is a non-commercial research and doesn't facilitate in creating or inventing anything. For example, an experiment is a good example of basic research.

Applied Research: Applied research focuses on analyzing and solving real-life problems. This type of research refers to study that helps solve practical problems using scientific methods. This research plays an important role in solving issues that impact overall well-being of humans. For example, finding a specific cure for a disease.

Problem Oriented Research: As the name suggests, problem-oriented research is conducted to understand the exact nature of the problem to find out relevant solutions. The term "problem" refers to having issues or two thoughts while making any decisions.

For e.g Revenue of a car company has decreased by 12% in the last year. The following could be the probable causes: There is no optimum production, poor quality of a product, no advertising, economic conditions etc.

Problem Solving Research: This type of research is conducted by companies to understand and resolve their own problems. Problem solving research uses applied research to find solutions to the existing problems.

Qualitative Research: Qualitative research is a process that is about inquiry, that helps in-depth understanding of the problems or issues in their natural settings. This is a non-statistical research method.

Qualitative research is heavily dependent on the experience of the researchers and the questions used to probe the sample. The sample size is usually restricted to 6-10 people in a sample. Open ended questions are asked in a manner that one question leads to another. The purpose of asking open ended questions is to gather as much information as possible from the sample.

Following are the methods used for qualitative research:

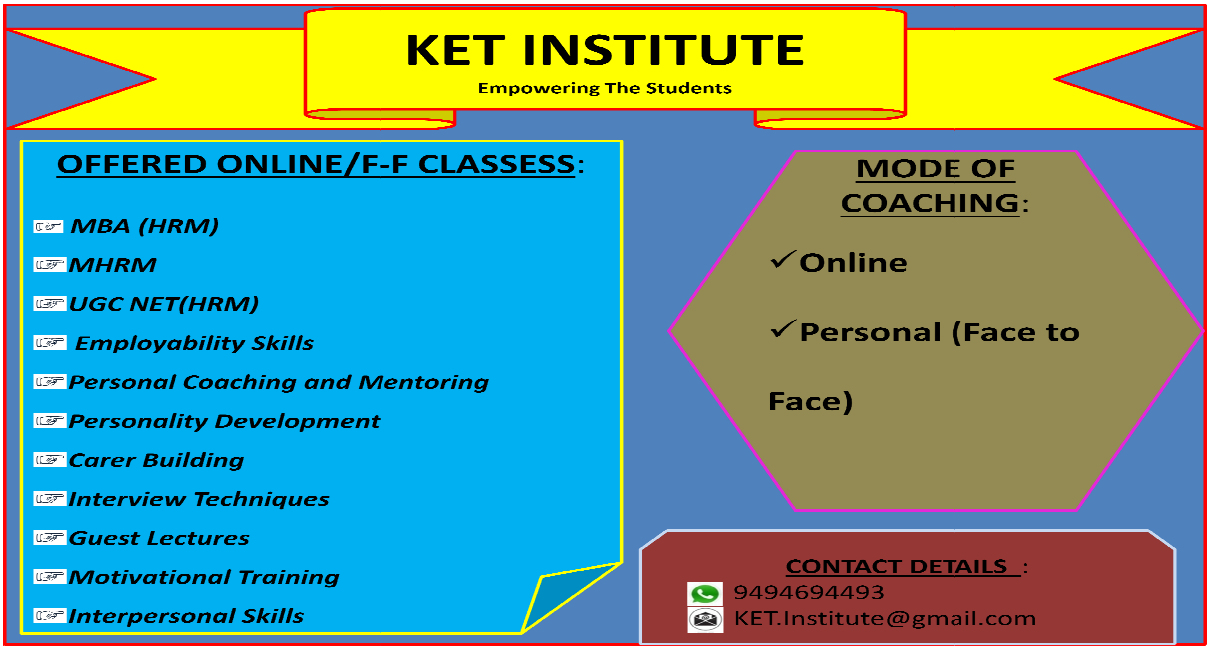
1. One-to-one interview
2. Focus groups
3. Ethnographic Research
4. Content/ Text Analysis
5. Case study research

Learn more: Qualitative Research Methods

Quantitative Research: Qualitative research is a structured way of collecting data and analyzing it to draw conclusions. Unlike qualitative research, this research method uses computational, statistical and similar method to collect and analyze data. Quantitative data is all about numbers.

Quantitative research involves a larger population as, more number of people means more data. In this manner, more data can be analyzed to obtain accurate results. This type of research method uses close ended questions because, in quantitative research, the researchers are typically looking at measuring the extent and gathering foolproof statistical data.

Online surveys, questionnaires, and polls are a preferable data collection tools used in quantitative research. There are various methods of deploying surveys or questionnaires. In recent times online surveys and questionnaires have gained popularity. Survey respondents can receive these surveys on mobile phones, emails or can simply use the internet to access surveys or questionnaires.



WHAT IS THE PURPOSE OF RESEARCH:

There are three purposes of research:

1. Exploratory Research: As the name suggests, exploratory research is conducted to explore the research questions and may or may not offer a final conclusion to the research conducted. It is conducted to handle new problem areas which haven't been explored before. Exploratory research lays the foundation for more conclusive research and data collection. For example, a research conducted to know the level of customer satisfaction among the patrons of a restaurant.

2. Descriptive Research: Descriptive research focuses on throwing more light on current issues through a process of data collection. Descriptive studies are used to describe the behavior of a sample population. In descriptive research, only one variable (anything that has quantity or quality that varies) is required to conduct a study. The three main purpose of descriptive research is describing, explaining and validating the findings. For example, a research conducted to know if top-level management leaders in the 21st century posses the moral right to receive a huge sum of money from the company profit?

3. Explanatory Research: Explanatory research or causal research, is conducted to understand the impact of certain changes in existing standard procedures. Conducting experiments is the most popular form of casual research. For example, research conducted to understand the effect of rebranding on customer loyalty.

To understand characteristic of research design using research purpose here is a comparative analysis:

	Exploratory Research	Descriptive Research	Explanatory Research
Research approach used	Unstructured	Structured	Highly structured
Research conducted through	Asking research questions	Asking research questions	By using research hypotheses.
When is it conducted?	Early stages of decision making	Later stages of decision making	Later stages of decision making

STEPS OF RESEARCH:

Research process contains a series of closely related activities which has to carry out by a researcher. Research process requires patients. There is no measure that shows your research is the best. It is an art rather than a science. Following are the main steps in social or business research process.

1. Selection of Research Problem
2. Extensive Literature Survey
3. Making Hypothesis
4. Preparing the Research Design
5. Sampling
6. Data collection
7. Data Analysis
8. Hypothesis Testing
9. Generalization and Interpretation
10. Preparation of Report

Selection of Research Problem:

The selection of topic for research is a difficult job. When we select a title or research statement, then other activities would be easy to perform. So, for the understanding thoroughly the problem it must have to discuss with colleagues, friend, experts and teachers. The research topic or problem should be practical, relatively important, feasible, ethically and politically acceptable.

Literature Review or Extensive Literature Survey:

After the selection of research problem, the second step is that of literature mostly connected with the topics. The availability of the literature may bring ease in the research.

For this purpose academic journals, conference and govt. reports and library must be studied.

Making Hypothesis:
The development of hypothesis is a technical work depends on the researcher experience. The hypothesis is to draw the positive & negative cause and effect aspects of a problem. Hypothesis narrows down the area of a research and keep a researcher on the right path.

Preparing the Research Design:
After the formulation of the problem and creating hypothesis for it, research Design is to prepare by the researcher. It may draw the conceptual structure of the problem. Any type of research design may be made, depend on the nature and purpose of the study. Daring R. Design the information about sources, skill, time and finance is taken into consideration.

***Sampling*:**
The researcher must design a sample. It is a plan for taking its respondents from a specific areas or universe. The sample may be of two types:

1. Probability Sampling
2. Non-probability Sampling

***Data collection*:**
Data collection is the most important work, is researcher. The collection of information must be containing on facts which is from the following two types of researcher.

Primary Data Collection: Primary data may be from the following.

1. Experiment
2. Questionnaire
3. Observation
4. Interview

Secondary data collection: it has the following categories:

1. Review of literature
2. Official and non-official reports
3. Library approach

***Data Analysis*:**
When data is collected, it is forwarded for analysis which is the most technical job. Data analysis may be divided into two main categories.

***Data Processing*:** it is sub-divided into the following.
Data editing, Data coding, Data classification, Data tabulation, Data presentation, Data measurement

***Data Exposition*:** Date Exposition has the following sub-categories.
Description, Explanation, Narration, Conclusion/Findings, Recommendations/Suggestions

Hypothesis Testing:

Research data is then forwarded to test the hypothesis. Do the hypothesis are related to the facts or not? To find the answer the process of testing hypothesis is undertaken which may result in accepting or rejecting the hypothesis.

Generalization and Interpretation:

The acceptable hypothesis is possible for researcher to arrival at the process of generalization or to make & theory. Some types of research has no hypothesis for which researcher depends upon on theory which is known as interpretation.

Preparation of Report:

A researcher should prepare a report for which he has done is his work. He must keep in his mind the following points:

Report Design in Primary Stages:

The report should carry a title, brief introduction of the problem and background followed by acknowledgement. There should be a table of contents, grapes and charts.

Main Text of the Report:

It should contain objectives, hypothesis, explanations and methodology of the research. It must be divided into chapters and every chapter explains separate title in which summary of the findings should be enlisted. The last section would be clearly of conclusions to show the main theme of the R-study.

Closing the Report:

After the preparation of report, the last step in business research process contains of bibliography, references, appendices, index and maps or charts for illustration. For this purpose the information should more clearer.

METHODS OF RESEARCH:

John W Best has classified research methods into three types. They are Historical Research, Descriptive Research and Experimental Research.

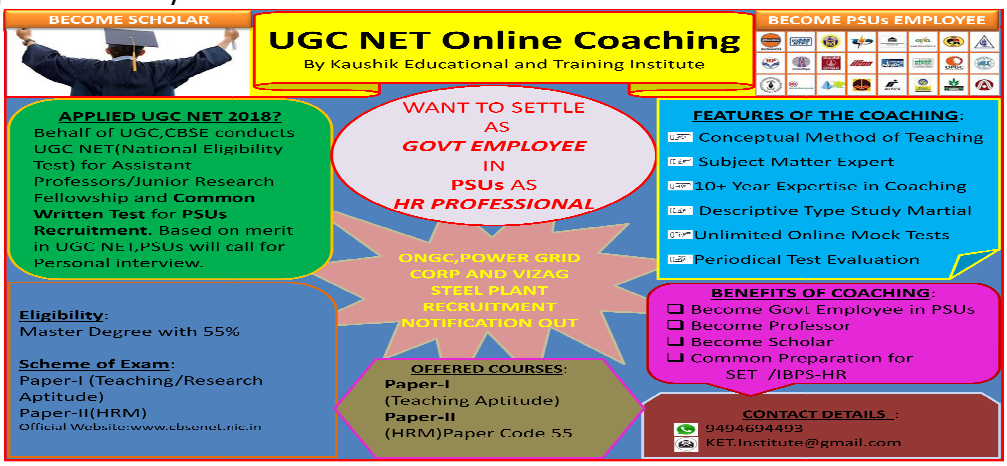
a) ***Historical Research***: Historical research has been defined as the systematic and objective location, evaluation and synthesis of evidence in order to establish facts and draw conclusion about past events. It involves a critical inquiry of previous age with the aim of reconstructing a faithful representation of the past
b) ***Descriptive Research***: Sometimes an individual wants to know something about a group of people. Maybe the individual is a would-be senator and wants to know who they're representing or a surveyor who is looking to see if there is a need for a mental health program.**Descriptive research** is a study designed to depict the

participants in an accurate way. More simply put, descriptive research is all about describing people who take part in the study.

There are three ways a researcher can go about doing a descriptive research project, and they are:

- **Observational**, defined as a method of viewing and recording the participants
- **Case study**, defined as an in-depth study of an individual or group of individuals
- **Survey**, defined as a brief interview or discussion with an individual about a specific topic

c) ***Experimental Research***:The term experiment may seem to be associated with the image of a chemist surrounded by bubbling tubes and other related items. Traditionally, experiments have been used by physical and behavioural researchers to a greater extent compared to business scientists. Nevertheless, experiments research can be effectively used in businesses in order to analyse cause and affect relationships. Deductive approach is mainly used for experiments research in order to test hypotheses.Experiments are usually used in causal studies. Specifically, experiment researches involve manipulation with an independent variable in order to assess its impacts on dependent variables. Changes in price levels on volume of sales can be mentioned as a basic example for experiment. In this specific example, price can be specified as independent variable, whereas sales would be dependent variable.The nature of relationships between two variables in causal experimental researches may be divided into three categories: symmetrical, reciprocal and asymmetrical.



RESEARCH ETHICS:

Ethics are closely associated with morals and involve embracing moral issues in the context of working with humans . Ethics have now evolved to

include issues beyond humans, incorporating a respect for and conservation of the environment. Ethics are also located within human rights and democracy discourses. With respect to the latter, society has become sensitive to the idea that the rights of people should be protected, particularly those who are vulnerable

According Burgess (1989), ethical questions are the subject of interdisciplinary

deliberations. Over the years philosophers have examined ethical issues in abstract terms, whereas sociologists and psychologists have focused on extreme cases and research 'scandals' to highlight ethical issues in research. In the contemporary world, ethics should be the concern of all researchers and they should have a critical awareness of potential ethical risks when performing research on an everyday basis. Broadly, there are three different perspectives on ethics:
1. Ethics as a disposition: This perspective is derived from Aristotle's notion of virtues that a person possesses, such as justice, generosity and honesty. Ethics in this instance is a disposition.
2. Ethics as duty: This perspective is derived from Kant, and it focuses on the duty humans (as rational beings) have to act in ways that show respect to other human beings.
3. Ethics as utilitarian: This perspective relates to guiding principles for ethical conduct that should benefited a majority of people

The following is a rough and general summary of some ethical principles

Honesty

Strive for honesty in all scientific communications. Honestly report data, results, methods and procedures, and publication status. Do not fabricate, falsify, or misrepresent data. Do not deceive colleagues, research sponsors, or the public.

Objectivity

Strive to avoid bias in experimental design, data analysis, data interpretation, peer review, personnel decisions, grant writing, expert testimony, and other aspects of research where objectivity is expected or required. Avoid or minimize bias or self-deception. Disclose personal or financial interests that may affect research.

Integrity

Keep your promises and agreements; act with sincerity; strive for consistency of thought and action.

Carefulness

Avoid careless errors and negligence; carefully and critically examine your own work and the work of your peers. Keep good records of research activities, such as data collection, research design, and correspondence with agencies or journals.

Openness

Share data, results, ideas, tools, resources. Be open to criticism and new ideas.

Respect for Intellectual Property

Honor patents, copyrights, and other forms of intellectual property. Do not use unpublished data, methods, or results without permission. Give proper acknowledgement or credit for all contributions to research. Never plagiarize.

Confidentiality

Protect confidential communications, such as papers or grants submitted for publication, personnel records, trade or military secrets, and patient records.

Responsible Publication

Publish in order to advance research and scholarship, not to advance just your own career. Avoid wasteful and duplicative publication.

Responsible Mentoring

Help to educate, mentor, and advise students. Promote their welfare and allow them to make their own decisions.

Respect for colleagues

Respect your colleagues and treat them fairly.

Social Responsibility

Strive to promote social good and prevent or mitigate social harms through research, public education, and advocacy.

Non-Discrimination

Avoid discrimination against colleagues or students on the basis of sex, race, ethnicity, or other factors not related to scientific competence and integrity.

Competence

Maintain and improve your own professional competence and expertise through lifelong education and learning; take steps to promote competence in science as a whole.

Legality

Know and obey relevant laws and institutional and governmental policies.

Animal Care

Show proper respect and care for animals when using them in research. Do not conduct unnecessary or poorly designed animal experiments.

Human Subjects Protection

When conducting research on human subjects, minimize harms and risks and maximize benefits; respect human dignity, privacy, and autonomy; take special precautions with vulnerable populations; and strive to distribute the benefits and burdens of research fairly.

RESEARCH COMMUNICATING STRATEGIES:

a) ***Research Papers***: A **research paper** is an expanded essay that presents your own interpretation or evaluation or argument. When you write an essay, you use everything that you personally know and have thought about a subject.

b) ***Research Articles***: An "original" research article is a detailed account of research activity written by the scientists who did the research--not by someone else who is reporting on the research; it is a primary resource. Some instructors may refer to these as "scientific research" articles or as "empirical" research

c) ***Symposium***: The symposium is a form of discussion in which s systematic presentation of papers or speeches concerning a problem or various aspects of problems/topic are done by two or more experts to an audience under the direction of a chairman followed by general discussion.

d) ***Seminars***: Historically or traditionally, as we hear form others and read in the literature, seminars provide opportunities for a group of top people or experts/specialists in a particular subject to come together to discuss all round trends based on views.

e) ***Conference*** :A conference can be described as a pooling of experiences and opinions among a group of people who have special qualification in the area or among the people who are capable of analysing a problem from information provided by competent leaders

f) Workshop: The workshop method is one among many techniques available to educators. As the name itself implies, all members of the group are engaged in the process of creative learning.

THESIS WRITING:

A thesis or a dissertation is a record of research activities. It is usually produced in partial fulfilment of the requirement of a course/programme or for am advanced degree. It involves presenting a research problem with an argument or point of view

Primary Section: The beginning or the preliminary section of the research report contains the following items.

- Cover or Title pageN
- Preface or/and Acknowledgement
- Table of contents
- List of tables
- List of figures and Illustration
- Glossary
- List of Abbreviations

The main Body:The main body of the report presents the actual work done by an investigator or researcher.It tells us precisely and clearly about the investigation /study from the beginning to the end.The methodology section of the final report should be written in the past tense because the study has been completed.

- Introduction
- Review of Literature
- Design of the study
- Analysis and interpretation of data
- Main finding and conclusion
- Summary

The end: The end of the report consists of reference and appendix/appendices .Reference come at the end after the last chapter of the report.

ADDITIONAL INFO:

i. A hypothesis is-Tentative statement whose validity is still to be tested

ii. A null hypothesis is- No significant difference between variables

iii. Randomization method-Lottary,Coin method and Tippit's table of random digts

iv. Unscientific means-Prejudices and biases,Useless arguments and not being harmony

v. "Research is an honest effort carried out through insight"by Watson

vi. Longitudinal approach of research deals with Long term research

vii. Action research deals with solve the problem immediately

viii. Father of Correlation is known as-Galton

ix. The father of Analysis of Variance(ANOVA)-Charles Spearman

x. Case study is the qualitative research

xi. Quota sample is a form of Non Probability Sample

xii. The research design to control variance

xiii. Psychological research starts with problems

xiv. Research report writing process: Abstract-Introduction-Method-Result

xv. Research problem is a interrogative statement and research hypothesis is a declarative statement

INFORMATION AND OCMMUNICATION TECHNOLOGY(ICT)

COMPUTER BASICS

The word "computer" comes from the word "compute", which means, "to calculate" . Hence, people usually consider a computer to be a calculating device that can perform arithmetic operations at high speed . In fact, the original objective for inventing a computer was to create a fast calculating machine. However, more than 80% of work done by computers today is of non-mathematical or non-numerical nature. Nowadays, computer are an integral part of our lives. They are used for the reservation of tickets for airplanes and railways, payment of telephone and electricity bills, deposit and withdrawal of money from banks, processing of business data, forecasting of weather conditions, diagnosis of diseases, searching for information on Internet etc. Computers are also used extensively in schools, universities, organsations, music industry, movie industry, scientific research, law firms, fashion industry etc.

DEFINITION:

1. A computer is a machine that can solve problems by accepting data, performing certain operations and presenting the results of those operations under the direction of detailed step by step instructions.
2. A computer is an electronic machine, devised for performing calculations and controlling operations that can be expressed either in logical or numerical terms.

HISTORY:

- Father of the computer – Charles Babbage
- Father of the modern computer – Alan Turing
- Basic Architecture of Computer: John Von Neumann (1947-49)
- First Programmer: Lady Ada Lovelae (1880)
- First Electronic Computer: ENIAC (1946) – J.P. Eckert & J.W. Mauchly
- First computer for the home user introduced – IBM in 1981

CHARACTERISTICS:

1. Speed

The computer can process data very fast, at the rate of millions of instructions per second. Some calculations that would have been taken hours and days to complete otherwise, can be completed in a few seconds using computer.

2. Accuracy

Computers are very accurate. Accuracy of a computer is consistently high and the degree of its accuracy depends upon its design. A computer performs every calculation with the same accuracy.
However, errors can occur in a computer. These errors are mainly due to human rather than technological weaknesses.

3. Reliability

Computer output is generally very reliable, subject to the condition that the input data entering the computer should be correct and the program of instructions should be reliable and correct.

4. Storage capability

Computers can store large amount of data and can recall the required information almost instantaneously. The main memory of the computer is relatively small and it can hold only a certain amount of information, therefore, the data is stored on secondary storage devices such as magnetic tape , disks etc.

5. Versatility

Computer is versatile in nature. It can perform different types of tasks with the same ease. As one moment, you can use the computer to prepare a letter document and in the next moment you can play music or movies or print document.

6. Diligence

When used for a long period of time, the computer does not get tires or fatigued. It can perform long and complex calculation with the same speed and accuracy from the start till the end.

7. Resource sharing

Apart from device sharing, data and information can also be shared among groups of computers, thus creating a large information and knowledge base.

8. Reduced cost

With ever increasing advances being made in the state of the art, the cost of computer equipment has dropped drastically over the years. Hardware costs have been decreasing at an estimated annual rate of 25%. Thus companies that at one time could not justify the cost of acquiring their own computer system may now find it not only feasible to acquire a system but cost effective as well.

9. Power of Remembering

As a human being acquires new knowledge, his/her brain subconsciously selects what it feels to be important and worth retaining in memory. The brain relegates unimportant

details to back of mind or just forgets them. This is not the case with computers. A computer can store and recall any amount of information because of its secondary storage (a type of detachable memory) capability. It can retain a piece of information as long as a user desires and the user can recall the information whenever required.

10. No I.Q.

Its I. Q. is zero, at least until today. It has to be told what to do and in what sequence. Hence, only a user determines what tasks a computer will perform. A computer cannot take its own decision in this regard

11. No Feelings

Computers are devoid of emotions. They have no feelings and no instincts because they are machines. Although men have succeeded in building a memory for computer, but no computer possesses the equivalent of a human heart and soul.

PARTS OF COMPUTER:

Hardware – Computer hardware is what you can physically touch includes the computer case, monitor, keyboard, and mouse. It also includes all the parts inside the computer case, such as the hard disk drive, motherboard, video card, and many others.

Input Devices – In computing, an input device is a peripheral (piece of computer hardware equipment) used to provide data and control signals to an information processing system such as a computer or information appliance.

Examples: keyboards, mice, scanners, digital cameras and joysticks.

Keyboard – A Keyboard is the most fundamental input device for any computer system. It helps to enter data in computer.

Mouse – A mouse is used to input data by sending a signal to the computer, based on hovering the cursor and selecting with the left mouse button. The left mouse acts as a 'enter' button. The right mouse button can be selected and will often pop up a window of choices. The scrolling wheel is used to move the view of the screen up or down. By moving your mouse to a location in a document, on a digital photo or over a choice of music, you can click the left mouse button to place the cursor.

Trackballs – A trackball is an input device used to enter motion data into computers or other electronic devices. It serves the same purpose as a mouse, but is designed with a movable ball on the top, which can be rolled in any direction. Instead of moving the whole device, you simply roll the movable ball on top of the trackball unit with your hand to generate motion input.

Barcode reader – A barcode reader (or barcode scanner) is an electronic device that can read and output printed barcodes to a computer. Like a flatbed scanner, it consists of a light source, a lens and a light sensor translating optical impulses into electrical ones.

Digital camera – a camera which produces digital images that can be stored in a computer and displayed on screen.
Gamepad – a handheld controller for video games.
Joystick – a lever that can be moved in several directions to control the movement of an image on a computer or similar display screen. It mainly used in playing games.
Microphone – an instrument for converting sound waves into electrical energy variations which may then be amplified, transmitted, or recorded.
Scanner – a device that scans documents and converts them into digital data.
Webcam – a video camera connected to a computer, allowing its images to be seen by Internet users.
Optical character recognition (OCR) – is the mechanical or electronic conversion of images of typed, handwritten or printed text into machine-encoded text.
Digitizer – It converts analog information into digital form.
Optical Mark reading (OMR) – Optical Mark Readers reads pencil or pen marks made in pre-defined positions on paper forms as responses to questions or tick list prompts.

Basic structure of CPU

CPU (Central processing unit)

A central processing unit (CPU) is the electronic circuitry within a computer that carries out the instructions of a computer program by performing the basic arithmetic, logical, control and input/output (I/O) operations specified by the instructions.
*CPU – Heart of the Computer
***CPU Process:**
1.Fetch the Instruction
2.Interpret the Instruction
3.Fetch the Data
4.Process the Data
5.Write the data

Output devices

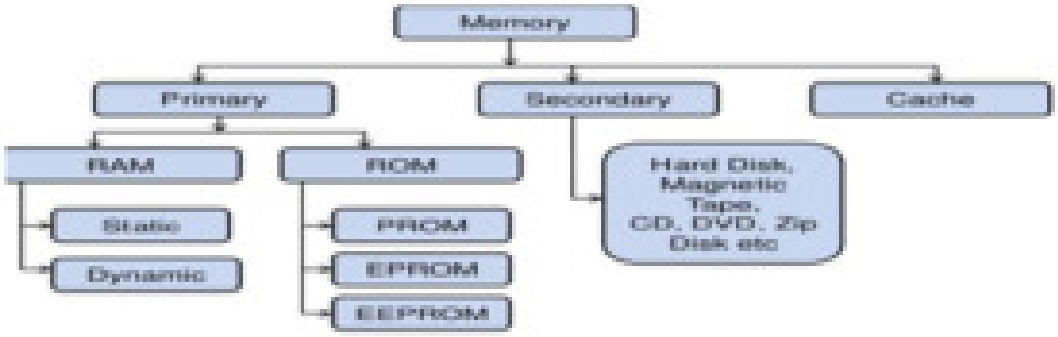
An output device is any device used to send data from a computer to another device or user. Most computer data output that is meant for humans is in the form of audio or video. Examples include monitors, projectors, speakers, headphones and printers.
Monitors – A **Monitor** is a TV-like display attached to the computer on which the output can be displayed and viewed. It can either be a monochrome display or a colour display.
There are two kinds of monitors

1. **CRT (Cathode ray tube) –** The cathode ray tube (CRT) is a vacuum tube containing one or more electron guns, and a phosphorescent screen used to view images.
2. **Thin-Film-Transistor Liquid-Crystal Display (TFT LCD)** – A thin-film-transistor liquid-crystal display (TFT LCD) is a variant of a liquid-crystal display (LCD) that uses thin-film transistor technology to improve image qualities such as addresability and contrast.

Printer – Printer is a output device for printing text or pictures.

1. **Impact printer** – An impact printer is a printer that strikes a print head against an ink ribbon to mark the paper. Common examples include dot matrix and daisy-wheel printers.
2. **Non-Impact printer** – Non-impact printers print the characters without using ribbon. Two common types of non-impact printers include inkjet printers, which spray small drops of ink onto each page, and laser printers, which roll ink onto the paper using a cylindrical.

Memory



Primary Memory or Main Memory

Register:

Register is one of a small set of data holding places that are part of the computer processor. A register may hold an instruction, a storage address, or any kind of data (such as a bit sequence or individual characters). Some instructions specify registers as part of the instruction.

1. **RAM (Random access memory) –** Random Access Memory (RAM) is a type of data storage used in computers that is generally located on the motherboard. This type of memory is **volatile** and all information that was stored in RAM is lost when the computer is turned off.

There are two types of Random access memory

- **Dynamic RAM –** dynamic indicates that the memory must be constantly refreshed (reenergized) or it will lose its contents.
- **Static Memory –** A computer memory that contains fixed information and retains its programmed state as long as the power is on.

Virtual memory is a feature of an operating system (OS) that allows a computer to compensate for shortages of physical memory by temporarily transferring pages of data from random access memory(RAM) to disk storage.

2. ROM (Read only memory) – Once data has been written onto a ROM chip, it cannot be removed and can only be read. Unlike main memory (RAM), ROM retains its contents even when the computer is turned off.ROM is referred to as being **nonvolatile**.

BASIC COMPUTER ABBREVIATIONS:

ATA—Advanced Technology Attachment

ASCII—American Standard Code for Information Interchange

ARPANET—Advanced Research Projects Agency Network

Ajax—Asynchronous JavaScript and XML

ASP—Active Server Pages/Application Service Provider

API—Application Programming Interface

ATA—Advanced Technology Attachment

ATM—Asynchronous Transfer Mode

BiDi—Bi-Directional

bin—binary
BAL—Basic Assembly Language

BASIC—Beginner's All-Purpose Symbolic Instruction Code

BIOS—Basic Input Output System

bps—bits per second

BCD—Binary Coded Decimal

Blog—Web Log

BMP—Basic Multilingual Plane

BT—BitTorrent / Bluetooth

BW—Bandwidth

CAD—Computer-Aided Design

CPU—Central Processing Unit

CIM—Common Information Model

CRS—Computer Reservations System

CRT—Cathode Ray Tube

CLI—Command Line Interface

CDMA—Code Division Multiple Access

CMOS—Complementary Metal-Oxide Semiconductor

CSI—Common System Interface

CD-R—CD-Recordable
CD-ROM—CD Read-Only Memory

CD-RW—CD-Rewritable

CMOS—Complementary Metal-Oxide Semiconductor

CSV—Comma-Separated Values

COBOL—Common Business-Oriented Language

CGI—Common Gateway Interface /Computer-Generated Imagery

DAO—Data Access Objects

DHTML—Dynamic Hypertext Markup Language

DAT—Digital Audio Tape

DB—Database

DIVX—Digital Video Express

DVD—Digital Video Disc

DVD-R—DVD-Recordable

DVD-ROM—DVD-Read Only Memory

DVD-RW—DVD-Rewritable

DOS—Disk Operating System

DDR—Double Data Rate

DNS—Domain Name System

EEPROM—Electronically Erasable Programmable Read-Only Memory

ENIAC—Electronic Numerical Integrator And Computer

EBCDIC—Extended Binary Coded Decimal Interchange Code

EPROM—Erasable Programmable Read-Only Memory

ESD—Electrostatic Discharge

FAT—File Allocation Table

FAQ—Frequently Asked Questions

FDD—Floppy Disk Drive

FDMA—Frequency-Division Multiple Access

FS—File System
FSB—Front Side Bus

FTP—File Transfer Protocol

Gb—Gigabit / GB—Gigabyte
GIF—Graphics Interchange Format

GPL—General Public License

GPRS—General Packet Radio Service

HD—High Density
HDD—Hard Disk Drive

HD DVD—High Definition DVD
HP—Hewlett-Packard

HT—Hyper Threading

HTM—Hierarchical Temporal Memory

HTML—Hypertext Markup Language

HTTP—Hypertext Transfer Protocol

Hz—Hertz

IBM—International Business Machines

IC—Integrated Circuit

ICMP—Internet Control Message Protocol

ICT—Information and Communication Technology

IDE—Integrated Development Environment /Integrated Drive Electronics

IE—Internet Explorer

IIS—Internet Information Services

IM—Instant Messaging

IMAP—Internet Message Access Protocol

I/O—Input/Output

IP—Intellectual Property /Internet Protocol

IrDA—Infrared Data Association

ISA—Industry Standard Architecture /Instruction Set Architecture

iSCSI—Internet Small Computer System Interface

ISDN—Integrated Services Digital Network

ISP—Internet Service Provider

IT—Information Technology

J2EE—Java 2 Enterprise Edition

J2ME—Java 2 Micro Edition

J2SE—Java 2 Standard Edition

JDK—Java Development Kit

JPEG—Joint Photographic Experts Group

JRE—Java Runtime Environment

JS—JavaScript

KB—Keyboard /Kilobyte /Knowledge Base

Kb—Kilobit

kHz—Kilohertz

KVM—Keyboard, Video, Mouse

LED—Light-Emitting Diode

MAN—Metropolitan Area Network

Mb—Megabit

MB—Megabyte

MBR—Master Boot Record

MDI—Multiple Document Interface

MHz—Megahertz

MIDI—Musical Instrument Digital Interface

MMU—Memory Management Unit

MMX—Multi-Media Extensions

MNG—Multiple-image Network Graphics

MPEG—Motion Pictures Experts Group

MOSFET—Metal-Oxide Semiconductor Field Effect Transistor

MPEG—Motion Pictures Experts Group

MS—Microsoft

MS-DOS—Microsoft DOS

NIC—Network Interface Controller

NTFS—NT Filesystem

NVRAM—Non-Volatile Random Access Memory

OO—Object-Oriented

OS—Open Source /Operating System

P2P—Peer-To-Peer

PAN—Personal Area Network

PATA—Parallel ATA

PC—Personal Computer

PCB—Printed Circuit Board

PC DOS—Personal Computer Disk Operating System

PCI—Peripheral Component Interconnect

PCIe—PCI Express

PERL—Practical Extraction and Reporting Language

PGA—Pin Grid Array

PHP—PHP: Hypertext Preprocessor

PIC—Peripheral Interface Controller /Programmable Interrupt Controller

PLC—Power Line Communication /Programmable Logic Controller

POST—Power-On Self Test

PPI—Pixels Per Inch

PS/2—Personal System/2

PSU—Power Supply Unit

RAD—Rapid Application Development

RAM—Random Access Memory

RAID—Redundant Array of Inexpensive Disks

RAIT—Redundant Array of Inexpensive Tapes

RF—Radio Frequency
RGB—Red, Green, Blue (RGBA—Red, Green, Blue, Alpha)

RIP—Raster Image Processor /Routing Information Protocol

ROM—Read Only Memory

ROM-DOS—Read Only Memory - Disk Operating System

SATA—Serial ATA

SCSI—Small Computer System Interface

SDRAM—Synchronous Dynamic Random Access Memory

SFTP—Secure FTP /Simple File Transfer Protocol

SHDSL—Single-pair High-speed Digital Subscriber Line

SIMD—Single Instruction, Multiple Data

SIMM—Single Inline Memory Module

SPI—Serial Peripheral Interface

SPI—Stateful Packet Inspection

SVG—Scalable Vector Graphics

SVGA—Super Video Graphics Array

TB—Tera Byte

TCP/IP—Transmission Control Protocol/Internet Protocol

TDMA—Time Division Multiple Access

tmp—temporary

TTF—TrueType Font

TTL—Transistor-Transistor Logic

UPS—Uninterruptible Power Supply

URI—Uniform Resource Identifier

URL—Uniform Resource Locator

USB—Universal Serial Bus

UTF—Unicode Transformation Format

UTP—Unshielded Twisted Pair

VB—Visual Basic

VBA—Visual Basic for Applications

VBS—Visual Basic Script

VPN—Virtual Private Network

VPU—Visual Processing Unit

WAN—Wide Area Network

WAP—Wireless Access Point /Wireless Application Protocol

Wi-Fi—Wireless Fidelity

WLAN—Wireless Local Area Network

WMA—Windows Media Audio

WMV—Windows Media Video

WPAN—Wireless Personal Area Network

XML—eXtensible Markup Language

Y2K—Year Two Thousand

EVOLUTION OF COMPUTERS:

First Generation:

First generation computers: made use of vacuum tubes. These computers were expensive and bulky. They used machine language for computing and could solve just one problem at a time. They did not support multitasking.

- IBM, today a big name in the list of computer technology industries, was founded in 1911.
- It was in 1937 that Alan Turing came up with the concept of a theoretical Turing machine. In the same year, John V. Atanasoff devised the first digital electronic computer. Atanasoff and Clifford Berry came up with the ABC prototype in the November of 1939. Its computations were based on a vacuum tube and it used regenerative capacitor memory.
- Konrad Zuse's electromechanical 'Z Machines', especially the Z3 of 1941 was a notable achievement in the evolution of computers. It was the first machine to include binary and floating-point arithmetic and a considerable amount of programmability. Since it was proved to be Turing complete in 1998, it is regarded as the world's first operational computer.
- In 1943, the Colossus was secretly designed at Bletchley Park, Britain to decode German messages. The Harvard Mark I of 1944 was a large-scale electromechanical computer with less programmability. It was another step forward in the evolution of computers.
- The U.S. Army's Ballistics Research Laboratory came up with the Electronic Numerical Integrator And Computer (ENIAC) in 1946. It came to be known as the first general purpose electronic computer. However, it was required to be rewired to change its programming thus making its architecture inflexible. Developers of ENIAC realized the flaws in the architecture and developed a better one. It was known as the stored program architecture or von Neumann Architecture. It got this name after John von Neumann, who for the first time described the architecture in 1945. All the projects of developing computers taken up thereafter have been using the von Neumann Architecture. All the computers use a 'stored program architecture', which is now a part of the definition of computers.
- The U.S. National Bureau of Standards came up with Standards Electronic/Eastern Automatic Computer (SEAC) in 1950. Diodes handled all the logic making it the first computer to base its logic on solid devices.
- American mathematician and engineer, known as the 'Father of Information Theory', Claude Shannon published a paper *Programming a Computer for Playing Chess*, wherein he wrote about a machine that could be made to play chess!
- IBM announced the IBM 702 Electronic Data Processing Machine in 1953. It was developed for business use and could address scientific and engineering applications.

Second Generation:

Till the 1950s all computers that were used were vacuum tube based. In the 1960s, transistor-based computers replaced vacuum tubes. Transistors made computers smaller and cheaper. They made computers energy-efficient. But transistors led to emission of large amounts of heat from the computer, which could damage them. The use of transistors

marked the **second generation of computers**. Computers of this generation used punched cards for input. They used assembly language.

- Stanford Research Institute brought out ERMA, Electronic Recording Machine Accounting Project, which dealt with automation of the process of bookkeeping in banking.
- In 1959, General Electric Corporation delivered its ERMA computing system to the Bank of America in California.

Third Generation:

The use of Integrated circuits ushered in the **third generation of computers**. Their use increased the speed and efficiency of computers. Operating systems were the human interface to computing operations and keyboards and monitors became the input-output devices. COBOL, one of the earliest computer languages, was developed in 1959-60. BASIC came out in 1964. It was designed by John George Kemeny and Thomas Eugene Kurtz. Douglas Engelbart invented the first mouse prototype in 1963. Computers used a video display terminal (VDT) in the early days. The invention of Color Graphics Adapter in 1981 and that of Enhanced Graphics Adapter in 1984, both by IBM added 'color' to computer displays. All through the 1990s, computer monitors used the CRT technology. LCD replaced it in the 2000s. Computer keyboards evolved from the early typewriters. The development of computer storage devices started with the invention of Floppy disks, by IBM again.

- In 1968, DEC launched the first mini computer called the PDP-8.
- In 1969, the development of ARPANET began with the financial backing of the Department Of Defense.

Fourth Generation:

Thousands of integrated circuits placed onto a silicon chip made up a microprocessor. Introduction of microprocessors was the hallmark of **fourth generation computers**.

- Intel produced large-scale integration circuits in 1971. Microprocessors came up during the 1970s. Ted Hoff, working for Intel introduced 4-bit 4004.
- In 1972, Intel introduced the 8080 microprocessors.
- In 1974, Xerox came up with Alto workstation at PARC. It consisted of a monitor, a graphical interface, a mouse, and an Ethernet card for networking.
- Apple Computers brought out the Macintosh personal computer on January 24 1984.
- By 1988, more than 45 million computers were in use in the United States. The number went up to a billion by 2002.

Fifth Generation:

The **fifth generation computers** are in their development phase. They would be capable of massive parallel processing, support voice recognition and understand natural language.

The current advancements in computer technology are likely to transform computing machines into intelligent ones that possess self organizing skills. The evolution of computers will continue, perhaps till the day their processing powers equal human intelligence.

INTERNET&EMAIL:

The Internet is a worldwide system of interconnected computer networks that use the TCP/IP set of network protocols to reach billions of users. The Internet began as a U.S Department of Defense network to link scientists and university professors around the world.

A network of networks, today, the Internet serves as a global data communications system that links millions of private, public, academic and business networks via an international telecommunications backbone that consists of various electronic and optical networking technologies.

Decentralized by design, no one owns the Internet and it has no central governing authority. As a creation of the Defense Department for sharing research data, this lack of centralization was intentional to make it less vulnerable to wartime or terrorist attacks.

The terms "Internet" and "World Wide Web" are often used interchangeably; however, the Internet and World Wide Web are not one and the same.

The Internet is a vast hardware and software infrastructure that enables computer interconnectivity. The Web, on the other hand, is a massive hypermedia database - a myriad collection of documents and other resources interconnected by hyperlinks. Imagine the World Wide Web as the platform which allows one to navigate the Internet with the use of a browser such as Google Chrome or Mozilla Firefox.

Follow the Internet Timeline below to see how the Internet has evolved over the years and take a glance at what lies ahead in the future as the Internet continues to change the world we live in.

Internet Timeline:

1957 – USSR launches Sputnik into space. In response, the USA creates the Advanced Research Projects Agency (ARPA) with the mission of becoming the leading force in science and new technologies.

1962 – J.C.R. Licklider of MIT proposes the concept of a "Galactic Network." For the first time ideas about a global network of computers are introduced. J.C.R. Licklider is later chosen to head ARPA's research efforts.

1962 - Paul Baran, a member of the RAND Corporation, determines a way for the Air Force to control bombers and missiles in case of a nuclear event. His results call for a decentralized network comprised of packet switches.

1968 - ARPA contracts out work to BBN. BBN is called upon to build the first switch.

1969 – RPANET created - BBN creates the first switched network by linking four different nodes in California and Utah; one at the University of Utah, one at the University of California at Santa Barbara, one at Stanford and one at the University of California at Los Angeles.

1972 - Ray Tomlinson working for BBN creates the first program devoted to email.

1972 - ARPA officially changes its name to DARPA Defense Advanced Research Projects Agency.

1972 - Network Control Protocol is introduced to allow computers running on the same network to communicate with each other.

1973 - Vinton Cerf working from Stanford and Bob Kahn from DARPA begin work developing TCP/IP to allow computers on different networks to communicate with each other.

1974 - Kahn and Cerf refer to the system as the Internet for the first time.

1976 - Ethernet is developed by Dr. Robert M. Metcalfe.

1976 – SATNET, a satellite program is developed to link the United States and Europe. Satellites are owned by a consortium of nations, thereby expanding the reach of the Internet beyond the USA.

1976 – Elizabeth II, Queen of the United Kingdom, sends out an email on 26 March from the Royal Signals and Radar Establishment (RSRE) in Malvern.

1976 - AT& T Bell Labs develops UUCP and UNIX.

1979 - USENET, the first news group network is developed by Tom Truscott, Jim Ellis and Steve Bellovin.

1979 - IBM introduces BITNET to work on emails and listserv systems.

1981 - The National Science Foundation releases CSNET 56 to allow computers to network without being connected to the government networks.

1983 - Internet Activities Board released.

1983 - TCP/IP becomes the standard for internet protocol.

1983 - Domain Name System introduced to allow domain names to automatically be assigned an IP number.

1984 - MCI creates T1 lines to allow for faster transportation of information over the internet.

1984- The number of Hosts breaks 1,000

1985- 100 years to the day of the last spike being driven on the Canadian Pacific Railway, the last Canadian university was connected to NetNorth in a one year effort to have coast-to-coast connectivity

1987 - The new network CREN forms.

1987- The number of hosts breaks 10,000

1988 - Traffic rises and plans are to find a new replacement for the T1 lines.

1989- The Number of hosts breaks 100 000

1989- Arpanet ceases to exist

1990 - Advanced Network & Services (ANS) forms to research new ways to make internet speeds even faster. The group develops the T3 line and installs in on a number of networks.

1990 - A hypertext system is created and implemented by Tim Berners-Lee while working for CERN.

1990- The first search engine is created by McGill University, called the Archie Search Engine

1991- U.S green-light for commercial enterprise to take place on the Internet

1991 - The National Science Foundation (NSF) creates the National Research and Education Network (NREN).

1991 - CERN releases the World Wide Web publicly on August 6th, 1991

1992 – The Internet Society (ISOC) is chartered

1992- Number of hosts breaks 1,000,000

1993 - InterNIC released to provide general services, a database and internet directory.

1993- The first web browser, Mosaic (created by NCSA), is released. Mosaic later becomes the Netscape browser which was the most popular browser in the mid 1990's.

1994 - New networks added frequently.

1994 - First internet ordering system created by Pizza Hut.

1994 - First internet bank opened: First Virtual.

1995 - NSF contracts out their access to four internet providers.

1995 - NSF sells domains for a $50 annual fee.

1995 – Netscape goes public with 3rd largest ever NASDAQ IPO share value

1995- Registration of domains is no longer free.

1996- The WWW browser wars are waged mainly between Microsoft and Netscape. New versions are released quarterly with the aid of internet users eager to test new (beta) versions.

1996 – Internet2 project is initiated by 34 universities

1996 - Internet Service Providers begin appearing such as Sprint and MCI.

1996 - Nokia releases first cell phone with internet access.

1997- (Arin) is established to handle administration and registration of IP numbers, now handled by Network Solutions (IinterNic)

1998- Netscape releases source code for Navigator.

1998-Internet Corporation for Assigned Names and Numbers (ICANN) created to be able to oversee a number of Internet-related tasks

1999 - A wireless technology called 802.11b, more commonly referred to as Wi-Fi, is standardized.

2000- The dot com bubble bursts, numerically, on March 10, 2000, when the technology heavy NASDAQ composite index peaked at 5,048.62

2001 - Blackberry releases first internet cell phone in the United States.

2001 – The spread of P2P file sharing across the Internet

2002 -Internet2 now has 200 university, 60 corporate and 40 affiliate members

2003- The French Ministry of Culture bans the use of the word "e-mail" by government ministries, and adopts the use of the more French sounding "courriel"

2004 – The Term Web 2.0 rises in popularity when O'Reilly and MediaLive host the first Web 2.0 conference.

2004- Mydoom, the fastest ever spreading email computer worm is released. Estimated 1 in 12 emails are infected.

2005- Estonia offers Internet Voting nationally for local elections

2005-Youtube launches

2006- There are an estimated 92 million websites online

2006 – Zimbabwe's internet access is almost completely cut off after international satellite communications provider Intelsat cuts service for non-payment

2006- Internet2 announced a partnership with Level 3 Communications to launch a brand new nationwide network, boosting its capacity from 10Gbps to 100Gbps

2007- Internet2 officially retires Abilene and now refers to its new, higher capacity network as the Internet2 Network

2008- Google index reaches 1 Trillion URLs

2008 – NASA successfully tests the first deep space communications network modeled on the Internet. Using software called Disruption-Tolerant Networking, or DTN, dozens of space images are transmitted to and from a NASA science spacecraft located about more than 32 million kilometers from Earth

2009 – ICANN gains autonomy from the U.S government

2010- Facebook announces in February that it has 400 million active users.

2010 – The U.S House of Representatives passes the Cybersecurity Enhancement Act (H.R. 4061)

2012 - A major online protest shook up U.S. Congressional support for two anti-Web piracy bills - the Stop Online Piracy Act in the House and the Protect IP Act in the Senate. Many in the tech industry are concerned that the bills will give media companies too much power to shut down websites.

The Influence and Impact Of The Internet:

The influence of the Internet on society is almost impossible to summarize properly because it is so all-encompassing. Though much of the world, unfortunately, still does not have Internet access, the influence that it has had on the lives of people living in developed countries with readily available Internet access is great and affects just about every aspect of life.

To look at it in the most general of terms, the Internet has definitely made many aspects of modern life much more convenient. From paying bills and buying clothes to researching and learning new things, from keeping in contact with people to meeting new people, all of these things have become much more convenient thanks to the Internet.

Things that seemed like science fiction only a couple of decades ago such as paying your bills from your mobile phone or accessing your music library anywhere are commonplace today thanks to the Internet. The concept of cloud computing and having all of your files with you at all times, even when you are miles away from your computer, is another aspect of the Internet that gives people great convenience and mobility that were unimaginable before it. For example, opening up and working on a Microsoft Word file located on your home computer can be done from anywhere, as long as you have Internet access, thanks to programs like Dropbox and Google Drive or a remote desktop access program or application.

Communication has also been made easier with the Internet opening up easier ways to not only keep in touch with the people you know, but to meet new people and network as well. The Internet and programs like Skype have made the international phone industry almost obsolete by providing everyone with Internet access the ability to talk to people all around the world for free instead of paying to talk via landlines. Social networking sites such as Facebook, Twitter, YouTube and LinkedIn have also contributed to a social revolution that allows people to share their lives and everyday actions and thoughts with millions.

The Internet has also turned into big business and has created a completely new marketplace that did not exist before it. There are many people today that make a living off the Internet, and some of the biggest corporations in the world like Google, Yahoo and EBay have the Internet to thank for their success. Business practices have also changed drastically thanks to the Internet. Off-shoring and outsourcing have become industry standards thanks to the Internet allowing people to work together from different parts of the world remotely without having to be in the same office or even city to cooperate effectively.

All this only scratches the surface when talking about the Internet's impact on the world today, and to say that it has greatly influenced changes in modern society would still be an understatement.

The Future: Internet2 and Next Generation Networks:

The public Internet was not initially designed to handle massive quantities of data flowing through millions of networks. In response to this problem, experimental national research networks (NRN's), such as Internet2 and NGI (Next Generation Internet), are developing high speed, next generation networks.

In the United States, Internet2 is the foremost non for profit advanced networking consortium led by over 200 universities in cooperation with 70 leading corporations, 50 international partners and 45 non profit and government agencies. The Internet2 community is actively engaged in developing and testing new network technologies that are critical to the future progress of the Internet.

Internet2 operates the Internet2 Network, a next-generation hybrid optical and packet network that furnishes a 100Gbps network backbone, providing the U.S research and education community with a nationwide dynamic, robust and cost effective network that satisfies their bandwidth intensive requirements. Although this private network does not replace the Internet, it does provide an environment in which cutting edge technologies can be developed that may eventually migrate to the public Internet.

Internet2 research groups are developing and implementing new technologies such as Ipv6, multicasting and quality of service (QoS) that will enable revolutionary Internet applications.

New quality of service (QoS) technologies, for instance, would allow the Internet to provide different levels of service, depending on the type of data being transmitted. Different types of data packets could receive different levels of priority as they travel over a network. For example, packets for an application such as videoconferencing, which require simultaneous delivery, would be assigned higher priority than e-mail messages. However, advocates of net neutrality argue that data discrimination could lead to a tiered service model being imposed on the Internet by telecom companies that would undermine Internet freedoms.

More than just a faster web, these new technologies will enable completely new advanced applications for distributed computation, digital libraries, virtual laboratories, distance learning and tele-immersion.

As next generation Internet development continues to push the boundaries of what's possible, the existing Internet is also being enhanced to provide higher transmission speeds, increased security and different levels of service.

PEOPLE AND ENVIRONMENT

People and Environment Interaction:

Our environment means our physical surroundings and the characteristics of the place in which we live. It also refers to the wider natural world of land, sea and atmosphere. Humans have been interacting with their environment since people first walked the Earth. For example, humans have been cutting down forests to clear land to grow crops for centuries and by doing so we have altered the environment. Conversely, the environment affects us in many different ways as well. A simple example is the way we change our clothes in response to cold or hot weather. In this section we will introduce some of the ways in which humans influence their environment and how the environment influences us, both positively and negatively.

A good climate, accessible clean water, fertile soil, etc. are aspects of the physical environment that enable people to live and thrive. However, harsh environments, such as a very hot climate, limited water and infertile land, make it more difficult for people to survive. We are also affected by major environmental events such as earthquakes, floods and drought that damage homes, property and agriculture. These can lead to the displacement of people and can cause injury, loss of life and destruction of livelihoods. They can also damage water sources and pipelines, causing water contamination and spreading waterborne diseases

USE OF NATURAL RESOURCES:

We use many different types of natural resources in our daily lives. We depend on food and water for survival and we need energy for many different purposes, from domestic cooking through to major industrial processes. Our clothes, transport, buildings, tools and all other items we use require many different resources for their production. Let's take a simple example. Manufacturing the paper needed raw materials of wood and water as well as energy for the production process. The trees that supplied the wood required soil, water and land to grow on. There may be ink or metal staples or other components in your notebook that were made from other types of resources. Our need for resources is vast and it is growing as the population increases and consumption per person increases with socio-economic progress. Depletion of natural resources by extraction and exploitation is especially of concern for non-renewable resources

***Renewable and non-renewable resources*:**

The resources we use can be classified as renewable or non-renewable. The basic difference between the two is the rate at which they are regenerated back into a usable form, relative

to the rate at which they are used by humans. **Non-renewable resources** cannot be replenished by natural means as quickly as the rate at which they are consumed. They include minerals and **fossil fuels** such as oil, coal and gas, which are formed over millions of years by natural processes from decayed plants and animals.

Renewable resources are constantly available or regenerated over short timescales by natural processes. Some renewable resources, such as solar energy, are not modified or used up by humans. Others, such as water, are altered when we use them and can be over-exploited or damaged such that the resource is no longer available for use.

Globally, both population and resource extraction increased by almost 50% in the 25 years from 1980 to 2005 (SERI et al., 2009). Over that time, the world population increased from 4.44 billion in 1980 to 6.49 billion. Figure 1.2 shows how the extraction of natural resources increased between 1980 and 2005 from 40 billion tonnes to 58 billion tonnes. The graph shows the extraction of four types of natural resource: fossil fuels, biomass, metals and minerals. **Biomass** means biological material derived from living organisms such as crops, livestock, fish, wood, etc. Metals are used in the manufacture of a wide range of goods – from cars to computers. Minerals are used in industrial processes and in construction to build our houses and roads. Both metals and minerals are obtained from rocks that have been mined and are then processed in various ways to extract the valuable resource.

Advances in technology have increased natural resource exploitation by enabling people to reach new resources and to exploit more resources *per capita* (per person). For example, fishermen who use traditional technologies such as small boats are limited in the number of fish they can catch. Modern industrial fishing fleets use very large ships that cover huge areas of ocean at greater depths to catch many more fish. This can lead to **overfishing,** which means catching fish at a faster rate than they can reproduce

Overfishing and other examples of over-exploitation of natural resources can result in damage to or the loss of entire ecosystems.An **ecosystem** includes all the living organisms (humans, plants, animals, micro-organisms) and their physical environment (soil, water, air, land) and the interactions between them. If one component of the system is removed, this can have knock-on effects on the other parts of the system.

***Deforestation*:**

One particular problem caused by over-exploitation of natural resources is **deforestation**, which occurs when forest areas are cleared and the trees are not replanted or allowed to regrow. In Ethiopia, clearing land for agriculture to meet the food needs of the growing population and the demand for fuel and construction materials has resulted in a steady loss of forest area.

The loss of forest has several undesirable consequences. Forests are home to many different types of trees, as well as other plants, and a wide range of animals from insects to birds and mammals. The conversion of forests to agriculture greatly reduces **biodiversity**, which is a measure of the variety of living organisms (all life forms). Biodiversity is important for humans because we use other living organisms to provide several essentials:

- *Food:* we use plants and animals such as fish, goats, wheat, rice and maize as sources of food.
- *Medicines:* many traditional medicines are made from plants and animals and new medicines are developed from them.
- *Ecological services:* living organisms, especially plants and micro-organisms, play an important role in processes that maintain our lives and environment such as providing oxygen, cleaning the air, purifying water, breaking down wastes and controlling erosion.

Deforestation is a significant contributory cause of soil erosion. Once the trees and undergrowth are removed, the underlying ground is exposed. Without the intercepting effect of the vegetation and the tree roots binding the soil together, the soil is more likely to be washed away when it rains. Loss of forests also has a significant impact on water supply. Tree roots reach deep into the soil and create spaces between the particles which increases soil permeability, allowing rainwater to soak in and replenish groundwater. (**Permeability** means the ease with which water moves through soil or rock.)

***Energy resources*:**

The use of renewable or non-renewable resources is a critical factor when considering energy resources. Fossil fuels have been the main energy source for global industrialisation, but because they are non-renewable, the quantity is ultimately limited and their use is not sustainable over the long term. Furthermore, burning of fossil fuels is the main cause of climate change. (Climate change is discussed fully in later study sessions.) There are several renewable alternatives to fossil fuels. Wood used as a fuel is renewable in the sense that trees will regrow but there are other disadvantages such as deforestation, as you have read. In Ethiopia, windfarms are harnessing wind power to generate electricity but the most important source of renewable energy in Ethiopia is water. Ethiopia already has several hydropower stations and more are planned, including the Grand Ethiopian Renaissance Dam, currently under construction. Hydroelectric power is renewable because it makes use of the energy of flowing water but does not use up the water in the process. Another renewable energy source is solar power, using photovoltaic cells that convert the sun's energy into electricity.

***Water resources*:**

You may have noticed that the four categories of resources shown in Figure 1.2 do not include water, and yet this is one of our most vital resources and is obviously central to the WASH sector. The direct use of water by people falls into three main categories:

- domestic uses, including drinking, washing and cooking
- agricultural uses, principally irrigation
- industrial uses, in manufacturing processes and for energy generation.

The relative proportions of these three categories vary in different parts of the world, but globally the sector using the most water is agriculture

As well as direct use of water for human activities, water is also essential for the environment and to maintain biodiversity. Rivers, lakes and wetlands are important habitats for wildlife and need a minimum amount of water at all times. This becomes a problem when the demand for water for human activities exceeds the supply.

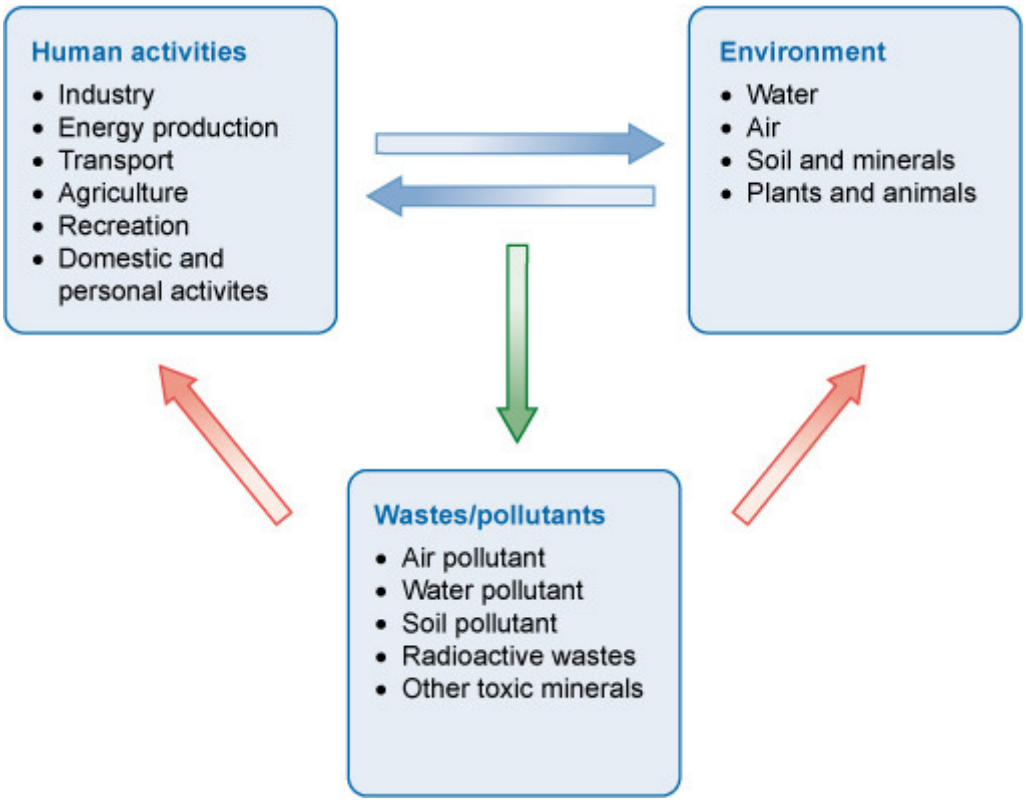
Water is not an endlessly renewable resource. In many parts of the world water demand is significantly above sustainable water supply. **Sustainable water supply** means there are adequate supplies, in both quality and quantity, to meet the current and future needs of people and of the environment.

Many countries are already experiencing water stress or scarcity. These terms refer to the volume of water available *relative to* the use and demand for it, which is linked to the population served. Figure 1.6 shows the availability of freshwater across the world. Countries which have less than 1700 m^3 of water per person per year for all purposes are defined as **water stressed** (United Nations, 2014). **Water scarce** countries have been defined as those with less than 1000 m^3 of water per person per year. These precise figures should be used with caution, however, because they do not recognise variations between countries and they hide the underlying causes of water scarcity.

***Production of waste and pollutants*:**

Following on from our use of natural resources, it is inevitable that wastes are produced. For the WASH sector, the most important of these is our own bodily wastes. The impacts of open defecation and inadequate sanitation on human health and on the wider environment are profound. Waterborne diseases are caused by **pathogens** (disease-causing agents) in water and food that have been contaminated by the wastes from infected people. Preventing this connection between human wastes and the intake of contaminated water is the primary goal of WASH services.

Industry, agriculture and energy production all generate wastes that can pollute air, water and soil. **Pollution** means the introduction into the environment of substances liable to cause harm to humans and other living organisms. For example, the leather industry produces large amounts of liquid wastes from the tanning process. These wastes contain organic materials such as fat from the hides and **toxic**(poisonous) chemicals including some human carcinogens (cancer-causing agents). Another example is the release of so-called **greenhouse gases** such as carbon dioxide, methane and nitrous oxide, which contribute to human-induced climate change. The interactions between 'human activities' and 'the environment'. The green arrow indicates the waste generated as a product of this interaction. The red arrows indicate the negative effect on both the environment and humans if the waste is not properly managed.



SOURCES OF POLLUTIONS:

The sources of pollution of Ganga or for that matter any other river can be classified broadly into two categories name

(i) **Point sources** - these are organised sources of pollution where the pollution load can be measured e.g. surface drains carrying municipal sewage or industrial effluents, sewage pumping stations and sewerage systems, trade effluents from industries etc.
(ii) **Non-point sources** - these are non-measurable sources of pollution such as run-off from agricultural fields carrying chemicals and fertilizers, run-off from areas used for dumping of solid waste and open defecation, dumping of unburnt/half burnt dead bodies and animal carcasses, dhobi ghats, cattle wallowing, mass bathing, floral offerings et

***Air Pollution*:**
Air pollution is the contamination of the natural air by mixing it with different pollutants such as harmful fumes and chemicals. This contamination can be caused by gases emitted by vehicles or from burning material or harmful fumes emitted as a byproduct of industries. The higher the concentration of air pollutants, the harder it to remove it effectively through natural cycles. The higher concentrations also result in breathing problems for living things. Some effects include increase in smog, higher rain acidity, crop depletion from inadequate oxygen, and higher rates of asthma. According to experts, global warming is one of the biggest side effects of air pollution.

***Water Pollution*:**
Water pollution is the contamination of the water on Earth. It includes contamination by pollutants such as chemical, bacterial or particulate that reduces the purity of the water. Oil seepage as well as littering is one of the most common forms of pollution. Water pollution occurs in lakes, oceans, rivers and even underground reservoirs. Water pollution is one of the most dangerous from of pollution as it decreases the amount of drinkable water that is available. It can also reduce the amount of water that can be used for irrigation as well as harm the wildlife that depend on the water.

***Soil Pollution*:**
Soil pollution, also known as land pollution is the contamination of the soil or the land that prevents growth of natural life, which includes land used for cultivating, wildlife as well as habitation. Common causes of soil pollution includes non-sustainable farming practices, hazardous wastage and seepage into the soil, mining as well as littering. Soil pollution can result in reduced growth of agriculture as well as poisoning of the land and nearby water.

***Noise Pollution*:**
Noise pollution is the loud noises that is created by human activity that disrupts the standard of living in the affected area. Pollution can stem from things such as traffic, railroads, concerts, loud music, airplanes, fireworks etc. Any noise that disrupts the ability of a person to perform can be termed as noise pollution. This can result in temporary or permanent loss of hearing as well as disturbances to wildlife.

***Radioactive Pollution*:**

This is one of the most dangerous forms of pollution as it is extremely harmful and can even result in death. This type of pollution has risen in the 20th century with the rise of atomic physics and nuclear weapons. Radioactive pollution results in the pollution of the air and land with radioactive poisoning. It can happen from leakages or accidents at nuclear power plants, as well as from improper disposal of nuclear waste. This pollution results in birth defects, cancer, deteriorating of health and even death.

***Light Pollution*:**

Light pollution is the over illumination of a certain area that is considered as obtrusive. It is considered pollution especially when it interferes with astronomical observation. The most common way to determine if an area is polluted is to look at the stars, if you can see them your area is not so polluted. Pollution includes large lighted cities, billboards and other advertising, and night time entertainment.

Thermal Pollution:

Thermal pollution is when the temperature increases in a particular area over time. This heat is often caused by air pollution and the release of carbon gasses in that area that traps more heat on the Earth. The earth has a natural thermal cycle, but excessive temperatures can result in long term effects. The rising temperatures can be a result of deforestation, power plants, high carbon footprint, etc. While, slight changes in temperature is common in nature, faster changes in the temperature can result in loss of wildlife as well as reduction of water.

***Visual Pollution*:**

Although not a life threatening form of pollution, it can be considered as unappealing to the eyesight. This form of pollution is when there are obstructions to views caused by billboards, power lines, construction areas and even high rises. It does not have immediate health effects but can have slow effects.

All pollution is interrelated and indirectly can be a cause for each other. Such as air pollution has a direct relation to thermal pollution. Light pollution is caused by energy companies that require burning fossil fuels, which in turn increase air pollution, which in turn increases water pollution. As one can see, there is a correlation between all the types of pollution.

LIST OF MAJOR POLLUTANT, THEIR SOURCES AND THEIR EFFECTS ON HUMANS AND ENVIRONMENT:

1. Oxides of Carbon (CO_x)

Types: Carbon dioxide (CO_2), Carbon monoxide (CO)

Sources of Production: Combustion of coal, oil and other fuels for energy production manufacturing and transport Biomass burning.

Effects on Humans and Environment: $C0_2$ has a major role in green-house effect, produces weak carbonic acid adding to acid rains; CO affects human health by binding to hemoglobin, which may result in asphyxia; hemoglobin has 250 times more affinity with CO as compared to that of O_2.

2. Oxides of sulphur (SO_x)

Types: Sulphur dioxide (SO_2); Sulphur trioxide (SO_3); Sulphate (SO_4)

Sources of Production: Combustion of sulphur containing fuel e.g., coal, petroleum extraction and refining; paper manufacturing; municipal incinerating; ore smelting for metal extraction

Effects on Humans and Environment: SO_2 has maximum deleterious effects as it damage to human and other animal lungs and is important precursor to acid rain; adverse effects include corrosion of paint, metals and injury or death to animals and plants.

What is Green Muffler & its relation with pollution?

3. Oxides of Nitrogen (NO_x)

Type: Nitrogen oxide (NO); Nitrogen dioxide ($N0_2$); Nitrous oxide (N_20) ; Nitrate ($N0_3$)

Sources of Production: Burning of fuels; biomass burning; by product in the manufacturing of fertilizers

Effects on Humans and Environment: Form the secondary pollutants: peroxy acetyl nitrate (PAN) and nitric acid (HNO3); suppression of plant growth and tissue damage; cause irritation to eyes, viral infections like influenza; nitrate form in atmosphere impairs the visibility whereas in soil promotes the plant growth.

4. Hydrocarbons (HCs) also called Volatile organic compounds (VOCs)

Types: Methane (CH_4), Butane (C_4H_{10}), Ethylene (C_2H_4), Benzene (C_6H_6), Propane (C_3H_8)

Sources of Production: Evaporation from gasoline tanks, carburettors; burning of fuels; biomass; municipal lard fills; microbial activity of sewage; industrial process involving solvents changes that occur in.

Effects on Humans and Environment: Can have carcinogenic effect on humans; higher concentrations are toxic to plants and animals; can convert into harmful compounds

through complex chemical atmosphere; some are more reactive with sunlight and produce photochemical smog.

Five most polluting countries in the world affected by smog

5. Other organic compounds

Types: Chlorofluoro carbon (CFCs), Formaldehyde (CH_20), Methylene chloride (CH_2Cl_2), Trichloro Ethylene (C_2HCl_3), Vinyl chloride (C_2H_3C1), Carbon tetra chloride ($CC1_4$), Ethylene Oxide (C_2H_40)

Sources of Production: Aerosol sprays; foam and plastics for making disposable fast food containers; refrigeration

Effects on Humans and Environment: CFCs cause reduction in stratospheric ozone that allows greater penetration of ultraviolet light at earth surface; intensified UV radiations cause skin cancer and can have lethal effects on various; life forms.

6. Metals and other inorganic Compounds

Types: Lead (Pb), mercury (Hg), Hydrogen sulphide (H_2S), Hydrogen Fluoride (HF)

Sources of Production: Oil wells and refineries; transport vehicles; municipal landfills; fertilizer, ceramic, paper, chemical and paint industries pesticides; fungicides; aluminium production; coal gasification

Effects on Humans and Environment: Cause respiratory problems, toxicity and even death to humans and other animals; damage to crops; prove to be carcinogenic.

10 Most Dangerous Waters in the World

7. Liquid droplets

Types: Sulphuric acid (H_2S0_4), Nitric acid (HNO_3) –Oil, Pesticides e.g. DDT and Malathion

Sources of Production: Agriculture pesticides; fumigation; oil refineries; reactions of pollutants in the atmosphere

Effects on Humans and Environment: Contribute to acid rains; corrosion; damage to various life forms

8. Suspended particulate Matter (SPM-solid Particles)

Types: Dust, soil, sulphate Salts, heavy metal salts, Fire particles of carbon (soot), silica, asbestos, Liquid sprays, mist etc.

Sources of Production: Fuel combustion; building constructions; mining; thermal power stations; stone crushing; industrial processes; forest fires; refuse incineration.

Effects on Humans and Environment: Have chronic effects on respiratory system; deposition on the surface of green leaves thus interfering with absorption of $C0_2$ and release of 0_2; blocking of sunlight; particles size that range between 0.1 to 10um, cause greatest lung damage

List of Major Fishing Grounds of the World

9. Photochemical oxidants

Types: Ozone (0_3), Peroxyacly Nitrates (PANs),

Sources of Production: Photochemical reactions in the atmosphere that involve sunlight, oxides of nitrogen and hydrocarbons.

Effects on Humans and Environment: Produce haze; irritation to eyes, nose and throat; respiratory problems; blocking of sunlight

EFFECTS OF POLLUTION

1. Environment Degradation : Environment is the first casualty for increase in pollution weather in air or water. The increase in the amount of CO2 in the atmosphere leads to smog which can restrict sunlight from reaching the earth. Thus, preventing plants in the process of photosynthesis. Gases like Sulfur dioxide and nitrogen oxide can cause acid rain. Water pollution in terms of Oil spill may lead to death of several wildlife species.

2. Human Health : The decrease in quality of air leads to several respiratory problems including asthma or lung cancer. Chest pain, congestion, throat inflammation, cardiovascular disease, respiratory disease are some of diseases that can be causes by air pollution. Water pollution occurs due to contamination of water and may pose skin

related problems including skin irritations and rashes. Similarly, Noise pollution leads to hearing loss, stress and sleep disturbance.

3. Global Warming : The emission of greenhouse gases particularly CO2 is leading to global warming. Every other day new industries are being set up, new vehicles come on roads and trees are cut to make way for new homes. All of them, in direct or indirect way lead to increase in CO2 in the environment. The increase in CO2 leads to melting of polar ice caps which increases the sea level and pose danger for the people living near coastal areas.

4. Ozone Layer Depletion: Ozone layer is the thin shield high up in the sky that stops ultra violet rays from reaching the earth. As a result of human activities, chemicals, such as chlorofluorocarbons (CFCs), were released int to the atmosphere which contributed to the depletion of ozone layer.

5. Infertile Land : Due to constant use of insecticides and pesticides, the soil may become infertile. Plants may not be able to grow properly. Various forms of chemicals produced from industrial waste is released into the flowing water which also affects the quality of soil.

Pollution not only affect humans by destroying their respiratory, cardiovascular and neurological systems; it also affects the nature, plants, fruits, vegetables, rivers, ponds, forests, animals, etc, on which they are highly dependent for survival. It is crucial to control pollution as the nature, wildlife and human life are precious gifts to the mankind.

NATURAL HAZARDS AND MITIGATION:

Natural hazards are naturally occurring physical phenomena caused either by rapid or slow onset events which can be geophysical (earthquakes, landslides, tsunamis and volcanic activity), hydrological (avalanchesand floods), climatological (extreme temperatures, drought and wildfires), meteorological (cyclones and storms/wave surges) or biological (disease epidemics and insect/animal plagues).

Technological or man-made hazards (complex emergencies/conflicts, famine, displaced populations, industrial accidents and transport accidents) are events that are caused by humans and occur in or close to human settlements. This can include environmental degradation, pollution and accidents.Technological or man-made hazards (complex

emergencies/conflicts, famine, displaced populations, industrial accidents and transport accidents)

There are a range of challenges, such as climate change, unplanned-urbanization, under-development/poverty as well as the threat of pandemics, that will shape humanitarian assistance in the future. These aggravating factors will result in increased frequency, complexity and severity of disasters.

KINDS OF NATURAL DISASTERS:

Landslide : A landslide is a disaster involving elements of the ground, including rocks, trees, parts of houses, and anything else which may happen to be swept up. Landslides can be caused by an earthquake, volcanic eruptions, or general instability in the surrounding land. Mudslides or mudflows, are a special case of landslides, in which heavy rainfall causes loose soil on steep terrain to collapse and slide downwards.

Avalanche: An avalanche is a geophysical hazard involving a slide of a large snow or rock mass down a mountainside, caused when a buildup of material is released down a slope, it is one of the major dangers faced in the mountains in winter. As avalanches move down the slope they may entrain snow from the snowpack and grow in size. The snow may also mix with the air and form a powder cloud. An avalanche with a powder cloud is known as a powder snow avalanche. The powder cloud is a turbulent suspension of snow particles that flows as a gravity current.

Drought: A drought is an extended period of months or years when a region suffers a severe deficiency in its water supply. Generally, this occurs when a region receives consistently below average rainfall. It can have a substantial impact on the ecosystem and agriculture of the affected region. Although droughts can persist for several years, even a short, intense drought can cause significant damage and harm the local economy

Wildfire: Wildfires, or forest fires, are uncontrolled fires burning in wildland areas. Common causes include lightning, human carelessness, arson, volcano eruption, and pyroclastic cloud from active volcano. The can be a threat to those in rural areas and also to wildlife. Wildfires can also produce ember attacks, where floating embers set fire to buildings at a distance from the fire itself.

Flood: A flood is an overflow of an expanse of water that submerges land, a deluge. It is usually due to the volume of water within a body of water, such as a river or lake, exceeding the total capacity of the body, and as a result some of the water flows or sits outside of the normal perimeter of the body. It can also occur in rivers, when the strength of the river is so high it flows right out of the river channel , usually at corners or meanders.

Tsunami: A tsunami is a series of waves created when a body of water, such as an ocean, is rapidly displaced. Earthquakes, mass movements above or below water, volcanic eruptions and other underwater explosions, landslides, large meteorite impacts comet impacts and testing with nuclear weapons at sea all have the potential to generate a tsunami. A tsunami

is not the same thing as a tidal wave, which will generally have a far less damaging effect than a Tsunami.

Volcanic eruption: A volcanic eruption is the point in which a volcano is active and releases lava and poisonous gasses in to the air. They range from daily small eruptions to extremely infrequent supervolcano eruptions (where the volcano expels at least 1,000 cubic kilometers of material.) Some eruptions form pyroclastic flows, which are high-temperature clouds of ash and steam that can travel down mountainsides at speeds exceeding that of an airliner

Tornado : Tornadoes are violent, rotating columns of air which can blow at speeds between 50 and 300 mph, and possibly higher. Tornadoes can occur one at a time, or can occur in large tornado outbreaks along squall lines or in other large areas of thunderstorm development. Waterspouts are tornadoes occurring over water in light rain conditions

Earthquake: An earthquake is the result of a sudden release of energy in the Earth's crust that creates seismic waves. Earthquakes are recorded with a seismometer, also known as a seismograph. The magnitude of an earthquake is conventionally reported on the Richter scale, with magnitude 3 or lower earthquakes being mostly imperceptible and magnitude 7 causing serious damage over large areas. Intensity of shaking is measured on the modified Mercalli scale. At the Earth's surface, earthquakes manifest themselves by shaking and sometimes displacement of the ground

Hurricane: Hurricanes, tropical cyclones, and typhoons are different names for the same phenomenon: a cyclonic storm system that forms over the oceans. It is caused by evaporated water that comes off of the ocean and becomes a storm. The Coriolis Effect causes the storms to spin, and a hurricane is declared when this spinning mass of storms attains a wind speed greater than 74 mph. Hurricane is used for these phenomena in the Atlantic and eastern Pacific Oceans, tropical cyclone in the Indian, and typhoon in the western Pacific

ADDITIONAL INFO:

i. The Chipko movement was for Environmental Protection
ii. The head quarters of international Whaling Commission-Cambridge
iii. National Biodiversity Authority is located at Thiruvananthapuram
iv. The massive hole in the ozone layer over the Antarctica was first discovered in 1985
v. SAARC disaster management centre is located at New Delhi
vi. National Institute of Disaster Management is at New Delhj
vii. Disaster management act was made in 2005
viii. World Ozone days is September 16
ix. The National Day for disaster reduction is on 29th October

HIGHER EDUCATION SYSTEM

"*The aim of education is gaining knowledge, not of facts, but of values*" –William S. Burroughs

Development of any nation solely depends on the quality of human resources; and good human resource is produced through quality education. Education provides people with an opportunity to reflect on the social, cultural, moral, economic, and spiritual issues and contributes towards the development through propagation of specialized knowledge and skills.

India, even after 70 years of its independence, is far away from the goal of universal literacy. The fact that India's higher education system is churning out millions of graduates who are unemployable speaks of the need to improve the quality of education in the country. However, on a positive note, India is engaged in the use of higher education as a powerful tool to build a knowledge-based information society of the 21st Century. Indian professionals are considered among the best in the world and are in great demand. This signifies the inherent strength of the Indian educational system.

GOING BACK TO THE ROOTS:

Education in India dates back to its early civilization time where teaching and learning process revolved around the 'Gurukul System'. It was a residential concept wherein the students were educated under the guidance of a "Guru" in different areas of religion, philosophy and science. Historians speculate that these centers had a remarkable resemblance to the European medieval universities that came up much later.

The initial education system in India gradually got obscured due to subsequent invasions and disorder in the country. In the early modern age, the Islamic influences enriched the traditional learning centers and brought in the disciplines of Geography, Administration, Law, and Arabic Mathematics to India.

A major change in the design of higher education was brought by the European rulers. The British established the formal system of higher education focused on languages, literature, history, and philosophy. These learning centers were focused on generating English-speaking working-class people for the British administrative services, army and trade. The British model of University system, inspired by the University of London, continued to expand across India, leading to a rising number of higher learning centers by 1947.

The higher education system in India grew rapidly after independence. By 1980, there were 132 universities and 4738 colleges, enrolling around five per cent of the eligible age group in higher education. The number of institutions in India is four times more than the number of institutions both in the United States and the entire Europe.

PRESENT-DAY SCENARIO:

India is dashing headlong towards economic success and modernization. It is counting on high-tech industries, such as IT and Biotechnology, to propel the nation to prosperity. Currently, Indian higher education system has many favorable factors to its advantage. India has a large higher education sector, the third largest in the world. It uses English as a principal language of higher education and research and has an extensive academic tradition. Academic liberty is appreciated and there are a small number of high-quality institutions that can form the foundation of quality education. The fact that State Government, rather than Central Government, maneuvers vital responsibility for higher education, creates a rather cumbersome structure, but the system allows for a diversity of policies and approaches.

Yet the weakness clearly outweighs the strengths. India educates approximately 10 per cent of its youths in higher education. Even though, none of its universities occupy a solid position at the top. A few of the best universities have some excellent departments and centers, and there are a small number of outstanding undergraduate colleges.

UGC recently released a report describing the current scenario of the Indian Higher Education System. It shows that despite the growing numbers of colleges and enrollments, it is not adequate enough to cater to the educational needs of the increasing young population.

Measures to Improve the Quality of Higher Education:

One of the most efficient ways of tackling the problem of poor educational quality is by sharing the resources between private and public schools. It is vital to remember that the quality of education is directly linked to the resources available and it is important for the government to improve the resource allocation to bring about qualitative changes in the field of education. To enable the higher education sector to take on the emerging competition from the Asian countries, there is a need to loosen the hold of the government over the higher educational institutions.

The Government should undertake the following measures to improve the quality of higher education:

***Encouraging Individuality*:**

Albert Einstein once said, "*Everyone's a genius. But if you judge a fish on its ability to climb a tree, it will live its whole life believing that it is stupid*." With the difference in ability, aptitude and interest of a student and the societal demands of expertise and specialization, the standardized testing and curriculum does not give much scope for the students to relate to the world of work and wages. Creativity that has nurtured our influences in almost all of life's passions and interests drops dead at standardized tests. The current educational system expects conformity and rewards predictable behaviors, both intellectually and emotionally.

***Tech-Savvy Methods of Teaching*:**

The new technologies offer vast opportunities for progress in all walks of life. The focus should not be on installing hardware but creating new, high-quality content such as intelligent teaching systems and tools that will help students to hone basic skills like reading and mathematics, and developing content in multiple Indian languages. Free high-speed internet connections can be provided to all schools through a simple scheme by which the government could reimburse internet service providers directly.

***Making the Curriculum Dynamic*:**

Currently, the curriculum in higher education is outdated in most cases. It is stale, dogmatic and teaches things that the world has moved on with. To infuse dynamism, the curriculum needs to be progressive in nature. Students need to be given the option of doing multiple courses. The spirit of curriculum should be projects-driven and not exams-driven.

***High-Tech Libraries*:**

The university libraries have a very good collection of books, but they are all in mess. A library must be online and helpful for serious study. Indian universities should concentrate more on providing quality education which is equivalent to that of the global standards. Instituting this notion in the education system will be of great help as anyone will be able to access the books and required study materials from anywhere with amazing effortlessness. Moreover, the E-libraries can be updated swiftly with new material and books.

***The Power of Alumni*:**

One of the most unappreciated potentials in Indian education system is the power of the Alumni. Excluding the IIT's and a few other top institutes, the concept of Alumni networking

is non-existent. Once you launch a sincere network which is transparent, it would give the avenue as well as the confidence for the alumni to contribute in terms of money or academic expertise.

Keeping in perspective the rapid changes taking place in the society, higher education should possess various qualities like inculcation of confidence and ability to take responsibility and prepare students to be effective within the circumstances of their lives and work, and promote the pursuit of excellence in development and application of knowledge and skills. Government should take certain appropriate policy measures to improve the education system. India, today, is one of the fastest developing countries of the world. And hence, needs an educational system that is modern, liberal and can adapt to the changing needs of a changing society, a changing economy and a changing world.

UNIVERSITY GRANT COMMISSION(UGC):

UGC was recommended in 1944 and formed in 1945 to oversee the work of the three Central Universities of Aligarh, Banaras and, Delhi. In 1947, the Committee was entrusted with the responsibility of dealing with all the then existing Universities. After independence, the University Education Commission was set up in 1948 under the Chairmanship of Dr. S. Radhakrishnan and it recommended that the UGC be reconstituted on the general model of the University Grants Commission of the United Kingdom.

The University Grants Commission (UGC) was formally inaugurated by late Abul Kalam Azad, the then Minister of Education, Natural Resources and Scientific Research on 28 December 1953.

However UGC was formally established in November 1956, by an Act of Parliament in 1956, as a statutory body of the Government of India. In order to ensure effective region-wise coverage throughout the country, the UGC has decentralised its operations by setting up six regional centres at Pune, Hyderabad, Kolkata, Bhopal, Guwahati and Bangalore. The head office of the UGC is located at Bahadur Shah Zafar Marg in New Delhi, with two additional bureaus operating from 35, Feroze Shah Road and the South Campus of University of Delhi as well.

DISTANCE EDUCATION SYSTEM:

Today two terms that are being used almost inter-changeably are 'Open Learning' and 'Distance Education' and they are often combined to be known as Open and Distance Learning (ODL). Open learning is a philosophy and Distance Education is the mode used for translating it into reality as the two are complementary to each other.

Distance Education (DE) is an umbrella term which describes all the teaching learning arrangements in which the learner and the teacher are separated by space and time. In fact it is a mode of delivering education and instruction to learners who are not physically present in a traditional setting of a classroom. Transaction of the curriculum is effected by means of specially prepared materials (self-study (learning) materials) which are delivered to the learners at their doorstep through various media such as print, television, radio, satellite, audio/video tapes, CD-ROMs, Internet and World Wide Web etc. Also a technological medium replaces the inter-personal communication of conventional classroom based education that takes place between the teacher and the learners. Communication between the institution, teacher and learners is mainly through electronic media (telephone, interactive radio counselling, teleconferencing, videoconferencing, chat sessions, email, website etc) and also through postal correspondence and limited face to face contact sessions held at Study Centres that are set up by the DE institutions as close to the learners' homes as possible.

Open Learning Open learning, which covers a wide range of innovations and reforms in the educational sector that advocates flexibility to the learner with regard to entry and exit; pace and place of study; method of study and also the choice and combination of courses; assessment and course completion. The lesser the restrictions, the higher the degree of openness. The Open learning system aims to redress social or educational inequality and to offer opportunities not provided by conventional colleges or universities. Educational opportunities are planned deliberately so that access to education is available to larger sections of the society. Thus, ODL is a term which accepts the philosophy of "openness" and uses the "distance mode" of learning

Why: ODL occupies a special place in the Indian higher education system because of its major contribution in enhancing the gross enrollment ratio and democratization of higher education to large segments of the Indian population particularly to reach out to the unreached and to meet the demands of lifelong learning which has become more of a necessity in the knowledge society. The major objectives of DE system are:

To democratize higher education to large segments of the population, in particular the disadvantaged groups such as those living in remote and rural areas, working people, women etc.

To provide an innovative system of university-level education which is both flexible and open in terms of methods and pace of learning; combination of courses, eligibility for enrollment, age of entry, conduct of examination and implementation of the programmes of study;

To provide an opportunity for up-gradation of skills and qualifications; and

To develop education as a lifelong activity to enable persons to update their knowledge or acquire knowledge in new areas.

How:

India has one of the largest DE systems in the world, second only to China. There are six types of institutions offering DE today:

- National Open University S
- tate Open Universities
- Distance Education Institutions (DEIs) at

-Institutions of National Importance

- Central Universities - State Universities

- Deemed to be Universities

- State Private Universities

- DEIs at Stand alone Institutions
  - Professional Associations
  - Government Institutions
  - Private institutions

Historical Developments: Five decades ago policy-makers realized the imperative need of DE in order to expand the base of higher education. With the expanding base at the elementary and secondary education levels, the demand for higher education had increased. The University Grants Commission (UGC) suggested in its report for 1956-1960 that proposals for evening colleges, correspondence courses and award of external degrees should be considered. The Planning Commission took serious note of such a need and in its

Third Five Year Plan mentioned the need for the introduction of correspondence education in the country. In the light of the observations made by the Planning Commission the Central Advisory Board on Education recommended the setting up of an Expert Committee under the chairmanship of Dr. D.S. Kothari, the then Chairman of UGC, to look into the proposal of introducing correspondence courses. The Expert Committee recommended the institution of correspondence courses in view of the greater flexibility, economic viability and innovative methods of imparting education. The committee also suggested that correspondence courses in India should be administered by the universities only and in the first instance, by one University, viz., the University of Delhi as a pilot project.

- Thus was born in 1962 the University of Delhi's School of Correspondence Courses and Continuing Education. Subsequently the Education Commission (1964-66), under the chairmanship of Dr. D.S. Kothari, also perceived correspondence education as an answer to the increasing pressure of numbers as well as the growing financial pressures on the universities.
- The next decade i.e. the 1970s saw the growth and spread of the Correspondence Education system in India, by more conventional universities opening Correspondence Course Institutes (subsequently renamed as Directorates of Distance Education/ Centres of Distance Education).
- The opportunity of access, affordability and convenience offered by the DE system contributed to its increasing popularity and growth. But again the DE system was plagued by the rigidities of the conventional system. The only flexibility was with regard to the larger number of seats. Education was still out of the reach of the marginalized and the disadvantaged. .It was realized that unless we open educational opportunities to the deprived, unless we remove the structural rigidities in our educational system and unless we integrate the educational system with developments in communication technology, we cannot and will not make headway in realizing the uphill task of educating majority of the people and of catering to the diverse types of education that a modern society demands
- Against this background the government introduced the Open University system in the 1980s, with the objective to further democratize opportunities for higher education to large segment of the Indian population, particularly those for whom access was difficult or impossible such as those living in remote and rural areas, working people, women and other adults who wish to acquire and upgrade their knowledge and skills through studies in various fields.
- The Ministry of Human Resource Development in its National Policy on Education (NPE) 1986, gave prominence to an OU system as a means to "augment

opportunities for higher education and as an instrument of democratizing education" Clearly, the vision was that OUs would be different from conventional universities.

- Thus a new chapter in DE system began with the establishment of Dr BR Ambedkar Open University, Hyderabad in 1982, followed by the establishment of Indira Gandhi National Open University at the national level by the Parliament of India in 1985. The idea was accepted by many states and 1987 saw the emergence of two more Open Universities, namely, Nalanda Open University (NOU) Patna, Bihar and Vardhman Mahaveer Open University (VMOU), Kota, Rajasthan. Subsequently, Yashwantrao Chavan Maharashtra Open University (YCMOU), Nashik, Maharashtra was established in 1989.
- The major responsibility for the promotion and coordination of Open and DE was bestowed by the Parliament on the Indira Gandhi National Open University (IGNOU), instead of the UGC, the statutory authority for regulating higher education India. Thus IGNOU became a unique institution as it was entrusted with a dual role: of functioning like an Open University by offering programmes of education and training through distance mode and also acting as the promoter, coordinator of the Open and Distance Education system in the country and determining standards in such systems. To fulfil this particular mandate the Distance Education Council (DEC) was set up by IGNOU in 1991 as a statutory mechanism under IGNOU Act which became operational in February 1992. The DEC functioned within the broad framework, and the policies laid down by the Board of Management of IGNOU while enjoying a significant measure of autonomy in its operations.
- As per the mandate of the DEC and the NPE 1986, which was revised in 1992, the DEC started interacting with the State Governments for establishing the SOUs in the respective states. As a result of DEC initiatives several State governments established Open Universities. As emphasized in the NPE of 1986 and subsequently Programme of Action in 1992, the OUs adopted a radically different approach to reach the disadvantaged by adopting a variety of media and delivery channels for dissemination of information and knowledge. As a result of this they have been able to make a definite impact on society, and more Indians have access to higher education than ever before.
- The Distance Education Council (DEC) took several initiatives for promotion, coordination and maintenance of standards of open and distance education system in the country. DEC has developed guidelines for regulating the establishment and operation of ODL institutions in the country.

- In August 2010, the Ministry of Human Resource Development constituted a Committee under the Chairmanship of Prof. Madhava Menon in respect of regulation of standards of education imparted through distance mode.
- In view of the acceptance of the Report submitted by the Madhava Menon Committee by the Ministry of Human Resource Development (MHRD) and its recommendations for the creation of a new regulatory body for ODL system, the Distance Education Council of India (DECI). The Madhava Menon Committee also decided that as an interim measure, the DEC of IGNOU may be shifted to UGC.
- Subsequently, the MHRD issued an order, dated 29th December, 2012, transferred the regulatory authority of distance education from IGNOU to UGC. Thereafter, IGNOU notified the repeal and deletion of Statute 28 of IGNOU Act and dissolution of DEC on 1st May 2013. UGC issued an order taking over the physical infrastructure of erstwhile DEC on "as is where is basis" and the staff working at erstwhile DEC on "deemed deputation basis". This is an interim measure till such time an independent body namely Distance Education Council of India is created by the Parliament.

CONSTITUTIONAL PROVISIONS REGARDING EDUCATION IN INDIA:

15th August 1947 is a red letter day in Indian History when India got freedom. The Constitution of the country was adopted on Nov. 26, 1949 and came into force on Jan 26, 1950. The Preamble of the Constitution outlines the social philosophy which should govern all our institutions including educational. Right to Education is one of the fundamental rights enshrined in the Constitution of India. The Constitution of India gives a few directions and suggestions for the development of education in the countries which are also called constitutional provisions.

The following provisions have a great bearing on the functioning of the educational system in India:

Article 28:

According to our Constitution article 28 provides freedom as to attendance at religious instruction or religious worship in educational institutions.

Article 29:

This article provides equality of opportunity in educational institutions.

Article 30:

It accepts the right of the minorities to establish and administrate educational institutions.

Article 45:

According to this article "The state shall endeavour to provide within a period of ten years from the commencement of this Constitution for free and compulsory education for all children until they complete the age of 14 years."

We notice that the responsibility for universal elementary education lies with the Central Government, the State Governments, the Local Bodies and voluntary organisations.

Article 46:

It provides for special care to the promotion of education and economic interests of the scheduled caste, scheduled tribes and the weaker sections of society.

Article 337:

This provides for special provision with respect to educational grants for the benefit of Anglo-Indian community.

Article 350A:

This article relates to facilities for instruction in mother tongue at primary stage.

Article 350B:

It provides for a special offer for linguistic minorities.

Article 351:

This article relates to the development and promotion of the Hindi language.

The seventh schedule of the Indian Constitution contains legislative powers under three lists viz. The Union List, the State List and the Concurrent List

The Union List:

This list contains 97 subjects where the following entries are related to education:

Entry 13:

To provide Educational and Cultural relations with foreign countries.

Entry 62:

The institutions known at the commencement of the Constitution as National Library, The Indian Museum, the Imperial War Museum, the Victoria Memorial, and Indian War Memorial. Any other such institutions financed by the Government of India wholly or in part and declared by the Parliament by law to be an institution of national importance.

Entry 63:

Institutions of national importance. The institution known at the commencement of this Constitution as the BHU, AMU and Delhi University etc. declared by Parliament by law to be an institution of national importance.

Entry 64:

The institution of scientific and technical education financed by the Government of India wholly or in part and declared by law to be institutions of national importance like IITs and lIMs.

Entry 65:
Union agencies and institutions for:

(i) Professional, vocational or technical training, including the training of police officers.

(ii) The promotion of special studies or research.

(iii) Scientific or technical assistance in the investigation of detection of crime.

Entry 66:

Coordination and determination of standards in the institution of higher education or research and scientific and technical institutions.

State List:

State list consists of 66 entries, out of which the following is the entry related to education:

Entry 12:

According to this entry all libraries, museums and other similar institutions controlled or financed by the state, ancient and historical monuments and records other than those declared by or under law made by the Parliament to be of the national importance.

Concurrent List:

It comprises 47 entries, among them the following are related to education:

Entry 20:

Economic and social planning.

Entry 25:

Education, including technical education, medical education and universities subject to provision of entries 63,64,65,66 of list (Union List).

Entry 34:

Newspapers, books and printing presses.

Reservation in Education
(A) Education of minorities :

Article 28 of the Constitution has made certain provisions for the education of the minorities including

(i) No religious instruction shall be provided in educational institutions wholly maintained out of state funds.

(ii) If any institution has been established under any endowment trust even if administrated by state, can impart religious education.

(iii) None person attending an educational institution recognized by the state or receiving funds from state government shall be required to take part in any religious worship or instruction that may be conducted in such institutions or in any premises attached there to unless such person or if such person in a minor and his guardian has given his consent thereto.

(B) Cultural and Educational Rights:

Under article 29 and 30 for the protection of educational interest of minorities viz.

***(*i) Article 29 (i):**

Any section of citizen residing in the territory of India on any part thereof having a distinct language, script or culture of its own shall have the right to conserve the same.

(ii) Article 30 (i):

All minorities whether based on religion or language shall have the right to establish and administer educational institutions of their choice.

(iii) Article 30 (ii):

The state shall not in granting and to educational institution discriminate against any educational institution on the ground that it is under the management of a minority whether based on religion or language.

(iv) To make any law providing for the compulsory acquisition of any property of any educational institutions established and administrated by minorities, the state shall ensure that the amount fixed by or determined under such law for acquisition of such property is such as would not restrict on abrogate the right guaranteed to them.

(C) Admissions:

(i) Article 29 (II) states that no citizen of India can be denied admission into any educational institution, which is either maintained by the state or receiving aid out of state funds oil ground only of religion, race, caste, language or any of them.

(ii)Article 15 (III) states that to make special provisions for women. Hence, separate educational institutions for women can be established.

(D) Mother Tongue:

For promotion of teaching of mother tongue the Constitution of India has made some provisions for Hindi language.

Article 350 (A):

It shall be endeavour of every state and local authorities with the state to provide adequate faculties for instruction in the mother tongue at the primary stage of education to children belonging to linguistic minority groups : the President may issue directions to any state as he considers necessary for recurring the facilities.

Article 351:

It is to promote the development of Hindi language and slates that it shall be the duty of the Central Government to promote the spread of Hindi language in the entire country.

(E) Right to Education:

Article 41 of the Constitution provides that "All the citizens have equal right to education ''. It states. "The state shall, within the limits of its economic capacity and development, make effective provisions for the right to work, to education and to public assistance in cases of employment, old age, sickness and disablement''.

(F) Weaker Section:

Our Constitution has made some special provisions for the weaker sections of our society viz.

Article 45:

The state shall endeavour to provide within a period often years from the commencement of the Constitution for the free and compulsory education for all children until they complete the age of 14 years.

Article 46:

The state shall promote with special care the educational and economic interests of weaker sections of the people and, in particular, of the scheduled caste and scheduled tribes, and shall protect them social injustice and all forms of exploitations''.

The Supreme Court of India has given the following guidelines to promote education of the people:

(i) The state can make regulatory measures to promote efficiency of education.

(ii) Educational institutions of minority groups cannot claim immunity from general laws such as contract law, labour law and industrial law etc.

(iii) The state can take over the management of the institutions of minority groups in case of irregularity and inefficiency.

(iv)Teachers have the right to approach to the Arbitration Tribunal in case of any injustice to them by the institution.

ADDITIONAL INFO*:*

- ***i.*** "National council of Educational Research and training (NCERT)" was established in the year 1961
- ***ii.*** IGNO was established in the year November 1985
- ***iii.*** The yashpal committee –Renovation and Rejuvenation of Higher Education
- ***iv.*** A central university is set up by and act of Parliament
- ***v.*** The UGC was constituted on the recommendation of Dr.Sarvepalli Radhkrishnan Commission
- ***vi.*** AICTE was set in 1945
- ***vii.*** The Indian First modern universities(Bombay,Calcuta and Madras) were set in 1857
- ***viii.*** Which of the following governor general took initiative to get the University Act of 1904 passed-Lord Curzon
- ***ix.*** The report of Sergiant commission tabled in 1944
- ***x.*** The chairman of the Calcutta university commission in 1917-M Sadler
- ***xi.*** The National Literacy Mission was launched in 1988
- ***xii.*** National Literacy Mission was set under Seventh Five Year Plan
- ***xiii.*** Educational TV was first introduced in India in 1959

xiv. The scheme of Central School or Kendriya Vidyalaya Was approved by the Govt of India in 1962

xv. The National Literacy Mission was launched by the then PM,Late Rajeev Gandhi in 1988

xvi. The National Adult Education Programme was formally Launched in 1978

xvii. Non- Statutory minority commission was established in India-1978

xviii. Chairman of the First National commission for Women-Jayanthi Patnaik

xix. Twelth Lok Sabha had shortest duration

xx. In 1991-2000 maximum number of PM were there

xxi. The age for voting right was reduced form 21-18 in 1989

xxii. All India Services Act was enacted in 1951

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