KNOWLEDGE AND CURRICULUM

UNIT – I

KNOWLEDGE AND KNOWING

Definition of knowledge and levels of knowledge – Types, kinds, forms and characteristics of Knowledge- Knowledge dimension – Categories of Knowledge dimensions – Dimensions of Cognitive Process - Indian and Western theories of knowledge. Theories of validity of knowledge: Correspondence theory of truth - Utility theory of truth - Semantic theory of truth and Deflationary theory of truth. - Knowledge in relation to information, belief and truth.

Meaning and Definition of Knowledge

Meaning of Knowledge

Knowledge is a familiarity, awareness or understanding of someone or something, such as facts, information (descriptive knowledge), descriptions (of objects - acquaintance knowledge), often contributing to understanding. By most accounts knowledge can be produced in many different ways and from many sources including but not limited to perception, reason, memory, testimony, scientific enquiry, education, experience and practice. The philosophical study of knowledge is called 'epistemology'.

Knowledge involves cognitive abilities of an individual, acting on information obtained through sensory perceptions and experiences. Knowledge may result from education as well.

The term knowledge can refer to a theoretical or practical understanding of a subject. It can be implicit (as with practical skill or expertise) or explicit (as with theoretical understanding of a subject), it can be formal or informal; systematic or particular.

Philosophy's core is the theory of knowledge; it is the foundation of science.

Definition of Knowledge

Plato, the Greeck Philosopher defined knowledge as "justified true belief" though "well- adjusted true belief" is more complete as it accounts for the Gettier problems.

Knowledge acquisition involves complex cognitive processes like perception, communication and reasoning while knowledge is said to be related to the capacity of acknowledgment in human beings. In other words 'Knowledge acquisition' is a process whereas 'Knowledge' is the product resulting from 'Knowledge acquisition'.

Levels of Knowledge

"Levels of Knowledge' refers to the 'Degree or Depth' of Knowledge acquired by an individual. Based on the nature of the Cognitive process involved in the construction or acquiring know- ledge, Benjamin Bloom has identified six levels in acquiring knowledge. They are: Remembering (ii) Understanding (iii) Applying (iv) Analysing (v) Evaluating and (vi) Creating.

The lowest level of knowledge acquired is at remembering level which involves 'recognizing' or is when memory is used to produce or to retrieve facts, definitions or recite learned information.

The highest level of knowledge is 'creating which involves putting elements together to form a coherent or functional whole; reorganizing Or elements together to form a new pattern or structure through generating, planning producing. 'Creating' requires to put parts together in a new way or synthesize parts into something new and different, thus creating a new form or product. This process is the most difficult mental function in the new taxonomy advanced by Bloom.

In between these two levels are understanding, applying, analysing and evaluating as per the increasing level of knowledge which warrant higher order mental functions / abilities of the learner.

Types, Kinds, Forms and Characteristics of Knowledge

Types of Knowledge

Knowledge, depending upon its nature, is categorized into six types viz. (1) Apriori knowledge (ii) Aposteriori knowledge (iii) Explicit knowledge (iv) Tacit knowledge (v) Propositional knowledge and (vi) Non-propositional knowledge, the details of which are presented below:

Apriori Knowledge

The Latin phrase 'Apriori' means "from the earlier". It implies that a person can derive knowledge from the world without needing to experience it. This is better known as reasoning. That is to say that 'apriori knowledge' or justification is independent of experience or empirical evidences.

'Deductive reasoning' forms the basis for arriving at conclusions in 'apriori knowledge'. Philosophy of Idealism gives prominence for 'apriori knowledge'. Apriori knowledge finds its place in subjects like metaphysics, economics, astronomy, mathematics etc.

Example 1: $11 + 1 = 12$; you can figure this out without actually getting twelve separate things and placing them in front of your eyes to count them You use apriori knowledge mathematical principles to figure it out.

2. An engineer is able to construct a multi million rupees bridge using his apriori knowledge of physics and engineering, and guarantee the bridge will withstand the load of trucks and that are plying over it.

Aposteriori Knowledge

The Latin phrase "Aposteriori" means "from the latter". This is a reference to experience and using inductive reasoning to gain knowledge. That is to say, in 'aposteriori knowledge', we first gain experiences through our five senses and then subject them to logical reasoning (inductive reasoning) and reflection to derive understanding (conclusion). In other words it could be said that 'Aposteriori knowledge' or justification is dependent on experience or empirical evidence, as with most aspects of science (evolution) and personal knowledge.

Naturalists and Pragmatists accept 'aposteriori knowledge' only.

Explicit Knowledge

Explicit knowledge is similar to apriori knowledge in that it is more formal and perhaps more reliable. It is knowledge that is recorded and communicated through media like libraries and databases. Anything from the arts to the sciences, can have elements that could be expressed clearly and they constitute explicit knowledge.

Tacit Knowledge

Tacit Knowledge is knowledge that you have but cannot be expressed verbally. Persons with tacit knowledge have usually had that knowledge for so long, that they cannot remember how they learned it or why it is true. They are simply aware that it is useful, accurate knowledge that exists in their mind.

Facial expressions, body movements and gestures, body language etc. may communicate information. Knowledge thus communicated non- verbally is otherwise known as 'Tacit Knowledge'. Tacit Knowledge is opposite to explicit knowledge. Explicit knowledge is easily transferable whereas tacit knowledge is very difficult, almost impossible to be communicated.

Tacit knowledge could be communicated through consistent and extensive relationships or contacts over a long period of time.

Example:

Practitioner Knowledge: Many expert practitioners know how to do things out of intuition. An expert veterinarian knows how to connect with a horse and settle its nerves but may be unable to explain how they can develop that relationship so quickly. An expert teacher may be able to diffuse a troublesome situation in a classroom but not really be able to explain to their apprentice teacher just how they did it.

Propositional Knowledge

It is also known as 'Descriptive' or 'Declarative' knowledge.

Explicit knowledge and tacit knowledge are propositional and non-propositional knowledge respectively. Propositional knowledge is the one which can literally be expressed in propositions. The key attribute of propositional knowledge is that it states 'something is true'. It is knowledge of something and not about how to do something. For example you can learn to use a computer, but may not know how to program a computer. Thus descriptive or propositional knowledge can be learned through memorization and does not require significant practical experience in the field. By contrast 'imperative' (knowing how) knowledge usually require practical skills in a task.

Imperative (or Procedural) Knowledge

It is the opposite of 'Propositional Knowledge' and can be used or applied in specific problems and situations. Imperative Knowledge is 'Knowing how'. It is about how to carry out tasks effectively. This may involve specific steps or a general understanding of the process by which something get achieved. Some people hold the secrets as a grandmother passes down a family recipe to her granddaughter.

Examples:

- Standard Operating Procedures in Business Most large companies of project managers who set out standard operating procedures. These are the procedures that people must follow in order to achieve the goals of the business.
- Secret Recipes. The famous KFC 11 herbs and spices are said to generate their specific 'KFC flavour' from the procedures in which they are cooked. This procedural knowledge is highly classified and the intellectual property of KFC

Kinds of Knowledge

The term 'type' refers to the category within a bigger or whole thing, whereas the term 'kind' is used to express the sense of sort i.e. variation(s) within a category. For example, 'Empirical Knowledge' is a kind of Knowledge and not a type of Knowledge. It is special category within the 'aposteriori Knowledge' type. Aposteriori Knowledge:

Knowledge derived from any experience. Empirical Knowledge: Knowledge derived from experiences observable by our five senses.

These 'specific types' or 'kinds' of knowledge cannot be transferred to other person; it can be transferred through learning. Specific types of knowledge may be based on the 'variation' or 'special category within' a given type of knowledge. The following are the important kinds of knowledge.

1. **Authoritative Knowledge**

It is that knowledge that we received from any authority or which is proved by scientists. (It is a specific variety of 'apriori' type knowledge).

2. **Scientific Knowledge**

This knowledge is gained through observation and experimentation. (This is a specific variety of 'aposteriori' type knowledge).

3. **Empirical Knowledge**

Knowledge drawn through sense observation This is a specific variety of 'aposteriori knowledge). This type of knowledge is based on sensory experiences, investigation and analysis,

4. **Rational Knowledge**

The knowledge drawn from reasoning is called rational knowledge. (This is a specific variety of 'apriori' type knowledge). Reasoning is a mental and intellectual process. Through reasoning man forms his opinion or reaches a conclusion.

5. **Pragmatic Knowledge**

Pragmatic Knowledge means practical knowledge. It is activity centered and useful in our day to day life. It is derived from an individual's experiences, experiments and investigation. It is in one's adjustment in life. (Pragmatic knowledge is a specific variety of 'aposteriori' type knowledge).

Specific types of knowledge may also be based on the nature of the knowledge acquired. Some such kinds of knowledge are:

6. **Domain or Expert Knowledge**

Domain knowledge is deep knowledge about a particular domain or discipline. We might also call it expert knowledge. Persons with domain knowledge are incredibly knowledgeable within their discipline but may just have general knowledge about everything else.

Examples:

1. **University Education**: After compulsory education ends, many people continue studying at university. When we go to university, we get the opportunity to specialize in a specific domain: maybe it's Computer Sciences, Communication Studies, or Teaching. This is even more the case at postgraduate level. Many such university degrees are all about developing specific domain knowledge rather than broad generalized knowledge.
2. **Industrial Revolution**: Henry Ford revolutionized manufacturing by creating the factory line based on domain knowledge theory. Instead of getting five people to build five different cars, he got a bunch of different experts to work on each. One person was an expert on wheels, another on engines, and another on the body. By developing expertise, these people became very efficient at building their part of the car, and the cars were b manufactured at a much faster rate.

7. **Dispersed or Distributed Knowledge**

Dispersed knowledge is knowledge that no single person has the capacity to see in its entirety. The knowledge is dispersed or spread out among many different people. If we want to bring a whole lot of knowledge together to achieve something great, we need to get a team of experts on different topics together to input their knowledge to achieve our goals.

Examples:

- In Surgery. Your surgeon may be the expert in fixing hearts, but he could not conduct the surgery without other specialists and anaesthesiologists who have knowledge and perspectives that the surgeon is not trained in

8. **Encoded Knowledge**

Encoded knowledge is knowledge that has been recorded in symbolic codes. This makes the knowledge easily retrievable by people who know how to (or have tools that

help them) decode that knowledge at a later date. We might also call it 'stored' knowledge.

Examples:

- Written Language. Written English is the code of our language. We encode knowledge when we write it down and anyone who can read our 'code' (i.e. anyone who can read in English) can then decode it at a later date.

- Road Signs. We have also created generalizable codes in our road signs. Red octagon means 'stop', green light means 'go', etc.

- Digital Data. Knowledge can be encoded into binary data that is stored on digital devices such as cloud computers and USB drives. In order to decode the knowledge, computer software is required to turn those binary 1s and Os back into a code we can understand, such as written words, spoken words, or images,

9. **Situated Knowledge**

Situated knowledge is knowledge that emerges out of a specific context, community or culture. It is knowledge that is specific to that situation and is hard to understand from outside of that perspective. All of us have situated cultural knowledge. This is the knowledge that we have inherited from our cultures. Others might have different knowledge that has grown from different cultures and you may find it hard to understand their knowledge from your 'outsider' perspective.

Example :

Cultural anthropology: Anthropologists and sociologists often need to situate themselves within a culture in order to understand the cultural perspectives and understandings that they are observing. As outsiders, they may find the situated knowledge, ritual and activities a little strange.

Education: Situated learning theory by Lave and Wegner advocates that students should learn within the context in which the knowledge is applied. For example, someone should take up an apprentice as a baker's aide in order to learn the nuances to bake bread rather than learn from a paper or article published.

Forms of Knowledge

Depending upon the ways of acquiring, know- ledge takes different forms. Knowledge acquired through sense perceptions is known as 'Sensory Knowledge'. When sense perceptions are stored in mind as images and applied in thinking whenever need arises, such kind of knowledge acquired is called 'Experiential Knowledge'. Knowledge acquired from things that could not be explained through direct relations but may be inferred through indirect relations is termed as 'Demonstrative Knowledge'.

These seven forms of knowledge are briefly explained below:

Sensory Knowledge

When we have direct contact with the environment, the various stimuli present in it, causes appropriate sensations in us by impinging on our sense organs. These sensations are transmitted to the brain and are interpreted with the help of already stored knowledge. This results in sensory perceptions and is recorded in the mind, which constitute 'sensory knowledge'. Sensory knowledge need not always be true.

For example, to our senses it appears sun rises in the morning and sets in the evening daily which is untrue. According to the findings of science, sun- rise and sun-set are caused by the rotation of the earth around the sun and not by the movement of the sun. But we may not be able to sense the rotation of the earth. Therefore, it is said that knowledge derived from logical reasoning is superior to sensory knowledge.

Experiential Knowledge

Sense perceptions are used then and there; but for long term use they are stored in the mind in the form of images. When these images are appropriately combined in a proper sequence and put into use, it results in thinking. Thoughts using imageries develops 'experiential knowledge'. For recollecting one's experience, there need not be any immediate sensation; mind uses the stored images of sense perceptions (experiential knowledge) to solve the problem it encounters. Experiential knowledge is superior to sensory knowledge as it operates mentally. As experiential knowledge is derived from initial sensations, it is also like sensory knowledge inferior to knowledge obtained through logical reasoning.

Demonstrative Knowledge

Demonstrative knowledge is said to be used when we perceive the agreement or c between two ideas or events indirectly through a series of intermediate ideas. For example, when we are unable to find a direct relationship between A and C, we may try to find it indirectly through the use of B, which may have relations to both A a and C. If 'A' is greater than 'B' and 'B' is greater than 'C', then we know demonstratively that 'A' is greater than 'C'.

Logical Knowledge

Logic is about the science of thinking or explaining the reasoning for some occurrence. Logical Knowledge is one that is accepted as logical conclusion as it is based on sound reasoning.

Logical reasoning is of two types (i) Inductive reasoning (ii) Deductive reasoning. In inductive reasoning particular instance are observed and the common elements if any present in them are found. In this way new truths of knowledge are obtained. In deductive reasoning, a particular truth that exists already is applied to a new event presently observed to find the validity of the existing truth. In science, laws and principles are developed through inductive reasoning and they are verified by the deductive method. This kind of logical knowledge is highly valid and useful and is largely found in science.

Intuitive Knowledge

When the mind transcends the sensory perceptions and intellectual reasoning and gets deeply absorbed in the highest level of conscious- ness enabling us to understand situations, people's feelings or agreement/ disagreement of two ideas etc. immediately without the need for conscious reasoning or study, it is called intuition. People who can focus their consciousness at a point (like in meditation) and also have rich and varied background experiences get intuitive experiences. Though intuition yields perfect certainty, it is only rarely available to us. The claim "Intuitive findings are always true" is not accepted by all.

Revealed Knowledge

Messages for the whole of mankind or for an individual have been recorded and cherished as they are believed to have come from supernatural power like God. This

divine know. ledge cannot be subjected to scrutiny. Religious scriptures like Vedas, Koran, Bible etc. claim authority as they were directly received by chosen great men. These revelations are relevant to all people and places and at all times. They have to be studied, understood and explained; but should not be questioned or altered. such or for some

Digital Knowledge

In this modern era knowledge of electronics and computer applications has become the basic requirement for all. The term digitalization is often used when diverse forms of information such as texts, sound, image or voice are converted into a single binary code that could be recorded and preserved in computers. Digital information exists as one of two digits, either 0 or 1, arranged sequentially.

Digital information could be converted back into their original form by using the equipment MODEM (Modulation and Demodulation) attached to the computer. By converting the existing information in the diverse forms into the digital form, it is easier to preserve for long without much distortion and that too in a small space. It is also easier to access and share. For example, an original historical document may only be accessible to people who visit its physical location, but if the document content is digitized, it can be made available to people worldwide. There is a growing trend towards digitization of historically and culturally significant data.

Acquiring the knowledge stored in the form of digital information and developing the skills required to access such information constitutes 'Digital Knowledge'.

Characteristics of Knowledge

The following are the important characteristics of knowledge. Knowledge is like wealth, the more he gets, the more he craves.

- Knowledge never decays.
- Knowledge once gained casts a light beyond its own immediate boundaries.
- Information is the source of knowledge.
- The word knowledge implies three things truth, proof, conviction
- Facts and values are the basis of the structures of knowledge.
- Knowledge is boundless
- It exists to be imparted.

Knowledge Dimensions

According to Anderson and Krathwohl (2001) knowledge has two dimensions. They are:

i) Knowledge Dimension or the kind of know- ledge to be learned.

ii) Cognitive Process Dimension or the cognitive process to be used in acquiring knowledge. Putting in short, knowledge refers to kind of knowledge acquired and the process of acquiring that knowledge i.e. knowledge is both process and product. Therefore, dimensions of knowledge implies, the four dimensions of the knowledge (product) acquired and the six levels or dimensions of the cognitive process involved in acquiring that knowledge.

Categories of Knowledge (as product of learning) Dimension

Knowledge dimensions refer to the kinds of knowledge to be learned. There are four categories of knowledge dimension, arranged as per the difficulty level involved in learning. They are:

i) Factual Knowledge

ii) Conceptual Knowledge

iii) Procedural Knowledge

iv) Meta-Cognitive Knowledge

A brief description of these four categories of knowledge dimension is presented below:

Factual Knowledge

Factual Knowledge is knowledge that is basic to specific disciplines. This dimension refers to essential facts, terminology, details or students must know or be familiar with in order to understand a discipline or solve a problem in it.

Conceptual Knowledge

Conceptual Knowledge is knowledge of classifications, principles, generalizations theories, models, or structures pertinent to a particular disciplinary area. The interrelationships among the basic elements within a larger structure that enable them to function together.

Procedural Knowledge

Procedural Knowledge refers to information or knowledge that helps students to do something specific to a discipline, subject, or area of study. It also refers to methods of inquiry, very specific or finite skills, algorithms, techniques, and particular methodologies.

Meta cognitive Knowledge

Met cognitive Knowledge is the awareness of one's own cognition and particular cognitive processes. It is strategic or reflective knowledge about how to go about solving problems, cognitive tasks, to include contextual and conditional knowledge and knowledge of self. Knowledge of cognition in general, as well as awareness and knowledge of one's own cognition constitutes meta cognitive knowledge.

Dimensions of Cognitive Process

As per the Revised Bloom's Taxonomy of learning objectives which indicate levels of cognitive process dimension, there are six levels of learning. They are: (i) remembering (ii) Under- standing (iii) Applying (iv) Analyzing (v) Evaluating and (vi) Creating. A brief description of these six levels of cognitive process dimension (Cognitive Domain) is presented below with the Key Words (Verbs) involved in respective level.

Remembering

Remembering involves recognizing and recalling knowledge from memory. Remembering is when memory is used to produce or retrieve definitions, facts, or lists, or to recite previously learned information.

Key Words (Verbs) - Defines. Describes, Identifies, Knows, Labels, Lists, Matches, Names, Outlines, Recalls, Recognizes, Reproduces, Selects States.

Examples (Learning Objectives) - The student will be able to: Recite a policy. Quote prices from memory to a customer. Recite the safety rules.

Understanding

Understanding involves constructing meaning from different types of functions be they written or graphic messages, or activities like interpreting. exemplifying, classifying, summarizing, inferring, comparing, or explaining.

Key Words (Verbs) Comprehends, Converts, Defends, Distinguishes, Estimates, Explains, Extends, Generalizes, gives an example, Infers, Interprets, Paraphrases, Predicts, Rewrites, Summarizes, Translates. Examples (Learning Objectives) - The student will be

able to; Rewrite the principles of test writing. Explain in one's own words the steps for performing a complex task. Translate an equation into a computer spreadsheet.

Applying

Applying involves carrying out or using a procedure through executing, or implementing. Applying relates to or refers to situations where learned material is used through products like models, presentations, interviews or simulations.

Key Words (Verbs) - Applies, Changes, Computes, Constructs, Demonstrates, Discovers. Manipulates, Modifies, Operates, Predicts, Prepares, Produces, Relates, Shows, Solves, Uses.

Examples (Learning Objectives) - The student will be able to; Use a manual to calculate an employee's vacation time. Apply laws of statistics to evaluate the reliability of a written test.

Analyzing

Analyzing involves breaking materials or concepts into parts, determining how the parts relate to one another or how they interrelate, how the parts relate to an overall structure or purpose. Mental actions included in this function are differentiating, organizing, and attributing, as well as being able to distinguish between the components or parts

Key Words (Verbs) - Analyzes, breaks down, Compares. Contrasts, Diagrams, Deconstructs. Differentiates, Discriminates, Distinguishes, Identifies, Illustrates. Infers, Outlines, Relates, Selects, Separates.

Examples (Learning Objectives) - The student will be able to; Troubleshoot a piece of equipment by using logical deduction. Recognize logical fallacies in reasoning. Gathers information from a department and selects the required tasks for training.

Evaluating

Evaluating involves making judgments based on criteria and standards through checking and critiquing. Critiques, recommendations and reports are some of the products that can be created to demonstrate the processes of evaluation. In the newer taxonomy evaluating comes before creating as it is often a necessary part of the precursory behavior before one creates something.

Key words (verbs) - Appraises, Compares, Concludes, Contrasts, Criticizes, Critiques, Defends, Describes, Discriminates, Evaluates, Explains, Interprets, Justifies, Relates, Summaries, Supports.

Examples: (Learning Objectives) - The student will be able to; select the most effective solution. Hire the most qualified candidate. Explain and justify a new budget.

Creating

Creating involves putting elements together to form a coherent or functional whole; reorganizing elements into a new pattern or structure through generation, planning or producing. Creating requires users to put parts together in a new way, or synthe is size parts into something new and different thus creating a new form or product. This process i most difficult mental function in the new taxonomy the Key Words (Verbs) - Categorizes, Combines, Compiles, Composes, Creates, Devises, Designs, Explains, Generates, Modifies, Organizes, Plans, Rearranges, Reconstructs, Relate Reorganizes, Revises, Rewrites, Summarizes, Tells, Writes.

Examples (Learning Objectives) The student will be able to; Write a company operations or process manual. Design a machine to perform a specific task. Integrates training from several sources to solve a problem. Revises and process to improve the outcome.

Sources of Knowledge

The Indian epistemological tradition comprises six important sources of knowledge. They are : (i) Perception (Pratyaksha), (ii) Inference (Anumana), (iii) Verbal testimony (Sabdha), (iv) Comparison (Upamana), (v) Presupposition (Arthapatti) and (vi) Non-apprehension (Anupalabdhi).

(i) Perception (Pratyaksha): It literally means that which is perceptible to the eye or visible; in general usage, it refers to being present before the eye. It is a pramana, mode of proof.

Pratyaksha is one of the three principal means of knowledge. The principal means of knowledge are: 1) Pratyksha, 2) Anumana, inference drawn from data 3) Aptavakya, which is evidence, the testimony of men in possession of the sought after knowledge.

ii) Inference (Anumana): 'Anumana' means "inference" or "knowledge that follows". It is one of the three principal sources of correct knowledge, in Indian Philosophy. Anumana is using observation, previous truths and reason to reach a new conclusion and truth. A simple example is observing smoke and inferring there must be fire.

Anumana consists of five steps; (i) a hypothesis (pratijna), (ii) reason (hetu), (iii) an example (udaharana), (iv) reaffirmation (Upanaya) and (v) conclusion. The hypothesis is conditionally true, if there are positive examples and absence of negative examples.

(iii) Verbal Testimony (Sabdha) : Verbal testimony is a means of obtaining knowledge. In the Indian philosophical systems (darshans), 'Sabdha' is equated with the authority of Vedas (the most ancient sacred scriptures) as the only infalliable testimony, since the vedas are deemed to be eternal, authorless and absolutely infalliable. Mimamsa School of Philosophy defines the authori- tativeness as applying blindly only scriptural statements called 'aptavakyas'. The Vedanta school extends this authoritativeness to super- sensual objects e.g. 'brahman', the ultimate reality. The School of logic (Nyaya) accepts verbal testimony, both of human and divine, as a valid means of knowledge but notes that only the divine knowledge of the Vedas is infallible.

The systems of Buddhism and Jainism, though they reject the authoritativeness of the Vedas, rely in fact on the 'Sabdha' of their own scriptures.

(iv) Comparision (Upamana): Observance of similarities, provides knowledge of the relationship between the two. It also means getting knowledge of an unknown thing by comparing i with a known thing. For Example, assume situation where a man has not seen a gavaya or a wild cow and doesn't know what it is. A forester told him that a wild cow is an animal like a c country cow but she is more furious and has a big horn in her forehead. In a later period, he comes across a wild cow in a forest and recognizes it as the wild cow by comparing the descriptions made by the forester. This knowledge is possible due to the upamana or comparison. Thus, upamana is the knowledge of the relation between a name and the object it denotes by that name. the a

(v) Presupposition (Arthapatti): Arthapatti is a Sanskrit term meaning 'Presumption' or 'implication'. It is one of the three auxiliary means of acquiring knowledge along 'upamana' and 'Anupalabdhi'. Arthapatti refers to the way in which

knowledge is derived from a set of circumstances. It is analogous in the contemporary logic, the concept of circumstantial implication. It generally requires an observation of fact(s) and a postulation based on such facts to arrive at the information.

vi) Non-Apprehension (Anupalabdhi): The Sanskrit term 'Anupalabdhi' means 'non- recognition', 'non-perception'. It consists in the presentative knowledge of negative facts. All things exist in places either in a positive or in a negative relation and it is only in the former case that they come into contact with senses, while in the latter case the perception of negative existence can only be had by separate mode of movement of mind-anupalabdhi. In short, anupalabdhi means understanding non-existence by non-perception. According to Dharmakirthi (Buddhist saint) 'anupalabdhi' is the affirmative assertion of a negative prediction and is same as anumana of a non-existence object.

Each of the schools of Indian philosophy acknowledges one or more of these pramana as valid source of knowledge, the details of which are presented below: The Nyaya School recognizes 'Perception (Pratyaksha) as a kind of pramana along with Anumana (Inference), Upamana (comparison) Shabda (verbal testimony). Nyaya School recognizes only these four kinds as means of acquiring correct knowledge. The Sankya School does not recognize upamana as a pramana. Pratyaksha, Anumana and Verbal testimony alone are recognized as pramanas in Sankya School.Vedantins recognize all the six means of knowledge. They believe in 'apriori' knowledge.Mimamsakas also add Anupalabdhi (Non- apprehension) and 'Arthapatti' (Presumption) as valid pramanas.

Yoga accepts 'anumana', 'pratyksha' and 'Sabda' as valid pramanas. Only the quasi philosopical school of 'Charvaka' rejects 'anumana', instead accepting pratyksha as the sole valid source of knowledge.

Important Western Schools of Philosophy and the Theories of Knowledge they Advance

Modern Schools of Western Philosophy

Among the modern schools of Western philosophy, the important ones are : (i) Idealism (ii) Naturalism (iii) Realism and (iv) Pragmatism. The salient features of these four schools of philosophy are presented below:

(i) Idealism

1. Its salient features regarding knowledge and truth are:

2. Mind or spirit is the ultimate basis for everything in this world. True reality is of mental character rather than material or physical world.
3. Universe, functions according to set laws called Universal Laws. Man discovers and not invents any of these truths. Knowledge comes through inner intuition and not through our senses.
4. Truth is subjective i.e. different people see the same object differently. One may see the God or the stone in the statue.
5. 'Knowledge' and 'Truth' are different. We integrate the knowledge obtained from sense organs to get at the truths, through the use of 'intellect', which lies inside man. Depending upon the nature of intellect, truth gets shaped.

(ii) Naturalism

Its salient features regarding knowledge and truth are:

1. Naturalism as opposed to idealism, believes that the ultimate reality is matter in its micro form and not spirit or mind.

2. Naturalists believe in 'Aposteriori knowledge' particularly 'Empirical Knowledge'. Knowledge acquired through human experience alone is real. Senses are the gateways of knowledge. Everyone is guided by his / her personal experiences alone.

3. Naturalists believe in Science and assert scientific Knowledge alone is true and final. With advancement in Science, basic concepts in science may change. It simply means that our ideas about nature and its laws have become refined and more accurate but the nature and its functioning remain the same.

iii) Realism

Salient features of 'realism' regarding 'Knowledge' and 'Truth' are :

1. The world of things or nature exists beyond and outside of our minds. The attributes of physical objects exist just as we know them through our perception. That is objects rule our mind and mind does not project the objects.

2. Knowledge is gained from experience. Sense organs are the gateways of knowledge. Everything is sense perception. There may be errors in perception (e.g. 'Mirage') which t is rectified on verification.

3. Analysis and reasoning are important in gaining knowledge from sensory experiences

iv) Pragmatism

Salient features of 'Pragmatism' regarding 'Knowledge' and 'Truth' are :

1. Human experience alone is real, at least for the concerned individual. When man reacts with environment, he gets experience; this experience leads him to obtain further experience. Thus the cycle of experience getting reconstructed goes on

2. One's knowledge is the result of his / her experience. True knowledge is one which works. There is no pre-existing knowledge.

3. Action is pre-runner for knowledge. Actions are more important than thoughts.

4. We should be concerned with the 'present'; dead past and uncertain future requires no attention .

5. Means justifies the ends. What we have achieved, serves as the stepping stone or the means for scaling further towards the peak.

Comparison between Indian and Western Philosophies with regard to Knowledge

Like Indian Philosophical schools, "Idealism" too accepts the supremacy of mind over matter. Idealists too, like traditional Indian Philosophical schools, believe in 'apriori' knowledge. They also accept reasoning, insight, intuition, authority and revelation by God as valid means of knowledge. They are not giving importance to empirical knowledge and scientific knowledge acquired by experimentation. Idealism is perhaps the oldest among the classical western schools of philosophy.

Naturalism and Realism accept the supremacy of objects over mind. They believe independent existence of the physical world. Both the schools advocate empirical knowledge is real and senses are the gateways of knowledge. They give importance for the scientific method of collecting data, forming hypotheses, experimentation and validation in acquiring knowledge i.e. they give primary importance of scientific knowledge. Realism advocates the importance of in dealing with abstract things.

Pragmatism advocates that human experience alone is real. When man reacts with environment, he gets experience; this experience leads him to obtain further experience. Thus knowledge is continuously evolving. True knowledge is one which works.

Summing up, it could be said, that Eastern Philosophies believe that sense impressions cannot be considered as the only source of knowledge. Inference, using similarities, presuppositions, verbal testimony from experts, insight and revelation by God

are also other modes of acquiring knowledge. However, in Western Philosophies, those views which emphasize sensory perception and empiricism have taken the center stage.

Theories of Validity of Knowledge

Validated or justified knowledge, otherwise known as knowledge backed with evidences is called truth. Theories of truth attempt to give satisfactory answers to the following questions: "What is truth?" and "How to know the truth?" We want to know whether propositions or beliefs are true or false. To deal with propositional truth we can take either the definitional route and define "is true" as qualifying the proposition, or the criterial route and justify the application of "is true" to the proposition.

What is the nature of truth? This is similar to the question, what is the underlying nature of the property of being gold or the substantive facts about gold? Or, what does the word "gold" mean in ordinary English? The result of the inquiry is that gold is an element with atomic number 79. One's concept of gold picks out many important and substantive facts about gold, that it is a malleable yellow metal, for instance. When philosophers ask what truth is, they are interested sometimes in the concept, sometimes in the underlying nature of its property, and sometimes in both. Unlike the case of gold, we have no independent, empirical access to the property of truth. Hence, mostly we do not make use of the 'definitional route' to know the nature of truth; instead employ the 'criterial route' to determine what is meant by truth i.e. what criteria should be satisfied before knowing a thing as truth.

i)The Correspondence theory of truth

ii) The Pragmatic or Utility Theory of truth

iii) Semantic Theory of truth

iv) Deflationary Theories

The Correspondence Theory of Truth

According to the correspondence theory of truth, a proposition is true just when it agrees with reality. It demands a unique conformity between judgements and states of affairs. It is systematic development of the commonsense account of truth expressed in dictionary definitions like "conformity with fact." "Delhi is the capital of India is true because it corresponds to the fact.

Correspondence as congruence says that every truth bearer (truthful proposition) is correlated to a state of affairs. If the state of affairs to which a given truth bearer is correlated actually obtains, the truth bearer is true; otherwise it is false. For Bertrand Russell it is beliefs that are true or false and facts make beliefs true. He agrees that beliefs depend on minds for their existence, but claims that they do not depend on minds for their truth. According to him "assertions correspond to states of affairs; they are true if the corresponding states of affairs obtains, and false if it does not."

Correspondence as correlation claims that there is a structural isomorphism between the truth bearers and the facts to which they correspond when the truth bearer is true. Like the two halves of a torn piece of paper, the parts of the truth bearer fit with the parts of the fact. It is because of this isomorphism that the fact and the truth bearer can be said to correspond with each other.

The Pragmatic Theory or Utility Theory of Truth

Pragmatism envisages a conception of truth that recognizes a close link between truth and human experience. The pragmatic theory of truth bases itself on the intuition that one cannot profit from error either by rejecting a true proposition of by accepting a false proposition. Being right is the most advantageous policy, and so maximal utility is a safe indicator of truth. The prominent advocates of classical pragmatism are Charles Peirce, William James and John Dewey.

For Peirce, a true proposition is a final and compulsory belief, a belief unassailable by doubt. The opinion which is fated to be ultimately agreed to by all who investigate is what we mean by the truth, and the object represented in this opinion is the real. Even though the possible hypotheses are infinite, investigation in the long run will eliminate all of them except the true one. A judgment is true only if it is justified at the hand of scientific inquiry. He renamed his theory as pragmaticism when pragmaticism was appropriated by Deway, Schiller and James to label their view. He claims that "human opinion universally tends in the long run to the truth". For him opinion which is fated to be ultimately agreed to by all who investigate, is what we mean by truth

According to James an empirical judgment is true if it is verifiable. The truth of an idea emerges the process of its verification and validation. Our knowledge of the world, according to James results from the interaction between our minds and the world. But our

minds do not, like mirrors, passively copy facts, but actively manipulate them according to our needs and ends. James insists that truth should be useful. Something is useful because it is true and it is true because it is useful. An empirical judgment is true just when it is verifiable. Instrumentalism holds that a belief can be useful if it leads to accurate predictions and hence true. For James the facts of the matter are irrelevant. What counts is the usefulness of the belief. For James usefulness means useful over the long term and when all things are considered.

According to John Dewey an idea is a plan of action or a possible solution and not a copy of the environment. Their validity and value are tested by their practical success. If they succeed in dealing with the problem they are true; if they fail they are false. In a way, all ideas are hypotheses: that which guides us well or that works is true. For example, a human being lost in the woods can use his idea as a working hypothesis. If he finds his way home, then his idea is true because it agrees with reality. According to Dewey, truth happens to an idea when it becomes a verified or warranted assertion. Thus he claims that all received truths should be critically tested by new experiences.

Semantic Theory of Truth

Alfred Tarski (1901-1983), a Polish mathematician, proposed his 'Semantic Theory of Truth' in 1930. This is in the form of a mathematical model. He claims that his semantic conception of truth is the essence of the correspondence theory of truth. He calls truth a semantic concept because it is defined in terms of other semantic concepts, especially the concept of 'satisfaction', Tarski's strategy is to define all semantic concepts, except satisfaction, in terms of truth, truth in terms o satisfaction, and satisfaction in terms of physical and logic-mathematical concepts. According to him, an adequate definition of truth is one from which all equivalencies of the forms "X is true it and only if p" follow, where X is the name of the sentence and p is the sentence. For example, if a person says, 'I am going to tell a lie'. If he is actually lieing, then what he uttered new is true, but if he used to tell no lies, then what he said now is false. This can be mathematically represented as (S) = S' and S = (S) where S denotes speaker's nature, S' denotes statement uttered by the speaker, thing within brackets denotes 'falsehood' and thing without bracket 'truthfulness'. Tarsky limits his definition of truth to artificial or formal languages of logic

and mathematics because the natural languages are semantically closed and hopelessly paradoxical. Such formal languages are semantically open and contain none of the ambiguity and vagueness of ordinary language. For example, in English a natural language, the word 'Satisfy' may mean 'to make pleased', 'to have what is necessary', 'to prove that has been done' etc. This causes confusion in the learners. There is no room for such confusions in formal languages like mathematics. Summing up, we can say that Tarsky argues that if a thing is true, it will satisfy a particular criterion.

Deflationary Theories

Deflationist is the name for a family of views which aim to deflate the lofty pretensions of traditional theories of truth. They believe that truth has no nature. It is not so important a concept. Deflationary theories call attention to the transparency of truth. When we say that "it is true that roses are red", we can look right through the truth that roses are red. We automatically infer that roses are red. There is no reason to try to explain why something is true by appealing to correspondence or coherence.

According to Frank Ramsey's Redundancy theory 'is true' is a superfluous addition; in reality we ascribe no property to the proposition. All ascriptions of truth are gratuitous or redundant. But the question arises as to why we would have the word 'true' in our language if it is redundant. According to P.F. Strawson's Performative theory ascriptions of truth to propositions are actually nonesoteric performative utterances like command. If I tell you to close the door, I am not making an assertion or stating a fact; I am telling you to do something. Strawson argues that we should regard utterances of the form "It is true that p" in a similar way. It calls our attention to an often neglected feature of our concept of truth; its normative and performative role in our language. According to Quine's Disquotation theory "ascription of truth just cancels the quotation marks. Truth is disquotation." According to Minimalism there is no more to understanding truth than understanding the equivalence of saying something is true and to asserting it. For instance, we know what it is for people to assert propositions and we normally know what kinds of considerations confirm or disconfirm the propositions.

Knowledge in Relation to Information, Belief and Truth

Knowledge in Relation to Information

The human mind's content is based on the kinds of things that one interacts with, on a daily basis. Many a time people perceive things based on what they have seen, heard, read, experienced, learned or inferred. These perceptions are then categorized in the mind as data, information, knowledge, understanding or wisdom. Unlike information and knowledge, perceptions are as a result of what the brain has recorded in the past.

Data

Sense perceptions regarding objects, persons or events are recorded in the mind in the form of data. Each small bit of information about a thing recorded in the mind is called 'datum'. When a set of 'datum' is assembled, it may indicate an attribute of a thing or a person.

Information

Information refers to data that has been given some meaning by way of relation / connection. In computing terms, it is the data that has been processed. For example the passbook of a savings bank account may contain various kinds of entries arranged data-wise. Entries may pertain to cash credit, cheque credit, cash withdrawal, withdrawal through cheque, withdrawal through ATM, half yearly interest credit, amount debited for service rendered such as issue of cheque book, penalty for bounced cheques etc. All these entries may be considered as data-base of a person with reference to the particular account holder. When a set of data, say cash & cheque credits alone are arranged in sequence, it reveals the income of the person during a particular period of time. So we can say when data are arranged sequentially with a purpose it reveals some meaningful information i.e. processing of data with a purpose yields meaningful information.

Knowledge and Information

Knowledge is the concise and appropriate collection of information in a way that makes it useful. Knowledge refers to deterministic process where patterns within a given set of information are ascertained. In short we can say, if we examine the relations among the data it yields information; if the information are processed with some purpose, we get knowledge. Knowledge is nothing but isolating useful information from the total information available to us. We require some cognitive and analytical abilities to get knowledge while for information no such cognitive abilities are required.

Knowledge and Belief

Belief is accepting something as true, even in the absence of any evidence. Sometimes there are chances that beliefs could be true. Some people without searching for any evidence for their belief, will simply say what their inner conscience says is the basis of their belief. We all act with certain beliefs. Generally various tenets of religion are not nothing but belief. They cannot be justified by any external (objective) evidences. Our beliefs give us comfort and solace. Beliefs which are based on evidences are false beliefs only. Those who refuse to examine the evidences provided are superstitious.

The act of knowing the true nature and belief using logic is known as reasoning. Reasoning is of two types viz. inductive and deductive. Reasoning help us to identify the true beliefs fact and reject the false belief. Hence it could be said that reasoning plays an important role in identifying true nature of a thing. Those who accept anything after due reasoning are called rationalists.

In short, beliefs are temporary; not based on evidences. The act of reasoning alone brings out the true nature of beliefs. Beliefs which are true tend to help in developing knowledge. That is reasoning helps as a way to get knowledge. Beliefs are the starting point of getting knowledge.

Belief, Knowledge and Truth

Knowledge is a mental state; i.e. Knowledge exists in one's mind. If an individual does not think, he cannot form beliefs. If one has no beliefs about a particular matter, he can not have knowledge about it. In other words, beliefs are the starting points of knowledge. Of course, not all beliefs constitute knowledge. Belief is necessary but not sufficient for knowledge. We are all sometimes mistaken in what we believe; in other words, while some of our beliefs are true and others are false. Beliefs based on reasoning are true beliefs. Beliefs that lack proper justification are false beliefs. As we try to acquire knowledge, then we are trying to increase of stock of true beliefs, while simultaneously minimizing our false beliefs.

We might say that the most typical purpose of belief is to describe or capture the way things actually are; i.e. when one forms a belief; one is seeking a match between the representation of a thing in one's mind and the actual thing in the real or objective world. We sometimes fail to achieve such a match; some of our beliefs do not describe the way

things actually are. Those beliefs are false beliefs. Thus, we can say that truth is a condition of knowledge; i.e. if a belief is not true, it cannot constitute knowledge.

UNIT –II

MEANING, NATURE AND PRINCIPLES OF CURRICULUM

Meaning and definition of Curriculum – Need for Curriculum development - Principles of Curriculum development – Types of Curricula: Subject-centered Curriculum, Learner centered Curriculum, Problem-centered Curriculum and Curriculum Alignment.

Meaning and Definition of Curriculum

Meaning of the Term 'Curriculum'

Etymologically, the term 'Curriculum' is derived from the Latin root word 'Currere' which means run or run-way or a running course. Thus curriculum means a course to be run for reaching a certain goal. In education, 'curriculum' means 'Work field of Student'. It simply means 'a course of study'.

Philip Phenix considers curriculum as a carefully thought out scheme of values, which constitute the aims and objectives, or purposes of education. The third view point is given by Hilda Taba which looks at curriculum as the function of the public school; she lists the three functions as preserving and transmitting cultural heritage, serving as an instrument of transformation of culture, and working a means for individual development.

Thus curriculum is to be construed as a dynamic entity that goes on changing with time.

Definition of Curriculum

The term 'curriculum' has been defined by the scholars and educationists. Some of the definitions have been given below to understand the nature and characteristics of curriculum.

1. "It (curriculum) is a tool in the hands of the artist (teacher) to mould his material (pupil) according to his ideal (objective) in his studio (school)". (Cunningham)
2. "The curriculum consists of content, methods and purpose. These three dimensions interacting are operational curriculum". (Taylor)
3. Curriculum is plan for learning. (Hilda Taba, 1962)

4. "Whatever the mode of expression, the subject matter is the sustentative hard core of the curriculum" (Beauchamp, 'curriculum Theory'.1968)

5. "Curriculum is concerned not with what students will do in the learning situation, but what they will learn as a consequence of what they do". (Johnson, 'Curriculum Theory Network')

6. Curriculum is, "a sequence of potential experience set up in school for the purpose of disciplining children and youth in group ways of thinking and acting" (Smith, Stanley and Shores, 'Fundamentals of Curriculum Development').

7. "Basically the Curriculum is what happens to children in schools as a result of what teachers do. It includes all the experiences of children for which the school should responsibility. It is the programme used by the school as a means of accomplishing its purposes" ('Curriculum Guide for Elementary schools'. Kanses State Guide).

From the above definitions both global and specific, we can arrive at a compromise and evolve a generic definition of curriculum, as follows:

"Any plan of action, written or unwritten, simple or elaborate, intended to achieve learning in students". Learning is desired change in student's behaviour. The curriculum of a school or college will be the formal and informal content and process by which learners gain knowledge and understanding, develop skills and alter attitudes, appreciations and values under the auspices of that school or college.

Nature or Characteristics of Curriculum

The definitions given for the term 'Curriculum', indicate the following characteristics of the concept of curriculum.

1. Curriculum is a tool in the hands of the teacher which is used to realize the objectives.
2. It is pivot, around which whole human knowledge concentrates.
3. It includes those activities which are used by the school to attain the purpose of education.
4. It is more than teaching and learning and includes practice, activities, industry, vocation and acquiring knowledge.
5. The curriculum is made up of everything that surrounds the learner in all his working terms.

6. It has been described as the environment in motion (physical, social and psychological).

7. Curriculum is the totality of all learning experiences that a child receives at a school.

8. All the learning inside or outside the school which is planned and guided by the teacher.

9. It includes contents, method of teaching and purpose of education.

10. A programme of activities designed to realize the objectives is known as curriculum.

Putting in a nutshell we can conclude the nature of curriculum:

- as an educational programme or a plan for learning
- as learning experiences
- as a subject matter of study as an objective
- as a system
- as a field of study

Curriculum Construction and Curriculum Development

Curriculum Construction

Curriculum construction takes into account educational needs of students as well as the society and decides upon the objectives which form the bases for what to teach and how to teach so that the desired curriculum objectives are achieved through planned learning experiences.

The process of curriculum construction involves the following steps: (i) formulating the objectives (ii) Selecting the content materials and learning experiences (iii) Organising the content in proper sequence (iv) Implementing the designed curriculum (v) Evaluating the curriculum.

Curriculum Development

The term 'Curriculum Development' was used first by Saylor and Alexander in their work 'Planning curriculum for schools' (1973) as interchangeable with 'Curriculum Planning'. According to them, curriculum development refers to the creation of relevant experiences and materials to be used by teachers to bring about desired behavioural changes in students; they are the product of curriculum planning. It involves the techniques and methods for developing, designing. Implementing, evaluating and improving the curriculum. Briefly stated, curriculum development involves curriculum construction and updating it periodically.

Curriculum = Curriculum Construction + Constantly updating and refining the curriculum Development Curriculum development, thus is a continuous process.

Need for and Importance of Curriculum Development

Curriculum development is a process of improving the curriculum. Various approaches have been used in developing curricula. Commonly used approaches consist of analysis (i.e. need analysis, task analysis), design (i.e. objective design), selecting (i.e. choosing appropriate learning / teaching methods and appropriate assessment methods), formation (i.e. formation of curriculum implementation committee / curriculum evaluation committee) and review (i.e. curriculum review committee). Thus the process of curriculum development is essential for need analysis or task analysis, curriculum design, selection of appropriate methods of teaching learning and evaluation, formation of curriculum implementation committees at various levels of education and reviewing the effectiveness of educational programme.

Principles of Curriculum Development

Curriculum refers to both organized and informal activities of school life. School life need not imply life of the child within the four walls of the school alone, but extend beyond that. The place and importance of the curriculum in the educative process needs no reemphasis. The following are the basic principles of curriculum development.

1) Principle of Totality of Experiences: In the first place, it must be clearly understood that, according to the best modern educational thought, curriculum in this context does not mean only the academic subjects traditionally taught in the school but it includes the totality of experiences that pupil receives through the manifold curricular, co- curricular and extra-curricular activities.

ii) Principle of Child-Centeredness: Child's nature, concern, motive and need should be of primary consideration in the construction of curriculum. Child is the central point around which all the curricular activities in school involve and develop. Curriculum should be adjusted to bringing nearer to the child rather than bringing the child nearer to the pre-determined curriculum.

iii) Principle of Conservation and Creativity: An effective curriculum must be based on the principle of conservation and creativity. While framing the curriculum, we should include those subjects and experiences which help in the conservation of cultural heritage. There

should be scope for their further modification in the light of changing needs and situations. A modern curriculum cannot be static. Subjects who will enable the child to exercise his constructive and creative powers should be included in the curriculum.

iv) Principle of Integration: The curriculum should not split up into water-tight academic subjects. Various subjects included in the curriculum at a particular stage of education, should be integrated and correlated with many other activities as well as with the real life of pupils. The school curriculum should promote unified studies which have direct connection with life.

v) Principle of Flexibility: In order to serve the varying needs and concerns of individual on the one hand and society on the other, curriculum should follow the principle of flexibility and dynamism. It should allow desirable changes and modifications of its contents from time to time in order to keep it up to date.

vi) The Principle of Utility: It is a very important principle that at the time of curriculum construction; utility instead of 'special knowledge or logical sequence should be the base. Only that which is useful to the individual and society should be included in the curriculum, and that which is not useful should be excluded, however, important matter it may be. Nunn rightly says, "While the plainman generally likes his children to pick up some scraps of useless learning for purely decorative purposes; but he requires, on the whole, that they shall be taught what will be useful to them in later life.

vii) Principle of Character Formation: Aim of curriculum identifies itself with development of character and personality in the students. It should train their desirable traits and qualities of character through the programme of rules, regulations and routines. Affective education should form part of curriculum for this character training.

viii) Principle of Mental Discipline: One major task of curriculum is to train the various mental faculties or powers of the learner for their efficiency and precision. Mental powers of individual is to be developed through cognitive training and practice.

ix) The Principle of Social Fulfillment: The curriculum should be connected with the social life of the people. Since man is a social being, he cannot be isolated from the society. Therefore, while constructing the curriculum we cannot ignore the areas of aspects of social life of the people. The social principle of curriculum construction will help for

training in citizenship. Curriculum should be constructed according to the social context of the children.

x) Principle of Relating to Community Life: The curriculumn should be vitally and organically related to community life. It should allow the child to come into close contact with the life around him. In fact the curriculum should grow out of community life. This means due importance should be given to social function and productive work which is the backbone of organized human life.

xi) Principle of Training for Leisure: The curriculum should be so designed as to train the students not only for work but also for leisure. Attempts should be made to include variety of co-curricular and extracurricular activities - social.

athletic, sports and games and dramatics, etc. Such a curriculum will help the adolescents to release their pent up emotions in a socially desirable channel.

xii) Principle of Correlation: Curriculum should not ignore the natural affinity that exists in between subjects. It should aim at giving a correlative view of knowledge to students instead of comparts- metalizing the subjects. For this, it should combine and correlate between theory and practice of knowledge.

Types of Curriculum

There are several approaches to curriculum designing. One school of thought advocates giving importance to subjects and giving them the central place; the second group pleads for giving 'students and their interests' the central place; the third group supports problem-centred curriculum.

Protagonists of subject-centred curriculum advocate that schools exist primarily, for transmitting the cultural heritage from one generation to the next and this is possible only through meaningful segments of our culture arranged as separate subjects and taught in schools. Supporters of student-centred approach argue that the very purpose of education is to prepare the students to lead their life effectively and in the fast changing world, as students' needs and interests change now and then, the curriculum should be tailored to suit their present needs and future expectations.

The third school of thought insists for following a middle path, which will give equal importance to subjects as well as students' needs and interests by relating the content to the activities of the community and the problems of life.

All these three approaches could be diagrammatically presented as follows:

Approaches to Curriculum Designing

- Subject-Centered Approach
- Problem-Centered
- Learner-Centered Approach

Each of these approaches have some variations. Subject-centered designs include discipline design (also known as 'Separate subject design'), Broadfield design, Correlated design, and Core curriculum design, Learner-centered designs are those identified as 'Child-Centered designs like 'Experiential Curriculum' and 'Activity based Curriculum'. Problem-centered designs consider Life situations designs, social function designs and social problem designs (Reconstructionist designs).

Subject-centered Curriculum

The subject-centered curriculum organisation is traditional, and most schools organise their work near this pole on the continuum.

What is a subject? A particular stream of knowledge, otherwise known as subject discipline is shortly referred as 'subject'. The amount of knowledge in the world, relative to man's ability to handle it, has been tremendous. This knowledge being enormous has been classified into bodies or branches called 'subjects'. The subjects that are presented in the school are few, but these subjects are found to be fundamental to the learner, and help him with a basis to proceed further.

Assumptions of Subject- centered Curriculum

1. The acceptance of Jerome Bruner's contention that the child's cognitive functioning is essentially the same as the adult scholar differing chiefly in a matter of degree.
2. The belief that disciplines organised according to their structure would allow for the accommodation of the explosion of know- ledge.

3. The belief that the major role of the schools is to transmit the cultural heritage from generation to generation.

4. The belief that most significant parts of this cultural heritage can be grouped into 'subject- disciplines'.

5. The assumption that each subject has an internal order which can be presented in sequence from simple to complex. [Eg. After learning addition and subtraction in arithmetic, one may proceed to multiplication and division.

6. The assumption that this subject-centered organisation of curriculum will enable the student to develop the capacity to deal with the problems as he meets them.

7. The belief that the teacher-dominant teaching methods are superior to other methods adopting a democratic approach.

8. The belief that this pattern of curriculum organisation has stood the test of time and hence has a merit.

9. The belief that subject-centered curriculum organisation provides security for the teacher,

Learner and the parent because of its time- honoured status.

Important Features of Subject- centered Curriculum

1. Objectives: The objectives in a subject- centered curriculum are stated as 'expected learning outcomes' expressed in behavioural terms. Objectives serve as the basis for content selection in the curriculum process. Drill and memorization are emphasised to learn and remember the content.

2. Contents: The contents for different subjects in the curriculum are selected by a committee of experts and teachers and presented in well organised lessons. They usually contain facts, concepts, generalised principles, established processes and skills in the subject area. As the contents are well established truths, they are universally applicable.

3. Structure: Each subject is in its own 'compartment', with little genuine concern for things outside its walls. University scholars often talk about (and even attend) 'inter-disciplinary' meetings but, although, they may be willing to peep through windows in their walls, they seem seldom to conceive to breaking the walls down.

4.Instructional Materials: Text-books pre- pared by experts in accordance with the syllabus, serve as the commonly used learning materials. Generally, students prefer to follow the same text books which their teachers use.

5. Learning Activities: Learning activities are mostly verbal involving listening, reading, writing and reciting.

6. Grouping: Generally, teachers provide instruction in the class or large gathering.

7. Time and space: Time spent in the classroom is considered highly valuable. Instructional time is divided into units of 45 or 60 minutes called 'periods' and every subject is allotted specific periods in the instructional time-table.

8. Teaching Methods: Teacher is considered as an expert in the subject. Contents are presented through teacher-centered methods like lecture, discussion and demonstration

9.Evaluation: Evaluation is periodically attempted to assess students' mastery of the subject-content (academic achievement) through oral and verbal tests. Marks/grades are allotted to indicate the proficiency achieved.

Criticisms Against Subject- centered Curriculum

1. The constant accumulation of knowledge and the increasing tendency of schools to add more subjects to the curriculum, have resulted in eroding the confidence of the teacher in his ability to handle the newly added contents/ subjects. Further, to give attention to these different areas of study newly added in the curriculum, it becomes necessary to chop up the school day into short unrelated blocks of time.

2. As efforts are taken to increase the number of pupils attending the school, among the children of school-going age, the problems of individual differences have been accentuated. These differences make it untenable to have a common curriculum for all.

3. A basic tenet of the subject-centered approach is that learning the information presented will eventually transfers to life situations. Psychologists raise serious doubts upon the likelihood of such automatic transfer, especially when knowledge is broken up into discrete parts.

4. Subject emphasis fails to take into consideration the needs and interests of the learners, and, as psychology has shown, interest affects learning.

5. Over concern with the cultural heritage leads to the neglect of current social activities and problems. This may lead to educated people functioning with no social awareness and responsibility.
6. Concern with structure of disciplines tends to fragment the curriculum rather than integrate learning.
7. The prevailing methodology and the nature of the learning material, foster rote memorization rather than a process of critical thinking".

Learner-centered Curriculum

The most serious objection to the subject-centered curriculum is that organisation of knowledge into 'subjects' tend to set up barriers to the understanding of relationships and inter- relationships. A major reaction to the subject- centered curriculum was to swing to the other extreme of centering the programme on students rather than on subjects. In its extreme form, this idea held that education is life, and since life is changing, there could be no fixed curriculum. Under this interpretation curriculum organisation was easy because the curriculum is to be built (i.e. learning experiences are to be set) upon what the pupils are interested in and ensure the development of the whole personality of the child.

In Kelly's (1977) views, a child-centered education should take into account (i) the needs of the learner (ii) growth of the learner and (iii) interests of the learner.
John Dewey, the American educationist advocated child-centered education characterized by (i) providing meaningful learning experiences by allowing children to interact with the environment. (ii) educating children according to their stages of growth and development. (iii) teaching to suit the interests and abilities of children and (iv) providing adequate opportunities for children to socialize, inquire and experiment, construct and innovate.

As Nisbet says, the learner-centered curriculum puts emphasis on the maximum growth of the pupils. The concerns of the children are the basis for organising the children's school programme. With emotional involvement of the pupil in learning, the whole learning process would become more vivid and valuable.

The student-centered programme meets the criticisms against subject organisation. It is related to pupil interest, learners are active, activity is built around psychological problems rather than logical topics, the programme is flexible rather than rigid, democratic, rather than authoritarian and it cuts across subject lines.

Important Features of Learner-centered Curriculum

i) Structure: Student-centered curriculum cares more for the individual learners and development of their potentials. Importance is given for the inculcation of original thinking, practical skills and free expression of one's own ideas. Learning experiences are planned to promote personality development.

ii)) Objectives: In student-centered curriculum objectives are not planned in advance. They are formulated on the basis of the needs of students, their interest and developmental stage and as such they are highly flexible.

iii) Contents: Contents are selected based on student's needs, ability to learn, age, aptitude and previous experiences. Lessons are written using words familiar to the students. Rote learning is not encouraged; direct experiences are insisted to facilitate original thinking.

iv)Teaching and Learning: Time allotted for teaching gets reduced, as more time is allowed for self-learning. There is active interaction between the teacher and students which creates a good learning environment. Audio-visual materials and practical demonstrations are increasingly used in the classroom instruction. Students are encouraged to undertake projects, prepare assignments and learn by self-efforts.

v) Grouping of Learners: Students are organised into several learning groups based on their achievement in the subject and interests exhibited. One of the members of the group direct the activities. Students learn through group activities. Formation of groups will vary for different subjects.

vi) Time Schedule and Space: Time-table is flexible and is unlike that followed in subject-centered curriculum. Time is allotted depending upon the nature and difficulty level of the lesson. Learning may take place in different places like laboratory, library, workshop, gymnasium etc. in addition to the classroom. Whenever necessary, field trips and educational tours are organised. Such flexibility is not possible in a subject-centered curriculum.

vii) Role of the Teacher: In student-centered curriculum teacher is mainly a facilitator. The social distance between the teacher and students will decrease. Teacher will not hesitate to accept student's ideas.

viii) Evaluation: Apart from teacher's evaluation of students, there is provision for self-evaluation by the students themselves. Students are assessed for how they learn and not merely by what they have learnt and this approach encourage students to improve their learning techniques.

Limitations of Learner-centered Curriculum

1. Students at secondary level are not mature enough to know their future needs. Further, they may also exaggerate their abilities. A curriculum based on students' present needs and interests may not meet their future needs.
2. There is a danger that essential contents to be learnt and values requiring training may not find a place in student-centered curriculum.
3. The aspirations and needs of students may widely vary and as such developing and implementing student-centered curriculum is very difficult.
4. As the contents for a student-centered curriculum are organised on psychological basis and not in a logical sequence, they may lack continuity.
5. In subject-centered curriculum instructional materials and aids which are available in the market could be used; but in student-centered curriculum the subject teacher himself has to prepare them.
6. Teachers adopting student-centered curriculum need to have wider scholarship and better resourcefulness.

Problem-Centered Curriculum

A problem-centered curriculum has its philosophical roots in constructivism, whereby knowledge is built through students' active participation in the learning process. A problem- centered curriculum places learning in the context of real-world problems that make students to solve them (Hmelo-Silver, 2004). Problem-centered curriculum models take a "learner-centered approach that empowers learners to conduct research, integrate theory and practice, and apply knowledge and skills to develop a viable solution to a defined problem" (Savery, 2006).

"Problem-centered Curriculum" also known as "Community Based Curriculum", relates the contents to be learnt with the activities of day to day life and social problems. It was proposed by Florence Stratemeyer and her colleagues.

There are problems in the community set-up like gender discrimination, domestic violence, social injustice and oppression, social problems like language problem, communalism and casteism, current threats to national security by terrorists, challenges encountered like environmental pollution, population explosion, massive unemployment, spread of dreaded diseases, corruption and inflation etc. which have to be understood in the proper perspective. As these are related to their life, students are also interested in them. As such, problem-centred curriculum sets its contents around the significant activities of and problems of the society in which pupils live so as to prepare them to face the real life.

Noted Psychologist Stratemeyer has given a different meaning to life-centered education. She says three types of life situations are indispensable for life-centered curriculum. They are:

i) Those meant for the development of individual capacities

ii) Those meant for growth in social participation

iii)Those meant for growth in ability to face the challenges posed by the environment.

Individual development includes health. Improvement of knowledge, taking responsibilities and expressing aesthetic sense.

Social development involves cordial relationship with other members of the society, behaving groups as a good citizen, avoiding conflict among and promoting social harmony.

Salient Features of Problem- centered Curriculum

i) Structure: Curriculum is so structured as to enable the students to understand the various dimensions of life revolving around societal needs, problems encountered in the present social-set up, and present day threats.

ii) Objectives: Objectives are not decided before hand; they are formulated now and then, to meet the changing social needs of the community.

iii) **Content:** Contents are selected from day to day practices and social problems. Subjects of study, content of the syllabus and methods of elaborating them depend upon the social

needs. Contents are selected with a view to promote problem-solving skills, human relation skills and social skills.

iv) **Teaching and Learning** : Learning by doing, problem solving in a social context, group teaching and group work are given more emphasis in teaching and learning. Role of students will be significantly high in the teaching-learning process; all community resources will be exploited for learning. Teachers are more friendly with their students and act as good guides in the Project Method. Ability groups are formed on the basis of the needs of students and their interests. Time table is framed to suit the nature of the learning activities. Learning may take place in the school campus, social setting or social gatherings.

Role of the Teacher: In the Problem-centred curriculum transaction, the teacher is student's friend, facilitator of learning, and also director of the project. This curriculum necessitates better rapport between the teacher and students.

Evaluation: There will be evaluation by the teacher as well as self-evaluation by the students. In evaluating the students, efforts and activities undertaken by them to solve the problems will also be taken into account.

Merits of Problem-centred Curriculum

1. Facing problems with confidence, working with others with goodwill and co-operation, reviewing the social context objectively are some of the qualities promoted by Problem-centred curriculum.
2. This curriculum creates awareness about social unrests, natural calamities and social problems among students and also encourage them to find solutions for overcoming them.
3. Students can utilise their previous experiences and varied knowledge in developing solutions to problems.
4. As all curriculum components including the content are related to social situations, this curriculum is strong in its social relevance.

Limitations of Problem – centred Curriculum

1. There is no certainty that social problems of today will continue to exist in the future also.

2. In Problem-centred Curriculum, there is the danger of the history, cultural traits, uniqueness and social heritage of the nation being ignored.

3. Selecting appropriate subjects and contents to suit Problem - centred Curriculum is difficult

4. There is a general view that this curriculum is suitable for Social Science and not to General Science.

5. This curriculum could be implemented only by multitalented teachers, who are always in short supply.

Curriculum Alignment

Definition of Curriculum Alignment

Curriculum alignment is an academic term meaning that the state and local academic standards, educational programmes, instructional materials, teaching techniques and academic assessments all coordinate with one another within schools. Different components of curriculum alignment take place at the school, district and state levels. Schools and school districts implement curriculum alignment as part of an effort to improve student performance. Most school districts must provide their states with curriculum guides or other documentation to demonstrate how they are meeting the standards.

Forms of Curriculum Alignment

There are two main forms of curriculum alignment. A vertically aligned curriculum is scaffolded so that the information student's leam in a lower grade or a previous course prepares more horizontally them for more advanced grades and challenging work. A curriculum that is aligned means that the same material is being taught across different classrooms in a given grade level, and that the material being taught is in alignment with the learning standards and assessments established by the district or state Central and State agencies use curriculum alignment to standardize education for the purpose of improving academic achievement and educational quality. The alignment is also used to mitigate factors like race, gender and socio-economic levels that often cause disparity in academic performance.

UNIT –III

CURRICULUM DESIGN AND ORGANIZATION OF KNOWLEDGE

Definition and Components of Curriculum design – Sources of curriculum design – Design dimensions: Horizontal and vertical organization – Scope, Integration, and Sequence - Articulation, Balance and Continuity. Meaning of knowledge organization - Forms of knowledge included in school education - Basis of knowledge organizations - Agencies involved in organization of knowledge in schools.

Meaning, Definition and Components of Curriculum Design

Meaning of 'Curriculum Design'

Curriculum designing is the process, that involves steps usually followed to produce curricular plans and 'Curriculum Design' is the product that emerges as a result of that planning procedure. The process or procedure creates the end result, a document or plan for achieving the desirable changes in student behaviour. Curriculum design refers to the ways in which we position or arrange curriculum components viz.

- why do we initiate instruction (i.e. aims and objectives)
- What should we teach to realize our set aims and objectives (subject matter)
- How can we inter-connect the subject content with target learning experiences.
- What we have realized and what actions should we take accordingly in relation to the instructional programme, learners and teachers (i.e. evaluation).

Thus, curriculum design is that document which reveals how the components of the curriculum viz. (i) aims and objectives (ii) Subjects, (iii) Curricular and co-curricular activities, and (iv) evaluation are arranged or organised into a pattern or structure.

Definition of 'Curriculum Design'

Curriculum design is defined as the substance and organisation of goals and culture content so arranged as to reveal the potential progression through levels of schooling.

Hilda Taba defined curriculum design as "a statement of document which identifies the elements of the curriculum, states what their relationship are to each other, and indicate the principles of organization and the requirement of that organization for the administrative conditions under which it is to operate".

Johnson identified three notions of curriculum design as

a) An arrangement of selected and ordered learning outcomes intended to be achieved through instruction.

b) An arrangement of selected and ordered learning experiences to be provided in an instructional situation.

c) A scheme for planning and providing learning experiences.

However one may conceptualize curriculum design, it is the design characteristics that make one curriculum like or different from another.

Components of Curriculum Design

All curriculum designs involve four elements or components. They are (i) Aims and objectives (ii) Content (subject matters), (iii) Learning experiences and (iv) Evaluation.

Some curriculum designers include 'Needs of the learner and his society' also as a component of the curriculum. In fact, from the needs of the learner and society only, aims and objectives c an instructional programme are derived. Hence some argue, that there is no need to include it as a separate component.

These five components are inter-related and interacting with each other. The structure of the curriculum, hence could be compared to any system such as the human body which consists of many sub-systems like respiratory, circulatory, nervous, muscular, excretory, reproductive etc. Any alteration in one component of the system (sub-system), brings changes in the functioning of the other components or sub-systems

The structure of the curriculum with it's inter- related and interactive elements, could be presented diagrammatically as follows. Needs of the Learner and his Society

1. Needs of Learner and his society

Curriculum should address the needs and aspirations of the students. It should also try to usher in a silent social revolution to bring out a new social order. Thus curriculum has to show concern for both the needs of the individual and the society.

2. Aims and Objectives

Aims and objectives are statements, focusing the goals to be achieved in the light of the needs of the learner and the society. They form the basis for selecting the contents of the curriculum as well as the nature of the learning experiences to be provided.

3. Content or Subject-matter

This refers to facts, concepts, principles etc. selected for developing knowledge, skills and values among the students. Contents are carefully chosen so as to fulfil the needs of the learners and the demands of the society. Contents of the curriculum are instrumental in achieving its aims and objectives. Text books and reference books are the usual sources, which amplify the subject- matter prescribed for any course of study.

4. Teaching-Learning Methods

The techniques and strategies adopted by a teacher to reach out the subject-matter / content to his students constitute the teaching method. Teaching methods are chosen, keeping in mind the nature of the content to be presented and the objectives to be achieved. For example, to impart training in 'Typing' (either in a typewriter or computer), neither demonstration nor lecture method of teaching will be of any use; instead learning through hands-on training will be the best instructional technique. Instructional techniques, in turn determine the method of evaluating learning outcomes.

5. Evaluation

Evaluation measures the learning outcomes of the learner in terms of proposed objectives. It also indirectly assesses the efficiency of the instructional methods and the relevance of the content employed. Thus, evaluation provides feedback to the teacher regarding student's learning, teaching method employed and the content used to develop learning experiences so that the teacher can initiate necessary modifications while taking up further instructional activities.

Sources of Curriculum Design

There are five sources of curriculum design. The first one is science. As a source, it ensures the usage of the scientific method. Elements that are included can be observed and quantified. The skill of problem-solving is prioritized due to the reflection of cognitive psychology. For example, considering science as a source can focus teaching students how to deal with reality in which knowledge increases extremely quickly.

The second source is society. As a source, it ensures that education will be based on current social situation. It appears as agent of society that serves social interests. It is critical to emphasize economic and political contexts as well. Moreover students'

background should be considered. For example, diversity can be emphasized through the tasks, which discuss people of various nationalities with different economic conditions.

The third source is the moral doctrine. As a rule, professionals refer to the great thinkers of the past to support their focus on content underlying that some things are of great importance than others. The reference can be made to religious texts, according to which morals and values are determined. However, the designer's values and personal morality can also be discussed in the frame work instead of or along with spiritual sources. A great example is the existence of denomination education institutions. They provide students with general knowledge just like all other establishments but also focus on religion in addition to that.

The fourth source is Knowledge. As it is critical in the frame work of education to provide students with knowledge and skills, this source is often considered to be among the main ones. When dealing with, professionals do their best to define what knowledge is the most essential for students so that they can obtain the most critical information. This point is essentially significant when dealing with some disciplines because they have their specific structure and method that is used to extend their boundaries. For example, physics refers to the exact science, and it is to be approached step by step, while environment studies can be adapted to the specific interest.

Thus, the disciplinary knowledge presupposes unique approaches that can not be substituted or inverted, while non-disciplinary knowledge allows dealing with a wide variety of approaches different training techniques.

Finally, the learner can be treated as a source. In this situation, it is significant to find out information about students as much as possible, because it will be used to design the curriculum. This approach was developed based on the psychological foundations that refer to cognitive research and reveal the great importance of "learning by doing". For example, professionals should identify the interests of their learners as well as their background to adapt to the curriculum.

Design Dimensions

Curriculum design can be equated with curriculum organization for it is defined as "the arrangement of elements into a substantive whole". This definition assumes that the curriculum developer has already thought of or perhaps formulated, the curricular aims,

goals, and objectives, and selected the appropriate curriculum content, learning experiences and evaluation procedures. The organisation of these components of curriculum into a coherent, meaningful, Curriculum plan is termed as curriculum design. Designing a curriculum involves two major dimensions viz Vertical organization and Horizontal organization.

Vertical Organisation

Vertical organisation refers to the longitudinal arrangement of content as reflected in the presence of sequence, continuity and articulation (also referred as vertical integration) in the curriculum.

Sequence refers to the vertical arrangement of the curriculum content (including the skills and process) such that new learning is based on previous learning. Proper sequencing of learning experiences (e.g. learner's interaction with content or engagement in skill building activities) entails analysis of what contents, skills or processes are prerequisite for the next. Decisions regarding vertical sequencing of the content are based on the following considerations:

- Logical structure of the course / field of study; Chronological learning;
- Psychological principles of learning;
- Learners' interests, needs;
- Analysis of how people use knowledge in their work or social functions.

Vertical integration (also called articulation) refers to the arrangement of the curriculum in such a way that relationship among topics in a given field of study or subject, across grade/year levels are emphasized. If vertical organisation is present in the curriculum, unnecessary repetition of content and gaps in knowledge can be avoided.

For example Grade II English teachers can confer with English teachers in Grade I and Grade III levels, to find out where Grade II English should start and end. This activity will enable these three groups of teachers to know each other's expectations as to pre-entry and terminal knowledge and skills of pupils of English on those educational levels.

Horizontal Organisation

Horizontal organization is the arrangement of topics, themes, or courses offered at the same point in time. (i.e. same grade or year level, or same semester / trimester). Horizontal organization is concerned with the scope and horizontal integration.

Scope refers to the boundaries or coverage of the curriculum in terms of breadth and depth. It answers questions like "What topics, themes, ideas, concepts, principles, theories, and other forms of knowledge (subject matter) as well as skills, competencies, and activities should be covered in each grade level?"

The vital problem with respect to scope of the content is the choice between 'breadth without depth' or 'depth without breadth'. One solution to this problem is to minimize the teaching of knowledge domain (who, when, what, where, how), in favour of thinking processess (why). This will allow for both breadth and depth in the curriculum.

Horizontal integration refers to the arrangement of content based on the relatedness of topics, themes, skills or processes in two or more subjects/courses in the same grade year, semester, or trimester.

Horizontal integration is accomplished by integrating separate subjects that are related (e.g. arithmetic, geometry, statistics and algebra in Mathematics I, II, III and IV under new secondary curriculum). Another approach is the planning of a lesson or a mini-course which integrates related concepts, principles, or themes from two or more subjects. For example, Global or Peace Education can be a mini-course that integrates lessons in science, mathematics, history and politics.

Curriculum Dimensions

Six curriculum dimensions are to be taken into consideration during the process of designing the curriculum. They are: (i) Scope (ii) Sequence (iii) Integration (iv) Articulation (v) Balance and (vi) Continuity.

Let us discuss each one of these dimensions in brief.

Scope

Scope refers to the "what" of the curriculum viz. subject matter and their width and depth. From this is derived the syllabi of various subjects. Syllabus of each subject spells out and limits the area of subject matter to be taught. Thus 'scope' of the curriculum reveals the main topics and activities that are included in each subject of the curriculum.

Sequence

Sequence refers to the "when" of the curriculum components, indicating what shall precede what, and what shall follow what. Curriculum components are sequentially arranged keeping in mind the principles of learning. In subjects like mathematics and grammar, logical sequence is given importance; in humanities and general sciences, psychological needs of students take precedence. For example, the four fundamentals in Arithmetic viz. addition, subtraction, multiplication and division, should be taught before proceeding teach fractions, averages, area, circumference etc. Nature and difficulty level of the subject learner's development stage are the psychological considerations in organizing the curriculum. Thus sequence indicates the order of the knowledge (subject content) presented in the subject curriculum.

Integration

The integration of the curriculum is a collaboration of both knowledge and experience. Theoretical concepts are to be integrated with practical applications in day-to-life. Practical works that are to be undertaken under each topic of the content area are to be spelt out clearly. Reference to previously learned information improves learners' understanding.

Articulation

The articulation of the curriculum is more extended than its integrations. Articulation refers to the relationship that exists among the different parts of the curriculum structure, at the particular standard or grade. This is synonymous with "Horizontal relationship or Concurrent relationship"

Types of Horizontal Relationships

Articulation situations in the school-setting are of three kinds. They are:

a) Arranging the contents chosen for the curriculum in different subject heads and that too adhering to the principle of correlation. That is to follow the interdisciplinary approach in arranging the concepts selected for the curriculum.

Illustrations :

i) While framing the syllabus, the geographical features of Tamilnadu and its resources may be included in Geography and the history of Tamilnadu in History.

ii) In teaching languages, comparisons may be made between verses of poet Kamban (Tamil) and extracts from 'Miltan's Paradise Lost' by including them in the curriculum of Std. X.

iii) Some topics are found both in physics and chemistry (eg. Atomic Structure) syllabus to be studied in the same year.

b) Integrating theoretical concepts with applications in day-to-day life. Practical applications in day –to –day life

c) Relating the teaching points with local community experiences.

Examples:

i) Visiting the nearby bird sanctuary while teaching about birds.

ii) Visiting a nearby museum while teaching about ancient civilizations.

iii) Meeting villagers residing in a remote place to find out their living conditions while teaching about economic development.

Thus, inter-disciplinary approach in teaching topics in different subjects, integrating theory with practical applications in life and relating the lessons with community life are the three ways of ensuring 'Horizontal Relationships'

Continuity

It refers to another kind of correlation in the curriculum. While articulation or horizontal correlation refers to the relationship among the contents in different subjects at a particular standard or grade, 'continuity' or vertical correlation refers to the sequencing of contents across the grades or classes. In other words, contents in a higher class are strengthened by relating them with those in the immediately lower class.

For example, what is learned in science in the 9th standard may be related to what should be learned in science in the 10th standard and this is called 'vertical organisation of contents' so as to maintain continuity.

'Articulation' and 'Continuity' are mutually related and the former is referred to as 'Horizontal articulation' and the latter as 'Vertical articulation'.

In the vertical organization of curriculum, contents are sequenced from simple to complex. The level of difficulty or complexity of contents increases with the grades or standards. Any omission of contents or bad teaching in the previous year will create difficulty in understanding contents in the successive years. 3:04:6

Balance

Balance refers to assigning importance to the different components of the curriculum, in terms of allotment of time or credits to be scored by pupils. Too much time should not be allotted to one subject of study or activity in the curriculum at the expense f other subjects or programmes. Sometimes of opposing forces have to be considered, for e.g., "should the emphasis be on the subject or on the child? It is not a case of either or, but of deciding what is the most effective balance point between these two views. In the phrase 'proper balance' proper is a value judgment and springs from one's philosophy.

A balanced curriculum implies structure and order in its scope and sequence, leading to the achievement of educational objectives.

The problem of balance has the following two dimensions:

i) Structure of the Curriculum

Balance is sought in the curriculum provided by the school subjects and programmes of studies offered, time allotment for various subjects and activities, the use of books and other aids, the respective amounts of general and specialised education to be offered etc.

ii) Inclusion of the Components of Curriculum that make impact on every Pupil

The second dimension involves that part of the curriculum actually experienced by each pupil; balance attained in the individual pupil's curriculum is indicated by the optimum level of competence achieved by the pupil in each area of his curriculum. If the curriculum is inflexible, the pupils will suffer from curriculum impoverishment and imbalance.

Meaning of Knowledge Organisation

Knowledge organization' or 'Content organization' refers to the orderly and meaningful sequencing of the subject-matter facilitating pupils' easy learning and teachers' effective presentation.

Forms of Knowledge Included in school Education

There is different classification of Knowledge into 'Forms of Knowledge'. One such classification categorizes knowledge into two forms: (i) Disciplinary Knowledge (ii) Non-disciplinary or specific area knowledge. Depending upon the ways of acquiring, knowledge

takes different forms such as (1) Sensory Knowledge (ii) Experiential Know- ledge (iii) Demonstrative Knowledge (iv) Logical Knowledge (v) Intuitive Knowledge (vi) Revealed Knowledge and (vii) Digital Knowledge. Anderson talks about four forms of knowledge viz. (i) Personal Know-ledge (ii) Conceptual Knowledge (iii) Proce- dural Knowledge and (iv) Metacognitive Knowledge.

However, when we consider forms of Knowledge to be included in school education, the most relevant classification of Knowledge into forms is the one advanced by Hirst P.H. (School Education and the Nature of Knowledge, 1974). Hirst argued that there are seven distinct forms of knowledge, each with its own unique concepts, distinctive logical structure, testability against experience and unique methods of testing. These seven forms of knowledge are:

i) Mathematics
ii) Physical Sciences
iii) Biological Sciences
iv) Social Sciences / Human Sciences
v) Language and Literature
vi) Fine Arts and Crafts
vii) Philosophy and Moral Knowledge

Hirst, searched for content for a liberal education in the context of how to find an education that is not grounded soley in the values that reflect the interests of some minority group. Thus, he says, 'arises the demand for an education whose definition and justification are based on the nature and significance of knowledge itself, and not on the predilections of pupils, the demands of the society, or the whims of politicians.

Hirst was criticized for including 'Philosophy and Moral Knowledge' and 'Language and Literature' as they give room for manipulation of beliefs and indoctrination. Hirst himself dropped philosophy and moral Knowledge' from the list of knowledge to be included in school forms education; but was firm on the inclusion of and literature' as it is essential for any language one to get access to different cultural perspectives and acquire communicative abilities. So at present we have the following forms of knowledge included in school education, in most countries of the world

i)Mathematics

ii) Physical Sciences (Physics, Chemistry, Geology etc.)

iii) Biological Sciences (Botany, Zoology etc.)

iv) Social Sciences (History, Geography, Civics etc.)

v) Language (Including mother tongue) and Literature

vi) Arts and Crafts

Basis of Knowledge Organisation

Curriculum indicates the subjects to be learnt, describing each subject in terms of lessons and topics included in it. The curriculum is amplified by Of a detailed syllabus for each subject, indicating the content elements or topics described in terms concepts and principles, practical work to be undertaken and time allotment for each component of the course work. Experts in writing textbooks and experienced teachers, then start preparing text books, meticulously following the syllabus, which get published after the scrutiny of an expert panel.

There are some techniques to arrange the content elements in the syllabus sequentially, of which the following are important.

1. Logical organization
2. Psychological organization
3. Concentric organization
4. Spiral organization
5. Modular organization

Logical Organisation

Each one of the content elements in the syllabus is first examined to judge its nature based upon the difficulty to learn and its relatedness with other content elements. Then all the content elements are sequentially arranged in a logical order, taking into account the nature of each of the content elements. Teacher's experience and proficiency in the subject, play a great role in judging the nature of the content elements in the syllabus and thereupon sequencing them in a proper order. That is why this method is called 'Logical Organisation' of the curriculum content. In logically sequencing the content, the following principles are kept in mind.

1. Proceeding from the known to the unknown.
2. Proceeding from the simple to the complex.
3. Proceeding from the easy to the difficult.
4. Proceeding from the concrete to the abstract.
5. Proceeding from definite to indefinite.
6. Proceeding from sensory experiences to cognitive level.
7. Proceeding from the whole to its parts.
8. Proceeding from analysis to synthesis.
9. Providing scope for both induction and deduction.
10. Introducing new concepts gradually.

Psychological Organization

This approach gives importance to sequencing age the contents/knowledge in accordance with human developmental stages. Hurlock has listed developmental tasks of children to several groups which could be taken as the basis for arranging the curriculum content sequentially. Jean Piaget, the popular developmental psychologist has stressed the need to provide education according to the stages of cognitive development of children. He has identified the following four stages of cognitive development in children.

i) Sensory-motor Stage (0 to 2 years)

During this stage, lasting from birth to 2 years of age, cognitive development takes place in children through self acquired experiences by manipulating the simple things in their neighbour- hood. To a toddler, learning experiences should be provided through songs and games helping to understand the environment.

ii) Pre-operational Stage (2 to 7 years)

The child from the age of two to seven, learns not only from sensory stimuli but also from previously learnt things, their images and incidents. Though there may be language development, words are understood in the background of their special needs and uses. Children of this stage need training to understand the correct meaning of words. They may attend pre-primary or primary schools. Activity-based learning is best suited for this stage. Even concrete objects have to be described and stories told in simple language.

iii) Concrete Operational Stage (7 to 11 years)

During this stage lasting from 7 to 11 years, children learn to think on the basis of perceptual experiences also, apart from sensory experiences. But they cannot go beyond the experiences received by them. For these middle school children, teaching materials should be used to make them provide direct experiences, by using pictures, models and demonstrations.

iv) Formal Operational Stage (11 to 15 years)

Children at this stage are young adolescents. They are capable of thinking without sensory stimulation and even in the absence of personal experiences. They can understand the ideas: experiences of others with the help of language So, the content in the curriculum should for concept learning.

Thus, the sequencing of the content according to the developmental stages of children is known as psychological organization of the curriculum.

Concentric Organization

In this method several essential topics may find a place in the curriculum in every standard and grade level. As the student goes to higher standards, other sub-topics or related topics of same subject, will be dealt with extensively and critically and the subject matter will become wider and deeper.

Example :

VI Grade: Sources of water

VII Grade: Properties of water

VIII Grade: Molecular formula of water, purification of water

IX Grade: Hardness of water, types of hardness and methods of removing hardness from water.

X Grade: Reaction of water with metals and non-metals

Spiral Plan

This method is like a spring. In some buildings with several stories, to save space, people use stair case which looks like an elongated spring. This method maintains continuity with the subject matter studied in lower grades; whereas in the concentric plan,

the same topic will rarely be repeated. As a student goes to higher standards, the information provided will be more detailed and the approach of presentation will also be varied.

Example:Subject:History / Social Science

Topic: Indian History

Primary Level

Stories of great heroes of India (Asoka, Harsha, Akbar, Rajaraja and others)

Secondary level

Vedic Age, Sangam Age, Mauryas, Pallavas, Later Cholas, Advent of East India Company rule and other topics.

Higher Secondary Level (Optional Subject)

Freedom Struggle - Political Leaders and Social Reformers India's achievements since independence.

In concentric plan, pupils might have studied separate sub units like Pallava Kings; Pallava sculptures etc. in the spiral plan, continuity with the previous sub-units will be maintained. Thus pupils may study "pallava rule in South India" which would include the previously learnt sub-units like Mahendra pallava, Narasimha pallava, Pallava sculptures etc

Advantages of Spiral Curriculum

1. Contents learnt in the previous year get integrated with those learnt in subsequent years.
2. Contents of the subject learnt become deeper with the increase in age of the learners.
3. Starting with basic concepts, the content grows complex with the gradual addition of new ideas.
4. The scope of the subject gets spread over a number of years
5. This type of curriculum organization is preferred for heterogeneous classes

Modular Organisation

Modular instruction is widely used in Distance Education Programmes. A module presents central idea which is elaborated to suit the learner's needs. It may have several sub-divisions called capsules. A module uses a language style to create the feeling among

the learners as if they are e being addressed by the teacher. It gives suitable illustrations, recall questions as part of the lesson and diagrams wherever necessary. The structure of a module is different from that of a lesson in a text book.

Structure of a module

- Overview
- Instructional Objectives
- Learning Activities (Content) - (Sub-headings, printing technical terms in bold letters,' your progress' questions at the end of each sub-topic with space for writing the answers, providing key points in 'boxes' etc.)
- Review
- Enrichment Activities
- Suggestions for further reading

Modules help the students to learn at their own pace, place and time. The same module may be useful to students enrolled in similar courses.

Agencies and Agents Involved in Organisation of Knowledge in Schools

When curriculum for a course is prepared for the first time, educationists and educational experts in curriculum designing play a significant role. However, many agencies of curriculum development take part in the exercise of improving the curriculum through periodical revisions, of which the role of individuals like teachers, headmasters and administrators of the State Education Department as well as organizations such as NCERT and SCERT are noteworthy at the school education level.

Role of N.C.E.R.T. in Curriculum Development

The National Council of Educational Research and Training is an autonomous body functioning from New Delhi as its headquarters. I was founded on 1st September 1961, through an act of Indian Parliament. The Union Education Minister is its president. A full-time director is selected on contract-basis by the Ministry of Human Resource Development, to coordinate, control and administer its day-to-day activities. This body is more an academic one rather than administrative. It has several departments to look after different aspects of education. The plans and programmes of NCERT are implemented through its branch offices located, one in each state capital under the leadership of a 'Field Officer'.

NCERT is conducting various teacher education programmes in its four Regional Institute of Education (RIES, formerly known as Institutes Regional Colleges of Education) located at Mysore, Bhuvaneshwar, Bhopal and Ajmer.

RIES offer a four year integrated teacher education programme like B.Sc.Ed., B.A.Ed., and B.Com.Ed., for those who have completed 12 years of schooling in general education and a two year course for graduates. RIES at Mysore and Bhuvaneshwar also offer post-graduate courses in teacher education like M.Sc.Ed., M.A.Ed., and M.Com.Ed. At present RIES concentrate on research and extension work in primary education and schemes like 'Sarva Siksha Abiyan'.

Functions of Curriculum Development Cell

One of the departments of NCERT is the Curriculum Development Cell (CDC), which takes up the responsibility of developing curriculum in different subjects, at different levels. The important functions of CDC are:

1. To study the school curriculum recommends now and then the needed modifications.
2. To produce and distribute quality text books, guide books and instructional materials to help teachers in the implementation of the curriculum (for different subjects, at different levels of school education conforming to the C.B.S.E. curriculum).
3. To organise curriculum related seminars and workshops at different places across the country.
4. It encourages action research projects of teachers in different areas of school education and the best projects selected are awarded cash prizes and other kinds of recognition.
5. The research findings, obtained in relation to curricular practices are disseminated among the teachers across the country through research journals published by the N.C.E.R.T.
6. The field advisers placed in different regions of the country helps the NCERT in the implementation of its curriculum.
7. Publishes reports, pamphlets and bulletins.

Role of S.C.E.R.T. in Curriculum Development

The State Council of Educational Research and Training (SCERT) attends to various wholesome programmes of school education at the state level. In 1965, the State Governments established the State Institute of Education in their respective states, for the same purpose and on the pattern of NCERT. Later on in 1970, some states (including Tamilnadu) have expanded and upgraded their State Institute of Education as State Council of Educational Research and Training, being the additional wing of the Directorate of School Education. In 1990, the Government of Tamilnadu created the Directorate of Teacher Education, Research and Training (DTERT) with a separate director to look after its functions. Its important functions are:

- To undertake Action Research Projects at the school education level.
- To provide in service education for primary and secondary school teachers and also for lecturers working in Teacher Training Institutes regarding new approaches to teaching.
- To undertake regular educational extension, work at the state level.
- To prepare quality textbooks, guidebooks and other instructional materials including the development of question banks.
- To monitor and coordinate the functioning of the DIETS.
- To take the responsibility of carrying out the different projects of the State and Central Governments, related to providing universal primary education (eg. Sarva Siksha Abiyan.

Role of Teachers as Agents of Curriculum Development

As day-to-day practioners in the field of education, teachers have a very crucial role to play in curriculum improvement. As they are working in close proximity of pupils, directing and guiding them in the process of curriculum transaction, they are in a better position to judge the working of the curriculum. Their judgment about the educational objectives, selection of content, organization of content and evolutional techniques will help to reduce the gap between theory and practice. But unfortunately, in our country, the participation of teachers is not significant in the process of curriculum development. We should not forget the fact that it is teachers who are ultimately responsible for successfully implementing the curriculum in the classroom. Without their participation and

co-operation, no curriculum however efficient it may be, can bring the desired results and prove to be effective.

Reasons for considering Teachers' Role as very Important

i) It is teachers who move closely and interact with students in the curriculum transaction process. Efficient teachers not only take efforts to provide quality instructional experiences in the classroom, but pass on their ideas to fellow-teachers. This kind of interaction among teachers proves to be more effective than administrative directives received from the higher-ups to improve the quality of school education.

ii) If any of the improved programme is to be based upon the needs of the learners, teachers are in a better position to provide the inputs for the same as they are familiar with these needs. Further they will help in the easy implementation of the programme

iii) Teachers vary in expertise. By utilizing the services of teaching with diverse backgrounds, curriculum planning could be made broad based in its perspective and in-depth in analysis.

iv) Decisions in curriculum-making are value judgments only. These judgments can be formulated better by the teachers who are considered as knowledgeable representatives of the community.

Therefore it is utmost important to ensure the active participation of teachers in the process of curriculum development.

Ways and Means of Involving Teachers in Curriculum Development

There are a variety of ways through which teachers can influence curriculum development. They are of three categories (i.e., general, classroom and professional).

General Ways

1. Teachers can become members of committees to study curriculum and thereby give their ideas.
2. When membership is on the basis of specialization, teachers with different subjects of specialization will contribute more valuable ideas.
3. Teachers exchange ideas and materials with other teachers and experts. This leads to professional growth of teachers.

4. Teachers can act as communication agents for the school and create better understanding between the public and the school.
5. Teachers can represent their schools at conferences. They can bring back those ideas discussed in the conferences to experiment them in their schools.

Teachers' Classroom Activities

- A fundamental responsibility of the teacher is to know his students well. This will enable him to identify the problems of individual students since personality in every student.
- Many curriculum experts feel that exploration at the classroom level is basic to the development of a curriculum. The study at the class- room level will provide opportunity for the discovery of new ideas and other possibilities. On the contrary experts sitting in air conditioned rooms and discussing about the possibilities of curriculum change is an 'ivory- tower approach' that simply ignores the ground realities.
- Teachers can help to evaluate new programmes by observing how they work with students. This will help to study effectively the curriculum objectives, materials and activities.
- Teachers can carry on action research on important topics that confront the teaching- learning process.
- Teachers who have gained significant experience in teaching a particular subject for a good number of years can be asked to contribute to curriculum study as consultants.

Activities Related to Responsibilities of a Different Teacher

It is well-known that self-improvement teachers will have an impact upon the classroom situation. In a democratic society a teacher has to develop a better personal philosophy of education. The modern curriculum believes in democracy. Accordingly, the teachers in charge of modern education should have democratic attitudes. The important functions of a teacher in the modern system of education are given below.

1. Director of Student-learning

The teacher has to serve as an essential agent of providing necessary information to pupils. The pupil's learning is related to information gained from the teacher. The teacher is often regarded as a sort of a live textbook. He must be able to explain and interpret different aspects of the subject. Sometimes the teacher encourages the pupils to question and tries to clarify all their doubts. The of this work expects every teacher to be nature thorough with the subject-matter. He has to consult a number of reference books and keep himself abreast with the latest developments in the field of his subject specialization.

2. Evaluation of Students' Proficiency in Learning

The teacher has to assess the learning of every pupil in the class. He has to estimate the degree of individual growth achieved by every student with reference to the objectives. As the concept of evaluation believes in continuous assessment, the teacher must have the ability to make use of different types of evaluation tools during the course of the year. He must also have the knowledge of different kinds of objectives with reference to the Taxonomy of Educational Objectives in the cognitive field developed by B.S. Bloom and several others. Apart from the objectives pertaining to the cognitive field, the teacher must also have the knowledge of skills and motor abilities. Then only he can undertake objective based teaching and evaluation.

3. Disciplinarian

The teacher has to function as a disciplinarian both inside and outside the class. He has to maintain perfect control in the classroom. Similarly, he has to maintain law and order in all group situations relating to the co-curricular activities. The important factor to be remembered in this connection is that the teacher has to be democratic in all his approaches of maintaining discipline as well as effecting different aspects of the curriculum.

The teacher required for the modern curriculum should not be autocratic by nature. He has to gain the good will of every student by his democratic approach. His success in maintaining classroom discipline should not be achieved at the expense of democratic principles. Guidance and counselling the teacher has to function as a guide, friend and philosopher. He has to work as a personal counsellor for every student in the class. He is responsible for the welfare of everyone in the classroom.

4. Guidance and counseling

The teacher has to function as a guide, friend and philosopher. He has to work as a personal counselor for every student in the class. He is responsible for the welfare of everyone in the classroom

The teacher must gain the confidence of pupils by his love and affection. If the students are afraid of him, there will be no scope for them to get any benefit out of the teacher. It is only when there is good rapport and friendly relations between the teacher and the taught, the teacher can influence the lives of the pupils. The teacher has to understand every student, his merits and demerits, assets and liabilities. Then only he can provide guidance and counselling to the pupils. Guidance and counselling service is essential to remove the maladjustments of the pupils. Guidance also helps in providing suitable vocational choices to the students; it finally helps them to have success in their careers.

5. Liaison between the School and Parents

The teachers have to function as a liaison between home and the school. The modern trends in psychology expect every teacher to have personal contact with his pupils. Then only it will be possible for the teacher to prepare assessment reports like Cumulative Records. For this purpose, the teacher should also establish contact with the parents. He has to organise Parent-Teacher Association meetings. He has to remove the guit between home and the school. The teacher has also to function as Liaison Officer between the school and the community.

To discharge the above functions, the teacher needs adequate training and preparation. The training alone will not equip the teacher with all the requisite skills. It shows the way only. The teacher has to acquaint all the skills required for the profession by his hard work and perseverance.

The above discussion shows that curriculum is a document describing subject contents, aims, Instructional activities and learning situations. Its quality and practical utility depend upon the teachers who put it into practice. Though the same curriculum is prescribed for all schools in the state for a particular class/grade, the actual curricular experiences undergone by the students differ from school to school. The major reason for this is that the functional efficiency of the curriculum largely depends on the nature and

professional skills of the teachers who put it into use as a tool to educate the pupils, under his care.

Curriculum and the Headmaster

All curriculum activity must come to the school campus and its individual classrooms for which the prime mover is the school headmaster. The role of the headmaster in implementing the curriculum is no less important than that of teachers. The headmaster has to function both as a teacher and as an administrator. The well-being or ill-being of any school depends on the personality of the headmaster. Good headmaster makes good schools and good schools produce good headmasters.

Although it is true that in small schools, the headmaster also teaches, in most cases the headmaster has no such regular instructional responsibilities. He is the administrative head of the school, and as such is in a "make or break" position. His indifference can dampen enthusiasm of teachers and pupils in the school. His opposition can stifle experimentation. His energy can stimulate the teaching faculty and make the school atmosphere vibrant with activities. He is the invisible force that activates everything in the school campus. In the classroom or away from it, he is the tone-setter for his school, the strategic centre for curriculum improvement. He is also pace- setter for curriculum implementation.

The following are the important functions of the headmaster with respect to the implementation of curriculum in the school:

i) Introducing the revised curriculum in the school and arranging for staff-orientation to put the new curriculum into action effectively.

ii) Taking efforts to provide all the facilities required for the effective implementation of the different aspects of the curriculum with the true spirit.

iii) Apart from getting the co-operation of the school management to procure the essential infrastructural and instructional resources for implementing the curriculum, he should plan for making use of the available community resources, (both physical and human)

iv) Encouraging the staff to participate in curriculum related seminars and workshops, in addition to taking efforts to arrange for such events in his own school as the venue.

v) By enlisting the co-operation and help of the officers of the state education department, Govt. officials and educational experts, arrangements can be made for staff improvement programmes like 'Refresher courses. Reorientation Training Programmes', 'Inservice Programmes etc.

vi) Democratic leadership calls for considerable amount of skill in social engineering. There will be teachers not trying any academic experiment or innovative curricular practice In a sense, they are 'have-nots'. The head- master should induce them to participate in workshops or conferences.

vii) The maintenance of good relations with community and teachers depends on the resourcefulness of the headmaster. He should try to generate adequate financial resources from the P.T.A., alumni association of the school, philanthropists in community etc. so that no curricular programme will suffer from paucity of funds.

viii) As a 'gate-keeper', the headmaster can and should be aware of all events in the school. By making available the latest books and literature, research journals, text books. Reference books, reports of education commissions and committees in the school library, he can make his staff become aware of the latest trends in education.

ix) Headmaster is the one who brings the ideas tried elsewhere to the notice of his faculty members and provides a means of security and moral support to adopt them.

x) Though the headmaster is the ultimate person to take various decisions with respect to the implementation of the curriculum, he should hear the views of all sections. The principle of co-operation recognizes that young people too have ideas, that their suggestions may be valuable to both planning and operation.

xi) The parents and the public should be informed of all the changes in the curriculum that may be operationalised because changes will sometimes involve risks. To be informed of the changes and risks, the public should be included in the planning sessions. To put it in a nutshell, the headmaster curriculum leader

has many roles - (ii) facilitator (iii) coordinator and (iv) an expert in human relations. The role of the headmaster quite challenging and an exalting one.

Role of School Administrator Curriculum Development

To a great extent the administrator's role is that of expeditor. Curriculum study takes time, energy, people, materials and funds. The administrator is in a key position to facilitate in the following ways.

1. He should provide time and space for teachers to meet and study.
2. The administrator should know which people could make good consultants and arrange such people to meet in groups.
3. The administrator can set up staff development programmes, special workshops and study groups.
4. Arrangements should be made for teachers to attend conferences, institutes and Conventions or to visit other schools. Often journals, reports and pamphlets come across the administrator's desk that teachers may never know about. The administrator should establish the practice of channeling items of interest to teachers.
5. He should keep himself up-to-date on educational ideas and programmes.

6. In setting the tone for relationship in the school, the administrator functions as a social engineer. In this role, he can do a number of things. (1) A supporting attitude on the part of the administrator will tend to release the creative energy of the teachers. He should see that the qualified staff members are given positions of leadership in the curricular programmes. (2) The administrator must know and understand the personality traits of teachers so that they become effective members of curriculum study teams. (3) The administrator will take steps to initiate interest and action among the faculty. A good administrator must be a good listener. He must not turn a deaf ear to representations made for change because he is unwilling to involve himself. (4) The administrator should arrange for periodical evaluation of the school. (5) The administrator should orient new teachers who joined the school to the school's philosophy, procedures and programmes.

UNIT-IV

CURRICULUM DEVELOPMENT AND IMPLEMENTATION

Phases of Curriculum Development process – Models of Curriculum Development: Tyler's curriculum Inquiry Model, Taba's Grassroots Rationale Model and Saylor and Alexander's Planning process Model. Curriculum Implementation Models: ORC Model and LOC Model.

Phases of Curriculum Development Process

Curriculum development is a dynamic and continuous process involving four stages or phases viz.

1. Curriculum Construction,
2. Implementation of curriculum developed,
3. Evaluation
4. Improvement.

Tasks involved in the First Phase of Curriculum Development Process viz. Curriculum Construction

The following four tasks are involved in curriculum construction phase:

- Formulating the goals and objectives of the curriculum.
- Selecting relevant learning experiences that are to be provided for the attainment of selected objectives.
- Selecting suitable subject contents in relation to the learning experiences to be provided.
- Organizing and integrating the learning experiences and subject contents to form the curriculum design.

Let us briefly discuss each one of the above tasks.

Formulation of Objectives

In the view of Ralph Tylor, curriculum objectives refer to instructional objectives curriculum planner begins his work by formulating the curriculum goals. Aims serve as milestones to reach the goals. Aims or general objectives are derived from the following three sources:

- Subject matter (from the world of knowledge)
- Needs of the learner.
- Needs of the society

After finalizing the aims or general objectives, they are to be filtered through two screens.

a) Philosophy of the institution.

b) psychological factors determining learning.

After refining the general objectives, specific instructional objectives are stated for each topic to be included, in terms of pupil's specific behaviour.

Selection of Curriculum Content (Subject matter)

Curriculum content refers to the subject-matter or topics prescribed for the instructional programme of a particular course, from which the knowledge, skills, attitudes and values are derived. Curriculum content get expanded in terms of the facts, concepts, principles, theories, and laws that are to be learnt in the course work. The criteria for content selection are: (1) Self. sufficiency (ii) Significance (iii) Validity (iv) Utility (v) Kindling interest (vi) Practicability or feasibility (vii) Learn ability (viii) Orientation to democratic values.

Selection of Relevant Learning Experiences

Depending upon the goals and objectives of education, the nature and types of learning experiences vary. Therefore, keeping in mind, the nature of the subject contents, appropriate learning experiences are to be selected carefully. For example, for each topic in the subject curriculum, practical work that are to be undertaken, appropriate curricular activities like project work, field study, discussion, assignments, seminar, brain-storming session, debate etc. are to be selected. Extra-curricular activities like field visit, collection and classification of specimen etc. can also be included.

Organizing and Integrating Curricular Components

The components of the curriculum viz. aim, goals and objectives, selected subject contents, learning experiences and evaluation procedures are organized into a coherent, meaningful plan and it is termed as 'Curriculum design'. Designing a curriculum takes into account horizontal and vertical organization. Vertical organisation refers to the longitudinal arrangement of curriculum content as reflected in the presence of sequence, continuity and vertical articulation in the curriculum. Horizontal organisation refers to the arrangement of the content, skills, and processes from the viewpoints of scope and horizontal integration.

The six dimensions of curriculum viz. scope, sequence, continuity, integration, articulation and balance are taken care of, while organising the subject contents and learning activities.

Tasks Involved in Second Phase of Curriculum Development viz. Implementation of the Curriculum

Implementation of the curriculum is done at two levels viz. (i) Institution-wise and (ii) in the class and in three modes viz. (i) Individual instruction (ii) Group teaching and (iii) Distance learning mode. In the classroom, when the curriculum is translated into learning experiences for pupils, it is called teaching. Teaching is a well planned task to achieve the pre-determined objectives expressed in terms of expected changes in pupils' behaviour.

Tasks Involved in the Third Phase of Curriculum Development viz. Curriculum Evaluation

The process used to define and determine the quality of the curriculum being constructed is known as curriculum evaluation. Evaluation can help to ensure that the curriculum constructed is of high quality. It can also help to tone up the process of curriculum transaction (Instruction) and ensure that the instructional materials are of high quality. Curriculum all its aspects can be evaluated completely in or can be done on select aspect only. There are four basic elements in curriculum evaluation viz. (i) Context (ii) Input (iii) Process (iv) Product. In schools and colleges when we say evaluation, it generally refers to the evaluation of instructional process (process evaluation). However in comprehensive curriculum evaluation, all the four elements are to be evaluated (CIPP model).

Curriculum evaluation is of two types (i) Programme evaluation, (ii) Material evaluation. Whatever may be the type of evaluation, the process of curriculum evaluation has two stages: (a) Developing the evaluation plan (b) Implementing the evaluation plan. The curriculum evaluation plan consists of five broad aspects: 1. Rationale, 2. Objectives of the evaluation study, 3. Curriculum description, 4. Evaluation Design, 5. Description of evaluation report.

Curriculum evaluation helps to improve the course content, tone up the instructional process and ensure the quality of instructional materials.

Tasks Involved in the Fourth Phase of Curriculum Development Process viz. Improvement of the Curriculum

Economic pressure, knowledge explosion, social change, influence of research findings, new inventions and discoveries in science and technology are the most important factors which necessitate changes in curriculum now and then.

Modifying the curriculum is not an abrupt process; it demands wide discussion and meticulous planning. The process of effecting curriculum change consists of four important stages (i) Perceiving the need for change (ii) Planning for the change (iii) Initiation, implementation and evaluation (iv) Arranging for institutionalized monitoring for ensuring the implementation of change in all educational institutions.

Models of Curriculum Development

While curriculum specialists hold many divergent opinions about what curriculum is, they generally agree on the fundamental components all of curriculum design. The curriculum documents differ in their structural format, in ideological may foundations and in the values, they emphasise, but the basic elements composing these designs are the same. Curriculum specialists have attempted to relate the elements by posing a few questions. According to the way they answer these questions, the design of the curriculum emerges. Thus, was born the different models of curriculum development of which the three important designs viz. Tyler's Curriculum Inquiry Model, Hilda Taba's Grassroots Rational Model and Saylor and Alexander's Planning Process Model are described in the following sections.

Tyler's Curriculum Inquiry Model

Perhaps the most eminent protagonist of the older view of curriculum was Ralph Tyler, whose "Basic Principles of Curriculum and Instruction" (1949) was a great land mark in curriculum theory.

Tyler's model is a simple linear approach suggesting four fundamental questions which he thought must be answered in connection with any curriculum. The four principal questions which he identified were:

1. What educational purposes should the school seek to attain?
2. What educational experiences can be provided that is likely to attain these purposes?

3.How can these educational experiences be effectively organized?

4. How can we determine whether these purposes are being attained?

These four questions are translated into a simple linear model.

- Purposes of the School
- Selection of Educational Experiences related to purpose
- Organization of educational experiences
- Evaluation

1. **Purposes of the school**

According to Tyler, "purposes" are objectives. Firstly, curriculum planners should identify these general instructional objectives from three sources:

1. The subject-matter (the world of knowledge)
2. The learners
3. The society from which the learner hails.

Secondly, after identifying numerous general instructional objectives, the curriculum planners should refine them by filtering through two screens:

- the philosophy of the school

-the psychology of learning

Thirdly, through such screening, specific instructional objectives are identified.

2. **Educational experiences related to the purposes**:

Curriculum planners should identify those learning experiences, which enable the learners to attain instructional objectives.

3. **Organization of the selected educative experiences:**

Tyler's third principle emphasizes that curriculum planners should organize and sequence the learning experiences. The organization of ideas, concepts, values and skills should maximize meaningful instruction and learning.

4. Evaluation of the purposes:

Tyler's last principle emphasizes that curriculum planners should find out whether learning experiences have actually produced the intended results. An evaluation should relate to all the chosen objectives, Evaluation determines whether the programme is effective or ineffective. Evaluation guides whether the programme should be maintained or modified, if it is to be modified, where improvements have to be made.

Merits and Demerits of Tyler'sModel

When Tyler wrote his book, over 70 years ago, he was motivated by the fact that many educational programmes did not clearly define purposes. The individual teachers were unable to answer enquiries about aims and objectives of their teaching programmes. Therefore Tyler's objectives model of curriculum, demands that educational objectives should describe student behaviour and not teacher behaviour. In other words, objectives should specify how pupils are to behave at the end of a particular teaching unit.

Tyler's model is criticised as being far too simple and also for leaving evaluation until the final stage of the curriculum process. This may give room for a bad curriculum to stay in practice and spoil student's learning.

Hilda Taba's Grassroots Rational Model

Hilda Taba maintains that Curriculum users should design the curriculum. According teachers should create teaching-learning materials for their students, by adopting an inductive approach starting with specifics and building up general design, as opposed to the traditional deductive approach.

Hilda Taba listed seven steps in her grassroots model of curriculum development in which teachers have to provide major inputs. These seven steps are:

1. Diagnosis of needs: The teacher curriculum planner identifies the needs of the students.
2. Formulation of objectives: The teacher then, specifies the objectives on the basis of student's needs.

3. Selection of content: The teacher should select subject contents in accordance with the objectives. The contents should be valid and significant.
4. Organization of content: The chosen contents must be sequenced in
   maturity of the leathers, their academic achievement and their interests
5. Selection of learning experiences Contents must be presented to the learners through some instructional methodologies Here, the students interact with the contents
6. Organization of learning activities Learning activities are also sequenced in the same way as the contents have been organized.
7. Evaluation and means of evaluation: The curriculum planners must determine just what objectives have been achieved.

Though Taba's model has many merits, some critics maintain that its primary weaknesses are as follows:

i) It applies the concept of participatory democracy as a highly technical and specialized process.

ii) It assumes that teachers have the expertise and time to engage in such curricular activities.

This model made it clear that a broad-based involvement of the users of the curriculum is essential for effective decision-making related to curriculum

Saylor and Alexander's Process Model Planning

Galen Saylor and William Alexander (1974) viewed curriculum development as consisting of four steps. According to them, curriculum is "a plan for providing sets of learning opportunities to achieve broad educational goals and related specific objectives for an identifiable population served by a single school centre".

Galen Saylor and his associates (1981) adopted an administrative approach to curriculum development. They describe and analyze curriculum plans in terms of the relations of ends and means, the attention to pertinent facts and data, and the flow of activities or procedures from beginning to end. The following figure depicts their conceptual model of the curriculum development process. Figure showing Designing the curriculum-an administrative approach.

(1) external forces, including legal requirements, research data, professional associations and state guidelines, and (2) bases of curriculum, such as society, learners, and knowledge (Note the similarity to Tyler's sources.) Curriculum developers then choose the combinations of curriculum design, implementation strategies, and evaluation procedures that are calculated to maximize the attainment of goals; review feedback from the plan in effect through instruction, and re-plan the elements of the curriculum as indicated by the data

Goals, Objectives and Domains: The model indicates that curriculum planners begin by specifying the major educational goals and specific objectives they wish to accomplish. Each major goal represents a curriculum domain and there are 4 major goals or domains viz. personal development, human relations, continued learning skills and specialization. The goals, objectives and domains are selected after careful consideration of several

external variables such as findings from educational research, accreditation standards, views of community groups and others.

Once the goals, objectives and domains have been established, planners move into the process of designing the curriculum. Here decision the appropriate learning opportunities for each domain and how and when these opportunities will on provided. Will the curriculum be designed along lines of academic disciplines, or according to be the student needs and interests or along themes? These are some of the questions that need to b answered at this stage of the curriculum development process.

Curriculum design involves decisions made by the responsible curriculum planning group(s) for a particular Educational district or State and student population. Having collected and analyzed essential data and identified goals and objectives, curriculum planners create or select a general pattern a curriculum design - for the learning opportunities to be provided to students. Among their alternatives is a subject-centered design utilizing specific studies in the specified curriculum area, scope and sequence plan built around a selection of persistent topics or themes, an analysis of the essential skills necessary for knowledge and competence in the subject area, and a selection o problem (in co-operation with students) related to the area of study. The design plan ultimately anticipates the entire range of learning opportunities for a specified population.

After the designs have been created, the next step is implementation of the designs by teachers. Based on the design of the curriculum plan, teachers would specify instructional objectives and then select relevant teaching methods and strategies to achieve the desired learning outcomes among students in the classroom.

Curriculum Implementation

Meaning of Curriculum Implementation

Once the curriculum is prepared for a course of study, then the next step is to implement it in operational terms. Implementation of the curriculum is known as curriculum transaction. This is done at two levels viz. (i) institution-wise and (ii) in the classroom and in three modes viz. (1) Individualized (iii) instruction (i) Group teaching and Distance Learning mode.

In the classroom when the curriculum is translated into learning experiences for the pupils. it is called 'teaching. Teaching is a well planned task to achieve the predetermined objectives expressed in terms of expected changes in pupils' behavior. Modification in behavior resulting from pupil's knowledge, skills, attitudes and interests. is brought about by well planned and systematically executed instructional programmes.

Curriculum Implementation Models

There are several models which suggest how to gain the support of teachers who are the actual implementers of the curriculum, when implementing a new curriculum. The two popular curriculum implementation models are (i) The ORC Model and (ii) the LOC Model.

ORC Model

One of the common curriculum implementation model practiced is the ORC Model The letters ORC here stands for Overcoming Resistance to Change'. This model rests on the assumption that success or otherwise of curriculum implementation primarily depends on the impact the curriculum developer can make on the consumers, i.e. teachers, students and the society in general.

If we desire change, we must address people's misgivings, their misapprehensions or other such related factors. We must point out to them that the curriculum incorporates, wherever possible and appropriate, their values, assumptions and beliefs While addressing the persons within the system, we should remember that to get the desired result the subordinates should be motivated rather than ordered. Curriculum developers should, therefore, identify and deal with the concerns of the staff in various educational institutions. We can group the concerns of the staff into the following four developmental stages

- Unrelated Concerns
- Personal Concerns
- Task-related Concern
- Impact-related Concerns

Stage 1: Unrelated Concerns

The first stage is a stage of indifference. At stage, teachers do not perceive a relationship between themselves and the suggested changes For example, if a new programme of online learning is developed, a teacher at this stage may not consider it something that concerns him/her. The teacher would not resist the change, because he she really does not perceive the change as something that influence his/her own personal or professional domain.

Stage 2: Personal Concern

At this stage, the teacher will react to innovation of new curriculum in relation to his personal situation. He/she is concerned with how the new programme compares to the one already in use. For example, the teacher may be wrestling with how using online learning will affect what they are doing at present in the classroom. Therefore when a new programme is being launched, he/she would involve himself/herself in the activity.

Stage 3: Task-related Concerns

In stage 3, the teacher is thinking about how to use the new curriculum or innovation. Questions begin to go through their head in terms of application. For the on-line learning example, the teacher may wonder about such problems as how much time will it take to learn this. What are the best ways to use this new innovation? What kind of support will I get? These are some of the questions that are possible.

Putting it in short, this stage relates to the actual use of the innovation. The teacher at this stage will be concerned with the time required reaching the new programme, availability of materials, strategies to be adopted etc.

4: Impact-related Stage

Now teachers have taken their focus off their performance and are worried about how the new curriculum or innovation will affect students. At this stage, teachers are focusing on their students, peers and school. For the on-line learning example, teachers start to wonder how on-line learning will benefit the students. A teacher may start wondering how other teachers are doing, as they try to use this new innovation. The shift in this stage is from self to others. Concerns Working with ORC model, we must deal directly with the concerns at stages 2, 3 and 4 in order to serve the purpose for which change is affected. To achieve this purpose, we can meet the faculty members together.

During this meeting, we can share our concerns and map strategies for dealing with those concerns.

Depending on the context and particular needs, we can administer questionnaires to gather and share information on concerns to make such meetings successful.

LOC Model

LOC is the acronym for 'Leadership-Obstacle Course' model. This model treats staff resist change as problematic and proposes that we should collect data to determine the extent and nature of the resistance in implementing the curriculum. This can be carried out by making sure the following five conditions exist:

i) the organisational members must have a clear understanding of the proposed innovation

ii) individuals within the organisation must be given relevant skills so that they possess capabilities requisite for carrying out the innovation;

iii) the necessary materials and equipment for the innovation must be furnished;

iv)if need be, the organizational structure must be modified so that it is compatible with the innovation being suggested

V) the participants in the innovation must be motivated to spend the required time and effort to make the innovation a success.

The LOC model extends the ORC model in several respects. While the ORC model conceptualizes educational change as a two-stage process:

i) initiation; and

ii) incorporation (or the innovation as part of the ongoing process of the organisation).

The LOC model considers educational change as a sequence of three stages:

i) Initiation;

ii) attempted implementation; and

iii) incorporation

We should note here, that implementation obstacles solved at one point of time using this model may arise again at another pants therefore have a feedback and monitoring mechanism to determine it problems once keeps reappearing, etc

UNIT –V

CURRICULUM EVALUATION AND CHANGE

Curriculum Evaluation – Concept, definition – Source dimensions and functions of curriculum evaluation - Approaches to curriculum Evaluation – Need and importance of Curriculum Evaluation – Evaluation Phases - Tyler's objective-centered evaluation model – Robert Stake's Congruence- Contingency Evaluation Model - Curriculum revision, Curriculum change and innovation: Types of change - Process of curriculum change strategies and models for curriculum change and innovation.

Concept of Curriculum Evaluation

According to Jame B Broadfield, "Evaluation refers to the act or process of determining the worth or value of something, event or person, by assigning symbols, either verbal or numerical or both". Evaluation is a process of delineating, obtaining and providing useful information for judging decision alternatives (Stufflebeam et.al.)

Curriculum evaluation, therefore refers to the process of assessing the worth or value of some aspect or the whole of curriculum. The way the term curriculum is defined, the objective of curriculum evaluation may include finding the effectiveness of the curriculum design developed, learning environment provided, instructional process carried out, resources and materials used in the process of imparting education. Thus we can say curriculum evaluation is a process attempting to assess the value and effectiveness of any aspect of the curriculum adopted and implemented.

Meaning and Definition of 'Curriculum Evaluation'

According to Worthen and Sanders (1973) "Within the concept of curriculum development, curriculum evaluation may be defined as the determination of the worth or merit of whole curriculum or part of it. It includes gathering information for use in judging the worth of the curriculum programme or curriculum materials". Programmes and materials are closely related but the evaluation of programmes will differ in means and methods from the evaluation of materials or products.

Programmes are considered synonymous with curricula; they focus more on formal aspects of education and typically on a specific course or instructional area (for example vocational education or science teaching for a particular degree or diploma course) Materials or products are the instructional items used such as texts, modules, resource

materials, audio-visual aids, multi-media packages, laboratory kits and manuals. Whether it is programme evaluation or product evaluation, it should be carefully planned and systematically conducted.

Sources of Curriculum Evaluation

For curriculum evaluation, the evaluator collect information from following sources (i) Students (either those who have completed the course or those who are still studying) (ii) Teachers (iii) Peer Groups (iv) Professional evaluators and subject experts.

Among the four dimensions of curriculum evaluation viz. context, input, process and product evaluation, for the context evaluation which involves the selection of goals and objectives of the curriculum, the source of information are (i) Subject matter (ii) Society and its needs and (iii) learners and their needs and interests.

For the 'Input evaluation' which examines human and material resources available, data can be gathered by peer group (teachers) consensus, subject experts' judgement, examination of the curriculum by professional experts, pilot experiments to assess the value and effectiveness of the material resources. Efficiency of human resources i.e. teachers could be assessed by subject experts through a rating scale.

For the 'process evaluation' of the curriculum which attempts to determine what effect the curriculum has on students (e.g. whether or not, content of the curriculum is learned by students), is closely associated with instructional methods and activities, methods of assessing students' proficiency in learning and support services offered to facilitate student-learning. Data for process evaluation may be gathered through teaching behaviour measures and teacher rating scales (in which teachers are observed in action and assessed by educational experts), Standardised learning achievement tests, teacher constructed performance tests etc. (which are administered on students to assess their learning proficiency).

In the 'Product evaluation' of curriculum, the focal point in determining the quality of the curriculum is former students. Field surveys are used to determine the number of students who joined higher education and who have succeeded in getting profitably employed. Data are gathered from sources like employers, incumbent workers (former students) through skill-survey. Thus students (present and former), teachers. peer groups,

professional evaluators and subject experts constitute the major sources for data gathering in curriculum evaluation.

Dimensions of Curriculum Evaluation

Stufflebeam views curriculum evaluation as the process of delineating, obtaining and providing useful information for judging decision alternatives. These processes are performed for four dimensions of evaluation. These evaluation dimensions can be listed as following:

Planning decisions- Context evaluation

Structuring decisions - Input evaluation

Implementing decisions - Process Evaluation

Recycling decisions to judge and react to programme attainments - Product evaluation

Context Evaluation

It deals with the decision on offering a course or a particular curriculum and if offered the parameters for selecting goals and objectivities.

For example, in attempting to develop a curriculum for the B.Ed Degree course, the following questions are raised, the answers of which form the basis for structuring the curriculum content.

i)What is the need for providing this course or developing a curriculum for the same?

ii) Who are the target groups or beneficiaries of this curriculum?

iii) What are the different subjects that should find place in the curriculum?

iv) What are the goals and objectives of this curriculum?

For example, B.Ed course is meant for the preparation of graduate teachers to serve in high and higher secondary schools. Teacher-trainees have to specialize at least in two school subjects. The course is of two years duration and aims to make the trainees understand the philosophical and sociological bases of education as well as the psychological basis of the teaching-learning process besides familiarizing with the current trends in education. Further it should also attempt to develop environmental awareness among the teacher-trainees.

Thus context evaluation deals with the background of a particular course or programme (curriculum) and the factors involved in the selection of its goals and objectives.

Input Evaluation

This relates to decisions on what resources and strategies will be used to achieve curriculum goals and objectives. Curriculum questions related to input evaluation are:

i)What curriculum materials (Text books, guides, reference books, self-learning packages, learning aids, audio and video recordings, instructional modules, multi-media packages etc.) might be most useful in a particular educational setting?

ii) What materials are most acceptable to teachers and students?

iii) How might individudised instruction be best implemented?

iv) What are the relative effects of different curriculum materials on student achievement?

Thus, this aspect of curriculum evaluation attempts to identify and assess the relative capabilities of the educational agencies, resources for achieving curriculum objectives and alternate plans for their implementation.

Input evaluation of curriculum examines the human and material resources available on the basis of their efficiency, relevance, utility and economy and recommends the solution strategies and procedural designs.

Data for input evaluation may be gathered by group consensus, experts' judgement, literature, and curriculum examination, management by objectives, pilot experimental or quasi-experimental efforts in assessing the effectiveness of the resources by alternate designs etc.

The above discussed two aspects of curriculum evaluation (context and input evaluation) are related to the two stages of curriculum development viz. (i) Initiation (Planning) and (ii) Selection and structuring the curriculuar content. (Designing the curriculum).

Process evaluation

This focuses on determining what effect the curriculum has on students. (e.g. whether or not, content of the curriculum is learned by students)

Curriculum questions that could be associated with process evaluation include:

i) How well are learners performing?

ii) What is the quality of instructional and support personnel?

iii) What are the costs associated with operating the curriculum?

iv) To what extent are students satisfied with the instruction?

V) Which of the curriculum components are deficient?

The primary objective of process evaluation is to identify the defect in procedural design of the curriculum or its implementation. As process evaluation is most closely aligned with instruction, the data associate with this element i.e. instructional methods and activities, methods of assessing students proficiency learning and support services offered facilitate student-learning are to be gathered and evaluated.

In the traditional sense, process evaluation is what many think of, as being evaluated in schools and colleges, i.e. evaluation of the teaching-learning process. However, it is but one part of total curriculum evaluation. The feed-back available from this type of evaluation is highly meaningful to the instructional staff..

Data for process evaluation may be gathered through teaching behaviour measures, teacher rating scales, standardized learning achievement tests, teacher constructed performance tests, etc.

Product Evaluation

This deals with examining the curriculum's effects on former students (whether the knowledge is sufficient for further study or employability etc.)

Curriculum questions in relation to product evaluation are:

i) What is the mobility of former students in the job-market?

ii) How much satisfied are the former students with their present positions?

iii) How do employers view the performance of former students?

iv) How much is the adequacy of the curriculum in preparing individuals for job entry?

The information obtained from product evaluation is feedback to the objectives, input and process elements of curriculum so as to undertake curriculum revision and improvement.

Product evaluation uses the former students as a focal point in determining the quality of the curriculum. Field Surveys are used to determine the number of students who joined higher education and who have succeeded in getting profitably employed. Data are

gathered from Sources such as employers, and incumbent workers (former students) through skill-survey or job-satisfaction survey.

Summing up, we can say that for a complete evaluation of the curriculum, all the four types of evaluation viz. context, input, process and product evaluation should be undertaken.

Functions of curriculum Evaluation

Curriculum evaluation is the process of collecting and analyzing data in order to find the value and effectiveness of the different aspects of the curriculum viz. curriculum design developed, learning environment provided, instructional process carried out, resources and materials used in the process of imparting education, or the whole of the curriculum, with a view to improve its quality.

Thus, the functions of curriculum evaluation involve collecting appropriate data to identify and assess:

- Curriculum/student needs
- Curriculum designs (selection and organisation of the content and activities)
- Instructional process
- Materials used in instruction
- Objectives of student outcomes
- Student progress through the curriculum
- Teacher effectiveness
- The learning environment
- Resource allotment and
- The outcomes of instruction

Information obtained from curriculum evaluation are utilized to revise the curriculum and improve upon the following.

- Curriculum content
- Instructional methods
- Educational facilities/instructional resources
- Professional growth of teachers
- Objectives of student outcomes.

Approaches to Curriculum Evaluation

Curriculum evaluation is the process of collecting data in order to make decisions about the curriculum in question. Curriculum can mean a host of things. It could refer the content of a particular subject say 8th standard science or it may mean the entire programme offered for 8th Std. i.e. subject contents, curricular and co curricular activities etc. As such one aspect of curriculum evaluation is to consider the scope of what is being evaluated. There are different approaches or ways of seeing curriculum evaluation. Curriculum evaluation serves to identify the strengths and weaknesses of the Curriculum before implementation and the effectiveness of its delivery after implementation.

Worthing and Sanders (1973) have defined evaluation as "the determination of the worth of a thing. It includes obtaining information for use in judging the worth of a programme, product, procedure or objective, or the potential utility of alternative approaches designed to attain specific objectives.

Bruce Tuckiman (19791) has defined evaluation as "the means of determing whether the programme is meeting its goals; that is whether the measures/outcomes for a given set of instructional inputs match the intended or pre- specified outcomes",

All the above definitions point out that decision- making is central to evaluation. Evaluation enables educators to identify the alternative curricular actions to determine various combinations of curricula to ensure maximum student learning in the light of overall programme goals.

Choice of evaluation techniques also depends on the kinds of decisions that evaluators have to make.

Four approaches to curriculum evaluation could be identified. They are:

1. Formative and Summative evaluation
2. Scientific Approach
3. Intrinsic Approach
4. Payoff Approach

Let us briefly discuss each of these approaches.

Formative and Evaluation Approach Summative

When any activity or process gets developed gradually, during the on-going process at different stages, if systematic assessment is carried out, then it is called formative

evaluation. The formative evaluation of curriculum aims to improve an existing programme based on the feedback obtained from evaluation. Hence, curriculum developers must be frequently involved with detailed and specific information to guide them in the developmental phase. On this basis, the evaluators can revise the curriculum while it is developed before it can be implemented on a large scale. Formative evaluation can occur at several stages during the development process. At any stage, the validity of the content can be checked, i.e. whether students are achieving the stated goal or objective by going through the content; if not then the content could be modified.

The Summative evaluation assesses the effectiveness of the complete programme or the complete curriculum of a subject. This type of evaluation is based on evidence about "Summed" effects of various components or units in the curriculum, and hence it derives its name from it. The people involved in the curriculum process can conclude how successfully the curriculum has worked. Since summative evaluation is carried out at the end of the curriculum activity it should not be construed as a one-time affair only. It can occur at the end of some curricular-unit plans. Summative evaluation could also be planned at certain points during the curriculum development process, for example, at the end of the first try-out stage before the final implementation. This would help evaluators to check a curricular programme as it evolves into the final product. Whereas formative evaluation uses informal methods and processes, the summative evaluation uses formal tools for gathering data. Tests are carefully designed for the attainment of objectives. Teachers' reactions are assessed formally through carefully prepared surveys. Students are assessed through tests at the end of the course or at the year-end.

Scientific and Humanistic Approaches

Scientific Approach

The scientific approach is probably the oldest approach to curriculum evaluation as it dates back from the period of modernism and the emphasis is on the scientific method of the 19th to 20th century. This approach to curriculum evaluation focuses on using quantitative data generated by the learners. This allows for statistical analysis. Furthermore, the results compared in order to determine the level of success. This comparison is at the heart of decision-making when this approach is employed.

There are natural issues with such a heavy emphasis on numerical data. For one, the student's narrative is missing. Likert scale analysis is not as rich in content as an interview. Another issue is the assumption of similar circumstances. The diversity in student ability and even in teaching ability makes it difficult to assume that students are facing similar challenges and circumstances. The scientific believer focuses on an experiment.

Scientific Approach and Humanistic Approach

Scientific approach advocates experimentation and the humanistic approach does not have faith in experimentation. In Scientific approach, all efforts are focused on the learners. Students' achievements in different situations are compared by way of test scores. Quantitative measures are adopted for data collection and statistical tools are employed for data analysis.

The humanistic approach is on the other end of the evaluation continuum. In humanistic approach, experiments are unacceptable; they advocate case studies. A humanist would study a curriculum already in place and not one imposed by the evaluator. The curriculum is to be seen through the eyes of the developers and clients; benefits are to be described, not reduced to a quality. In humanistic approach, data are gathered basically by employing observation, interviews, personal meetings and discussions with participants. However curriculum evaluators tend to adopt a middle approach I.e. somewhere between the two ends of the evaluation continuum. In other words, they use the scientific approach in curriculum evaluation along with using observations, interviews, discussions and rating scales.

Intrinsic Approach

The intrinsic approach is used to assess the overall quality of a curriculum. This involves looking at the various components of curriculum design such as the scope, sequence, articulation, balance, and other aspects. Other aspects of curriculum development are also assessed means examining the teaching methods, content, and learning experiences. However, initially, the criterion of evaluation is not determined but emerges after the process begins. The intrinsic approach not only examines the value of the curriculum but also how well a given curriculum reaches its goals and objectives. This

involves collecting some form of data whether quantitative or qualitative. As such, most evaluators normally approach evaluation with some of the characteristics of the intrinsic approach.

The evaluators merely answer the question, "How good is the curriculum?" instead of evaluating it on any criteria. **Michael Scriven** cites the example of studying an axe to explain intrinsic evaluation. An individual would study an axe by examining the following aspects; design of the bit, the material used, the weight distribution, shape, and fit of the handle. People assume that an axe of such dimensions would cut trees but they do not try it directly. Intrinsic evaluation of curricula implies that evaluators study the content, its sequence, organization, accuracy, learning experiences provided, etc. They believe that with accurate content and organization, student learning would be stimulated. Most of the time evaluators tend to neglect the concept of intrinsic evaluation. Instead of asking the question, "how good is the curriculum?" they ask, "How well does the course or curriculum achieve its goals?" Educators must however establish the worth of the curriculum,

Payoff Approach

Pay-off evaluation occurs when the effects of the delivered curriculum are examined and its worth has been established. The effects of the curriculum on learners can be determined since this evaluation involves judgments based on pre-test, post-test scores or experimental group tests and control group tests and other parameters. Apart from students, its effects can be examined on teachers. parents and administrators. This allows evaluators to measure the attainment of objectives by learners which intrinsic evaluators cannot gauge.

In the payoff approach, clear evaluation criteria are set from the outset. Normally, evaluators look at the impact of the curriculum on its stakeholders, which often includes, students, teachers, parents, and administrators. This approach to evaluation is among the most popular in education because of the clear criteria which make data collection smooth and efficient.

On the other hand, supporters of intrinsic evaluation counter that outcomes of the curriculum do not actually show up in payoff approach because the present testing instruments and scoring procedures are laced with their shortcomings. They also feel that to examine the full worth of a curriculum, the materials should be looked at directly rather than at students' test scores.

Need and Importance of Curriculum Evaluation

There are several parties, or stakeholders, interested in the process and results of curriculum evaluation.

- Parents are interested because they want to be assured that their children are being provided with a sound, effective education.
- Teachers are interested because they want to know that what they are teaching in the classroom will effectively help them cover the standards and achieve the results that parents and administration are expecting.
- The general public is interested because they need to be sure that their local schools are doing their best to provide solid and effective educational programmes for the children in the area.
- Administrators are interested because they need feedback on the effectiveness of their curricular decisions.
- Curriculum publishers are interested because they can use the data and feedback from a curriculum evaluation to drive changes and upgrades in the materials they provide.

Purpose of curriculum evaluation

Education prepares future generation to take their due place in the society. It becomes essential that substandard educational goals, materials and methods of instruction are not retained but updated in consonance with the advances in social, cultural and scientific field. It is also important to ascertain how different educational institutions and situations interpret a given or prescribed curriculum. Hence, arises the need for curriculum evaluation.

Uses of curriculum Evaluation

Curriculum evaluation is useful to the extent that the results are used for effecting improvement in the curriculum programme or materials. Evaluation results should serve as

a basis for determining if and when appropriate educational change should be made. **Cronbach** mentions three ways in which curriculum evaluation would help us.

i) For course Improvement

To decide whether instructional materials and methods are satisfactory and whether change is needed.

ii) For Making Decisions about Learners

(a) To decide on the entry qualification and behaviour of students who are supposed to make use of the curriculum.

(b) For judging pupil-merit to group them for instruction and also acquaint them with progress and deficiencies, while they are making use of the curriculum.

For Administrative Regulations

To judge how good the school system is and how good individual teachers are.

Evaluation Phases

Evaluation is a continuous process undertaken throughout the duration of the activity. There are typically a series of temporary ends in a continuous cycle. In student evaluation, for example, we start with a set of instructional objectives. Then we implement strategies to facilitate their learning achievement. Then we measure and assess students' achievements which are a temporary end in the instructional cycle. Based on the results, we reassess our objectives and strategies and proceed. Thus the process is cyclic, with feedback from one cycle guiding the next. We do not just evaluate the outcomes; every stage of the process is subject to evaluation, beginning with the objectives.

The evaluation process entails decision making. Any educational endeavour involves a whole lot of decisions which must be made i.e. decisions about objectives, decisions about strategies, decisions about measurement and so on. These decisions can be classified in terms of, when they are made, i.e. during what stage of the activity under study. Thus, each phase of evaluation involves different kind of decisions. Logically, we can identify three phases of evaluation - (i) planning phase (ii) process phase and (iii) product phase.

Planning Phase

The initial phase of evaluation takes place prior to actual implementation and involves decisions about what course of action will be taken and towards what ends. The planning phase involves a number of processes which are discussed below.

a) **Situation Analysis**

The first step is to analyze the situation as it presently exists in order to establish the parameter of the effort. This step includes activities such as the collection of background information and assessment of existing constraints. For a teacher this may involve examination of the cumulative records of his or her students in order to get a frame of reference based on their abilities. After the parameters have been established, more realistic goals and objectives can be formulated.

b) Specification of objectives

Goals are general statements of purposes or desired outcomes and not as such directly measurable. Each goal must be translated into one or more specific objectives which are measurable. Thus objectives are specific statements of what is to be accomplished and how well and are expressed in terms of quantifiable, measurable outcomes. Objectives may be process-oriented or product-oriented. Process objectives describe outcomes desired during the execution of the effort and they are related to the development and execution. Product objectives, on the other hand, describe outcomes intended as a result of the effort. Objectives give direction to all subsequent activities and achievement of objectives is ultimately measured. Objectives whether instructional or programmes objectives, form the foundation of all subsequent evaluation activities and therefore it is critical that they themselves be evaluated in terms of relevance, measurability, significance and technical accuracy.

c) Specification of pre-requisites

Objectives entails unique procedure with respect to student evaluation. In most cases specification of a given set of instructional objectives is based on the assumption that students have already acquired certain skills and knowledge. The assumed behaviours are referred to as pre- requisites or entry behaviours. Assessment of entry behaviour is specifically important at the beginning of any instructional unit. To arrive at pre-requisites, we simply ask the following question: What must any student know or be able to do prior to instruction, in order to benefit from instruction and achieve any objectives.

Selection / Development of Measuring Instruments

Collection of data to determine the degree of achievement of objectives requires good measuring instruments. If a standardized tool is available, it could be made use of; or otherwise, we have to develop an appropriate tool. Development of a good instrument takes considerable time, effort and skill.

e) Delineation of Strategies

Strategies are generally approaches to promoting one or more objectives. There may be instructional strategies, curriculum strategies and programme strategies. Each strategy entails a number of activities. There are number of strategies to choose from. Execution of these strategies must be planned for, to ensure the availability of necessary resources. Strategies which must be thoroughly thought of before evaluation is conducted include: task analysis, review of concepts, sequencing, provision of feedback and practice.

Preparation of Time-schedule

Preparation of realistic time schedule is important for all types of evaluation. Basically time schedule includes a list of major activities of the proposed evaluation effort and corresponding expected initiation and completion times for each activity. We should allow enough time, so that if an unforeseen minor delay occurs, we still can meet the final deadline.

Process Phase

The process phase involves making decisions upon events which occur during actual implementation of the planned instruction, programme or project. The first step in the process phase is to administer pre-test, if such test is appropriate. Based on the pre-test results, decisions may be made concerning the appropriateness of the already specified objectives. Following initial testing, planned strategies and activities are executed in the pre-determined sequence. Data collected during this phase provide feedback concerning whether the execution is taking place as planned and whether the strategies and activities are being effective. The basic purposes of this phase are to determine whether the effort is being executed as intended, to determine the degree of achievement of process objectives, and to identify ways in which improvements can be made. The process phase is referred to as 'formative evaluation'.

Product Phase

The product phase involves making decisions at the end or more likely at the end of one cycle of instruction, a programme or project. Decisions made during the product phase are based on the results of the post-tests and on other cumulative type of data. The major purpose of product phase is to collect data in order to make decisions regarding the overall effectiveness of instruction, a programme or project. During this phase, it is determined whether intended product objectives are achieved and if so, to what degree. Data analysis and interpretation is followed by the preparation of a report which describes the objectives, procedures followed and the outcomes of the effort (evaluation).

The results of the product phase of evaluation are used in two major ways: (i) They provide feed- back and direction to all who are involved in the effort viz. students, teachers and curriculum developers. (ii) They provide feedback to outside decision makers such as parents, principals, school board members and funding sources.

Models of Curriculum Evaluation

Curriculum evaluation has to be planned and systematically carried through. Evaluation is made for different purposes. Conforming to the basic principles of curriculum evaluation, evaluators have developed different models of curriculum evaluation to suit their purposes. Some well known curriculum models are:

i) Tyler's Model
ii) Stake's Model
iii) Stuffle Beam's Model
iv) Hilda Taba's Model
v) Scriven's Model

Tyler's Objective-centered Evaluation Model

Ralph Tyler in his monograph on basic principles of curriculum and instruction (1949) explains his paradigm of curriculum evaluation in seven major steps. The major steps indentified by Tyler are:

1. Formulation of objectives: These objectives should specify both the content of learning and the student behaviour expected.

2. Identifying the situations that will give the student the opportunity to express the behaviour embodied in the objective and evoke or encourage this behaviour.

3. Selecting, modifying or constructing suitable evaluation instruments and check the instruments for validity, reliability and objectivity.

4. Using the instruments to obtain summarized or appraised results.

5 Comparing the results obtained from several instruments before and after given periods, in order to estimate the amount of change taking place.

6. Analysing the results to determine the strengths and weaknesses of the curriculum and to identify possible explanations about the reason for this particular pattern of strengths and weaknesses.

7. Using the results to make the necessary modifications in the curriculum.

The main emphasis in Tyler's model is on instructional objectives. The purpose of evalutaion is to measure students' progress towards the instructional objectives. The key activities in the evaluation process are the specification of objectives and measurement of students' competence.

Advantages of Tyler's Model of Curriculum Evaluation

i) It is relatively easy to understand and apply.

ii) It is rational and systematic.

iii) It focuses attention on curriculum strengths and weaknesses rather than being concerned soley with the performance of individual students; it also emphasizes the importance of a continuing cycle of assessment, analysis and improvement.

Deficiencies of Tyler's Model of Curriculum Evaluation

i) It does not suggest how the objectives themselves should be evaluated.

ii) Its emphasis on the pre-determined objectives may restrict creativity in curriculum development and it seems to place undue emphasis on the pre-assessment and post-assessment, ignoring completely the need for formative assessment.

Robert Stake's Congruence Contingency Evaluation Model

Robert Stake's countenance model of curriculum evaluation helps to describe and make judgment about the curriculum. This description and judgment is made by different people as they look at and approve (countenance) the curriculum. Hence the model is

known as the countenance model. The rationale of the curriculum evaluation is first described. What is the purpose of evaluation? Is it going to be primarily descriptive or judgmental or both? Is it to emphasize antecedent conditions, transactions or the outcomes or a combination of these? Are we interested in the congruence structure? What is intended and what actually occurs? Are we interested in evaluating a single programme or in the comparison between two or more curricular programmes? Is it intended more to future development of curriculum or to help choose among available curricula? Countenance model aims to give answer to one or more of these questions according to the needs and requirements of the evaluation.

The main emphasis of this model is on description and judgment. The curriculum is described at three levels:

i) The antecedents or the pre-requisites (i.e. the objectives the curriculum intend to achieve)

ii) Curriculum transaction or instructional process

iii) Outcomes of curriculum process.

First of all the intents, the objectives, what we intend to achieve by implementing the curriculum must be clearly specified. Then the standards expected to be accomplished and the criteria on which the outcome is to be tested are defined. Finally the three components viz. antecedents, transactions and outcomes are observed and measured. The observed data are compared with the standards already defined and judgment made with reference to these standards on all the intended objectives.

The purpose of evaluation in this model is to report the ways different people see and appraise (countenance) the curriculum. The key activities consist of finding out the observations of different stream of people and gathering opinions. Journalists and social psychologists may engage themselves in this observation and collection of opinions. Teachers' main role will be keeping log and giving opinions. The final outcome will be a broad picture about the curriculum and the conflicting expectations of different groups of people.

Curriculum Change and Curriculum Improvement

No curriculum however good it may be, cannot continue for all the time without any change. With changing time, curriculum should also change, reflecting the needs and

aspirations of the people. Further, knowledge is expanding at 'astronomical speed'. Knowledge we possess today is something like newspaper information that becomes obsolete the very next day. Curriculum content should be based on current information and not on the past information that has been proved to be false or outdated and unusable. There is therefore need for constantly changing and updating the curriculum content periodically. This changing and updating the curriculum periodically, say at least once in three years, is known as Curriculum change. Curriculum Change and curriculum improvement are used interchangeably and no distinction is made between the two.

The changing society, the changing student population, the growing knowledge, the developing technology, all these demand change in the curriculum

Curriculum Change and Curriculum Revision

Curriculum change occurs following curriculum evaluation. This could be ongoing. e.g. a topic in the course need changing immediately; so this will be addressed before the next iteration of the course runs.

Curriculum revision means to give it a new position or direction alteration to its philosophy by way of its aims and objectives, reviewing the content included, revising its methods and rethinking its effectiveness.

Curriculum Change and Innovation

Curriculum change follows curriculum evaluation. Based on the feedback obtained, either the contents of the curriculum, methods of instruction and evaluation may be modified to improve students' learning and achievement.

Innovation on the other hand is just trying something new or different or creative. The curriculum needs a review every year and a review that must look into what is the most suitable for learners. Some of the broader areas where curriculum shift and innovation is needed could our range from:

- Reorganizing the curriculum around themes if our curriculum is based on themes, adding on new subjects of study.
- Reviewing the time allotted and bifurcation of periods done for each of the subjects.

- Do we need to allocate longer blocks of time for some subjects?
- Do we need to readjust the school timings to accommodate students' exploration and innovation?

We need to carefully research and learn from our previous practice and not hesitate to make revision. Similarly in the instructional and evaluative methods too, teachers can think of innovative practices and give a fair trial.

Curriculum change and innovation is the need of the hour. So, for the present era of students, innovation and change in curriculum is very important.

Types of Change Process

Analysing the ways in which curriculum change occur, Bennison identified the following seven types of changes.

i) Planned Change

Planned change is brought about by those who implement the change with full realization of the need for change. If as a classroom teacher you feel the need for a change in instructional methods to help your students achieve better and if you plan, implement and then institutionalize the change, it is called a planned change.

ii) Change by Indoctrination

We may be indoctrinated by being constantly told by others that a particular method is more effective, as a result of which if we accept and adopt it is 'change by indoctrination. For example, one of our colleagues who has been abroad, talks often about a new method he has observed in the foreign country. Believing that it may be a better method, even though we may not actually feel the need for changing what we now follow, may go in for the new method. Then it is a case of change by indoctrination.

ii) Coercive Change

Here the change is brought about by coercion or compulsion. For example a higher authority in the education department may issue an order to all school teachers to follow certain changes in the curriculum due to which teachers are forced to follow the same. Often we have changes brought about in this way and the change so brought about is gradually dropped when the coercion or compulsion ceases to be.

iv) Technocratic Changes

Technocratic changes are the results of the developments in science and technology. Computers are used for instructional purposes as they are made available to teachers as a result of advancement in science and technology. The "countryside classroom", educational instruction by the UGC through educational satellite, are examples of technocratic change.

v) Interactional Changes

Interactional change is the result of interaction with someone who is practising a new method, or curriculum. For example, you visit a school; say the school at Rishi Valley, where a different curriculum, a different instructional strategy, is being followed. You discuss with the people there, observe their performance, get some experience in the actual practice and convinced of the 'good' of it. Then you come back to your school and change over to that method. You may have this kind of experience in an In-Service education course too.

vi) Cumulative changes

Cumulative change is the one brought about I over a period of time, making small gradually changes now and then.

vii) Natural Changes

A natural change is that which occurs without any effort by those who implement it. Here teachers spontaneously accept the curricular changes and put them into practice.

Process of Curriculum Change

Curriculum change has to be effected in stages. Four stages have been identified in the change process. They are:

i) Perceiving the Need for 'Change'

Those who want to bring about change in the curriculum should perceive the need for it. If the need for change is not recognized, one would be satisfied with what is obtained and deceive himself by believing that everything is all right. This recognition of the need for change may be by an individual, or a group of people or by the entire society itself.

ii) Planning for the Change

The need for curriculum change is realised, once we become aware that some of the felt needs are not satisfied in the present curriculum. So planning for change to satisfy the unaccomplished needs is the second stage.

Planning implies formulation of a solution for the problem that we now face. The plan will take into account the present conditions, decide on the conditions that we want to be in, and then identify the gap between the two, consider possible alter- natives to bridge the gap, select a feasible one among them and then work out the details of implementing the selected alternative means of bridging the gap between where we are and where we want to go.

iii) Initiation and Implementation

When the plan is finalized, we enter into the third stage, namely initiation and implementation. In this stage the plan is tried out and its success evaluated. If it is found successful, then the new curriculum process is taken to be effective in satisfying the needs.

Iv) Institutionalizing the Changed Curriculum

Once the modified curriculum is accepted, it is implemented in all educational institutions through continuous monitoring statewide, for which a separate department is established.

Strategies for Implementing Curriculum Change and Innovation

Chin classifies the strategies adopted for bringing about change under three categories viz. rational empirical, normative educative and power coercive.

1. Rational Empirical Strategy

Rational empirical strategy is based on the assumption that people are rational and when they have empirical evidence they will be convinced and implement the proposed changes. When the teacher is convinced about the merits of the changed curriculum or curricular practice through his own classroom experiences, he voluntarily implements the new curriculum / instructional practice with a sense of commitment.

2. Normative Educative Strategy

This strategy aims at educating the people who have to implement the change about the good of the change, the strategy of implementing the change etc. The seminars conducted by educationists, the workshops and other in service programmes arranged by the SCERT

and NCERT are the best examples for this approach to educate the teachers to adopt curriculum changes.

3. Power-Coercive Strategy

This strategy relies on the power or the authority of persons who advocate the change. The education department sending a circular requiring all schools to impart moral education is an example for resorting to power-coercive strategy. The coercion may be direct or even indirect.

Models for Effecting Curriculum Change

Change-scientists have identified some models for effecting changes. Some of these models have been successfully adopted in some disciplines or walks of life e.g. agriculture, medicine, business or military.

Demonstration Model

In this approach, the proposed new method is demonstrated on a small scale in the real field- setting so that everyone could see with their own eyes how it works and realize its relative advantages. The demonstration approach is widely used in agriculture. Demonstration plots/centres are set up in villages themselves wherein the farmers can see the new method being practiced in all its aspects and at various stages. On witnessing the increased crop production, that too with low input-cost, the farmers will be motivated to adopt the new method in their own fields with all enthusiasm. Similarly in education too, a model school or a demonstration school, attached to a college of education, or set up in a district centre may serve as a demonstration unit for practicing a new method / technique. Teacher Association meetings and in-service education programmes may also prove to be suitable demonstration grounds. Teachers will observe the new methods (changes) being practised in these demonstration 'programmes', get convinced by actually seeing the results and will come forward to adopt them. As the demonstration is done in their own surroundings, in their own places, using the facilities available there and with their 'own students', the teachers may not have the general complaint that "it is all right in advanced countries like England or America or in urban centres like Chennai, Mumbai or Delhi but it will not work in our place like Attayampatti (a rural school)

Action Research Model

Action research model is typically a medical model. A new medicine if found effective in clinical studies, it is then tried on a small number of cases and if it proved effective, then it is widely distributed for treating patients. Action research we know is research undertaken in a small way, to find a solution to a pressing problem. As the innovation is first tried in one school and its effectiveness evaluated, then it is introduced in a few selected representative schools. This is the feasibility (or pilot) study. When the results are encouraging, then it is recommended for wide application. The NCERT is adopting this approach for its CAPE (Compre- hensive Approach to Primary Education) Programme.

Incentive Model

Incentive approach is the business model of change. Rewards are announced for the adoption of change. The rewards may be financial assistance, concessions for certain privileges or recognition for promotion. Liberal grants for American studies in Indian Universities, for instituting integrated education (equating the handicapped together with normal students and not in separate school for them) is a strategy under this model. It is 'pulling approach' or a 'carrot approach' in the business language.

Administrative Model

The administrative model is an authoritarian model. It is the military model. The approach is based on authority or power. The strategy it adopts is power-coercive. Most of the curriculum changes in our country are brought about through this approach. A circular is issued by the authorities in the education department to change the instructional method, content or curriculum and accordingly the teachers in schools incorporate the same. The content (text books) is changed by an order from the administrative authority. In fact we are given the content and we adopt it. Similarly when a circular is received from the Director of School Education that hereafter 'structural approach' is to be used for teaching English, we, t accordingly. Thus this approach is a 'pushing act approach' or a 'stick approach' in the management language.

Grass Root Model

In the grass root model, the change starts from below. It is not dictated from above. The needs for change are felt by the practitioner, the class room teacher. If he is capable of finding out a solution for the problem that he faces, then he plans for it and

implements it and recommends the solution, the 'change' for others who face the same or similar problem in their teaching. If he is not capable of finding a solution, then the problem is passed on to one who has the expertise in finding solutions to problems i.e. to an applied researcher. The need for change here arises from the practicing ground, the grass root level.