UNIT 1   LEARNING AND TEACHING DURING EARLY SCHOOLING

Structure

1.0 INTRODUCTION

Learning and teaching are two processes with which you, as a teacher, are very familiar, because you are engaged in teaching children to learn. You normally expect that all children in your class will excel in acquiring maximum learning experiences as per their potential. While all the teachers have similar expectations i.e. maximizing the students' efforts to acquire new experiences, each individual teacher does not approach this goal in the same manner.

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Let us consider the following two classroom situations in a primary school:

> **Situation 1:** *In class V, Mr.Raman was teaching his pupils to learn the different parts of a plant. He was explaining various parts of the plant such as; root, stem, branch, leaf, flower, fruit, seed etc. with the help of a figure of a plant drawn on the black board. He was occasionally asking questions to ensure whether the students understood the concepts. Sometimes he was humorous with the students and sometimes he was calling on the inattentive students to focus on the figure drawn on the board. At the end, he concluded the class by asking some students to show different parts of a sample plant he had brought to the class.*

> **Situation 2:** *In another class,Ms. Seema was teaching the same topic i.e. the identification of different parts of a plant in a different way. She had earlier instructed each student to bring a sample of a plant from home to the class. She divided the students into small groups of five and asked them to draw the figures of the five plants on a piece of paper, color them and label the different parts of the plants. After the groups completed the task, they displayed their sheets on the wall for others to see. At the end of the class, when Seema asked to label different parts of a diagram of a mango tree, there was competition among the student to perform the task.*

Can you identify the differences in the styles of teaching-learning process followed in the two classes?

The similarities in the two situations are :

(i)   the teacher planned the activities, and
(ii) both used some materials to teach.

However, the differences are as follows:

● In the first situation, the class was entirely teacher dominated. The teacher planned the lesson, arranged teaching-learning materials, explained the concepts, asked questions and did other classroom activities. The students were passive and were expected to be obedient to teacher's instructions.

● In the second situation, the students in the class were actively engaged in learning activities than merely driven by the instruction of the teacher. They brought the materials with them, prepared charts, labelled the parts, displayed the chart and willingly took part in the evaluation task.

It seems that the differences between the two ways of teaching are due to attitudinal differences of the teachers towards the students. In fact the underlying belief in the

practices of teaching and learning was different. While Mr. Raman was guided by the belief that the students are young and inexperienced and the facts for learning have to be provided, Ms.Seema believed that the students have acquired experiences of the world around them before coming to the class and those can be utilized by the students themselves to build new experiences.

Thus beliefs and assumptions about students, the role of teachers, the processes of classroom interaction and the modes of evaluation influence the actual teaching learning processes and practices. Some teachers emphasize on teaching and learning for modifying observable behaviour of the students, some try to develop intellectual (cognitive) abilities while some others believe that the students can be helped to build their own knowledge. As a teacher you need to be aware of the various practices and their underlying beliefs and this is what you will learn in this unit. You will know about the nature and characteristics of the learning process, the ways children learn, and the different trends of teaching guided by the dominant beliefs. The theories and practices of teaching-learning processes following three dominant approaches, namely, teaching and learning for (i) behaviour modification, (ii) problem solving and (iii) construction of experience, will be discussed. For young children these methods have been found to be meaningful. It is believed that when learning becomes meaningful to a child, he/she loves learning and continues to learn. After all it is important to help children for lifelong learning.

While studying this unit you need to keep in mind such children, who are in the beginning grades of a primary school and to complete and comprehend different concepts in the unit, you will need 12 (twelve) hours of study.

1.1 LEARNING OBJECTIVES

After completing this unit you will be able to:

● Explain the concept and process of learning.

● Elucidate the factors influencing learning process.

● Describe different theories and modes of learning.

● Differentiate between traditional and modern approaches to learning and teaching.

1.2 LEARNING PROCESS

What is learning? How does a child learn? How can we facilitate children's learning? As a teacher these are some of the questions which need to be understood in order to fulfil the responsibility in shaping children's learning in school.

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1.2.1 Concept and Process of Learning

Given below are some statements about learning for you to read and ponder.

● Learning is the process of being modified, more or less permanently, by what happens in the world around us, by what we do, or by what we observe.

● Learning is the process by which behaviour is originated or changed through training procedure (whether in the natural environment or in the laboratory).

● Learning is a process by which the individual acquires various habits, knowledge and attitude that are necessary to meet the demands of the life in general.

● "Learning is relatively permanent change in personality (including cognitive, affective, attitudinal, motivational, behavioural, and experiential) and reflects a change in performance usually brought about by practice although it may arise from insight or other factors, including memory." (Sahakian, 1976 p.3)

These statements lead us to understand learning in three broad ways.

Learning can be considered as:

● the relatively permanent modification of behaviour.

● acquisition of habits, knowledge and attitude necessary to meet the demands of life.

● the relatively permanent change in personality(all possible dimensions).

The *characteristics of learning process* are:

● *Learning is a continuous process.* From childhood every human being tries to change his/her behaviour, thinking, attitude, interest etc. continuously to fit himself/herself to the ever changing conditions of life.

● *Learning is goal directed.* Every human being aspires to achieve some goals in his/her life. These goals may be achieved through learning. If there is no goal to achieve, then there would be no necessity of learning.

● *Learning is intentional.* Since an individual sets a goal to achieve, he/she has to deliberately do some activity to attain the goal. If he/she does not have any intention to reach the goal or is quite casual about it, then it is difficult to reach the goal and in that sense learning is weak or may not take place at all.

● *Learning is an active process.* One has to perform some activity, may be physical or mental or both to learn something. Mind has to remain active to acquire new experience; otherwise no learning can take place.

● *Learning is individualistic.* You might have observed that in a class there are some students who learn more quickly while others learn slowly. In fact, the pace of learning differs from person to person.

- *Learning is the outcome of the interaction of the individual with the environment*. As a teacher, you have to organize the environment carefully to motivate the students so as to interact with you, peer students and teaching-learning materials.

- *Learning is transferable*. Learning in one situation can be used to solve problems in another situation. Learning of mathematics, science, social science and language helps the child to perform different activities in their real life.

E1. State any three characteristics of learning with examples.

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1.2.2 Factors affecting Learning

You may have observed that some people learn driving or swimming or cooking easily, while some others do not. Why this happens? What could be the reasons for individuals to differ with respect to how and what they learn? To find answers to these questions, let us try to understand the various factors affecting learning.

- *Learning and maturation***:** Maturation is related to the process of growth. It describes changes that are relatively independent of the environmental influence and are assumed to be closely related to the influence of heredity. Learning on the other hand is shaped primarily by individual's interaction with the immediate environment. For example, beginning to walk depends on the maturation of certain muscle groups and on increasing control over their movements (maturational developments). But, without the opportunity to practice various skills involved in walking (environment and learning), one may not walk at all. Similarly, although to start speaking is mostly influenced by maturation, one cannot speak fluently and meaningfully without proper practice and training which is essentially influenced by learning. We also know that it is impossible to make a six months old baby learn multiplication table until a certain level of mental maturation is reached.

- *Readiness to learn:* While transacting learning material in the classroom you must have come across a pupil to be non-attentive. You become annoyed with him/her when he/she does not respond to your questions. Why does this happen? Have you ever inquired about the pupil?

  Well, due to many reasons which maybe psycho-physical and/or social, the pupil may not be prepared to learn. There are various types of readiness, some relating to physical maturation (like one cannot join a race if he/she is not capable of

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walking), some to the development of intellectual skills and the acquisition of background information (like one cannot multiply if one does not know addition of numbers) and some to motivation.

Mental readiness of the pupil is essential for learning. For example in case of language learning it is not expected from a child to learn difficult words and sentences at early stage of learning. Similarly for physical activities like type writing, dancing etc. requires physical readiness of the pupil. Effective learning takes place when the pupil is ready to learn. Hence, to determine readiness, you need to have some knowledge of children's emotional and intellectual development.

● *Learning Environment:* For education in school to be effective, the environment needs to be conducive to learning, allowing the pupils space and time to interact within the learning and teaching process. Creating and maintaining stimulating learning environments can be achieved through effective classroom organisation, interactive and whole school displays and a climate of innovation.

Imagine the following two classroom situations:

> **Situation 3:** *In one school the classroom is small where around 40 children are sitting without adequate space for free movement. The light and ventilation in the room is also not adequate. In the extreme heat and in the crowded room the children are sweating and making noise. Due to lack of space there is no trace of any teaching learning materials in the room. The teacher is literally shouting to maintain discipline in the class.*

> **Situation 4:** *In another school, nearly same number of students is engaged in various activities in a spacious, clean and well ventilated classroom. The walls are tastefully decorated with learning materials; the teaching-learning materials are properly stored and are available in plenty to the children. The teacher is friendly and understanding.*

● Take a moment to think which of the above situations is conducive to effective learning and why? Also think of your own school days. What memories stand out? What activities gave you more satisfaction in the process of learning? Probably field trips, group activities/group work, project or learning activities outside the class room and in the community and society might have given you more satisfaction.

● In reality, conducive learning environments do not just happen, it needs to be created by considering the physical environment like the size of the class room, the colour of the wall, type of flooring, ventilation and light as well as effective classroom management that establish and maintain work systems for pupils to

engage in their learning. Safe, attractive and comfortable child-friendly environment help children engage in the activities you offered.

- *Learning and Motivation:* Motivation refers to the force originated or generated in the individual which sustains, directs and controls the activities of the pupil till the goal is achieved. There are two types of motivation- intrinsic motivation and extrinsic motivation.

  Intrinsic Motivation refers to motivation that is driven by an interest or enjoyment in the task itself, and exists within the individual rather than relying on any external pressure. Intrinsic Motivation is based on taking pleasure in an activity rather working towards an external reward. Intrinsic motivation results in high-quality learning and creativity For example; preparing any project in science/ mathematics may give pleasure to the pupil as a result of which he/she is motivated to undertake similar activities on his/her own.

  Extrinsic Motivation: refers to the performance of an activity in order to attain an outcome, and comes from outside of the individual. For example, a student who does his homework only because he/she fears parental dissatisfaction for not doing it is extrinsically motivated because he/she is doing the work in order to attain the separable outcome of avoiding parental dissatisfaction. Common extrinsic motivations are rewards like money and grades. Parents and teachers often reward their child for successful completion of learning tasks.

However, proper motivation accelerates learning in the child. You as a teacher have to know various techniques to motivate the child. You have to be careful to draw the attention of the student by devising suitable mechanisms.

E2. State any two reasons as to why intrinsic motivation is better than extrinsic motivation for learning.

1.3 HOW CHILDREN LEARN

You must have seen several children coming to your school for the first time for enrolling themselves in class I. For these children who come to school for the first time formal learning begins with predesigned and prescribed curriculum. Do you think all these children have not learnt anything and are going to start learning?

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ACTIVITY-1

Prepare a list of activities a normal child aged 6 years and coming to the school for the first time usually performs.

Mr. Binay, a teacher like you in a primary school observed and interacted with a newly entrant child named Jhumpa and listed the following activities which she could perform with ease.

- She expresses her feelings in simple sentences.

- She speaks using proper tense of the verb appropriate to the subject.

- She answers simple questions like "What have you taken in your lunch?", "Which game do you like?", "Who came to your house yesterday?"

- She is curious and asks a lot of questions.

- She understands and obeys teacher's commands like "stand up", "move to your left", "close your eyes", "come to the black board" etc.

- She sings some songs according to her liking.

- She plays games with other children in the class strictly following the rules of the game.

Notice that the list is quite long. Every normal child can perform such activities. But how did Jhumpa learn to perform so many activities correctly and with ease? Although there were several individuals around her in the family and neighbourhood, no one deliberately taught her so many activities she is performing.

Clearly school is not the only place for learning, and one can acquire a wide range of experiences from the world around him/her. If we know the processes that help one to gather experiences in a natural way, we can use those processes in the classroom for making school learning more natural, meaningful and easier to adopt and internalize. Let us understand some of the basic processes of acquiring new experiences which are usually used by children and others as well for learning in a very informal way.

1.3.1 Imitation

Much of human learning is a function of imitating and observing the behaviour and action of others and these are also the main processes through which children acquire new experiences and behaviour. Imitation is copying or reproducing others' actions or behaviours. One does not imitate everybody one comes across. One chooses consciously or otherwise a person for imitating some of his/her behaviours or actions

that attract him/her. Such a person becomes a model for imitation. The model can be a person with whom the child/individual has direct contact like the parents, siblings, teacher, or any other adult member with some quality to be imitated. There are other persons with whom the child has no direct contact but can be models for imitation. Examples of such models maybe great men from history and mythology like Ashoka, Shivaji, Akbar, Gandhi, Nehru, Mother Teresa or Sri Ram, Sri Krishna, Mirabai, Jesus or popular film stars, players, artists etc. Even the characters from popular comics are sometimes imitated by young children. Such models are called symbolic models. Very often, parents, siblings and teachers project before the child well-known persons of eminence. Such models either real or symbolic are called exemplary models.

It is to note that all imitations are not learning unless the imitated action becomes relatively permanent behaviour of the child. When you observe a child is imitating a positive and desirable action, how can you strengthen the recurrence of this imitated action to be learned behaviour? There are possibly three ways to strengthen imitations. These are:

● *Providing direct praise or incentives*: Statements like *"He is solving the problem like an expert!"*, *"She is singing very well like Lata Mangeshkar"*, or *"What a shot you played! It is just like the shot played by Sachin Tendulkar"* encourages the child to repeat the imitated action.

● *Satisfying consequences:* If through imitation the child acquires a socially acceptable behaviour or achieves a desired goal, then he/ she likes to repeat it. For example when a child imitates her mother saying "milk", she would like to repeat saying this word if in response she gets milk to drink.

● *Vicarious reinforcement:* Sometimes, a child imitates behaviour by observing that others are imitating it without getting any direct incentive or any satisfying consequence. It rests on the logic that others are imitating it as they might be getting some benefit/satisfaction out of it. Choosing a brand of dress or cosmetic, talking in a particular style or singing an odd tune are some such vicarious imitations.

Effects of imitation: Superficially, imitation is merely copying the behaviour of a model. A closer examination of the responses involved, suggests that there are three categories of imitative behaviour: the modelling effect, the inhibitory dis-inhibitory effect, and the eliciting effect.

● The *modelling effect* involves acquiring new behaviour as a result of observing a model.

● The *inhibitory effect* is concerned with suppression of deviant behaviour of the model usually as a result of seeing the model punished for engaging in the same behaviour. The *dis-inhibitory effet* is the opposite of it. It occurs when a child observes the model engaged in the previously learnt deviant behaviour being rewarded for it.

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- The *eliciting effect* is related to responses of the model not to his/her behavioural characteristics per states. An illustration of the eliciting effect is the mass behaviour. In any sporting event, one person's clapping or booing might elicit similar behaviour from others in the crowd. Sometimes, many in the crowd do not know why they behaved in the way they imitated.

As a teacher, what can you do in the classroom/school to use imitation for enabling young students to acquire positive and socially desirable behaviour? Well, you can do the following:

- Try to be a model for imitation by your students. Demonstrate positive aspects of your behaviour to your students. A teacher's positive practices like cleanliness, punctuality, truthfulness, and fairness to all have immense impact on the students to imitate. Nevertheless, do not expose your weaknesses to your students.

- While teaching history, social science, literature and telling stories to children, always highlight the positive aspects of the important characters for imitation by the students.

- When any student imitates positive behaviour, try to recognize it and provide verbal praise encouraging him/her to repeat it.

E3. What can you do to discourage your students to avoid imitating undesirable/deviant behaviour of a model?

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1.3.2 Observation

Learning from observation is a common and natural method of human learning. Observational learning (also known as vicarious learning, social learning, or modelling) is a type of learning that occurs as a function of observing, retaining and replicating novel behaviour executed by others. Observational learning is a key learning method for children when acquiring basic tasks such as language and cultural norms. But it is different from imitation in which the observer copies and reproduces the behaviour of the model. In observational learning we think and judge and learn not only how to do certain things but also what the consequences of our action are likely to be. Therefore, learning through observation is not exact reproduction of the model's behaviour but developing behaviour based on the observed behaviour.

According to Bandura (1977), following four distinct processes are involved in observational learning:

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- *Attention Process:* We do not imitate the total behaviour of a model….rather we focus on specific aspects that we are interested to learn. We pay attention to significant features of the behaviour we want to learn. For example, a child learning to write in good hand writing watches her teacher and keenly observe the way she is holding the pen, moving her fingers, where she is using capital letters and does not pay attention to how the teacher is dressed or how she walks.

- *Retention Process:* The ability to store information is also an important part of the learning process. Retention can be affected by a number of factors, but the ability to pull up information later and act on it is vital to observational learning. We need to remember the things observed through some way of using symbols, understanding and organizing our observations. Usually we employ two processes for retention: first *storing* the things observed as visuals in our memory and then *rehearsing* the sequence of actions mentally. For example, if anyone is trying to bowl like Zahir Khan, then he should mentally rehearse the sequences of the bowling actions of Zahir after observing him in person or in TV telecasts and forming a visual image of the actions. Bandura (1977) suggests that the best way to learn from a model is to organize and rehearse the observed behaviour cognitively (mentally with proper thinking) and then act it out.

- *Motor Reproduction Process*: After we have retained the observed behaviour through rehearsal of the visual images, the behaviour has to be transformed into physical actions. For this one needs two things. First, he/she must have basic requirements for the action to be performed by him/her. If one desires to be a batsman like Tendulkar, the basic requirement is the physical capability of a batsman. If one is too weak, no matter how perfectly one rehearse the sequences of batting of Tendulkar, one will not be able to perform because it would be difficult to lift and move the bat in the same manner..

- The second aspect for transforming the observed behaviour to action is to actually practice the sequence of actions. Having a perfect visual imagery and mental rehearsal of the actions will not help the observer to perform the act spontaneously. To perform effectively, repeated practice combined with continuous feedback on practice and making appropriate corrections after each practice are necessary.

- *Motivational Process*: You must have come across some children who have learnt very well through observational learning as they can vividly describe the steps of action and can perform it perfectly. But often they do not perform as and when required. In such cases, what they lack is proper motivation to act. The child is required to be motivated especially self-motivated to act.

In summary we can say that observational learning begins with observation of a modelled event and undergoes following four processes before being transformed into a matching performance on the part of the observer.

(i)   the observer must pay attention;

(ii) the observer must represent the observed behaviour cognitively, store it and rehearse it;

(iii) the observer must reproduce and refine the observed behaviour if he/she has required capabilities; and

(iv) the observer must perform the learned behaviour under appropriate motivational conditions.

E4. State your role as a teacher in helping your students for observational learning.

E5. State any two ways to motivate your students to perform in observational learning.

1.3.3   TRIAL AND ERROR

Let us observe a child learning to ride a bicycle. Perfection in riding the bicycle is not achieved through one trial. The child makes many attempts to acquire mastery over the skill. At the initial stage, he/ she make errors and gradually the errors are minimized. The child makes a number of attempts for a particular task or problem and finds his/ her attempts ultimately rewarding.

When one is confronted with a difficult problem, for which he/she does not have any readymade solution, he/she will engage in a variety of different responses until one response produces a satisfying effect. In other words, it is through trial and error that problems are solved.

The theory of trial and error learning was developed by the American psychologist E.L.Thorndike as early as 1913 through a series of experiments conducted on different animals, mostly on cats. One of his famous experiments to illustrate the method of trial and error learning involved placing a hungry cat inside a cage and dangling a fish outside the cage. The cat had to press a lever and come out from the cage to grab the fish. In the initial attempts the cat made several unnecessary movements before pressing the lever of the cage. In subsequent trials, the random movements were gradually reduced and finally the cat could directly approach the lever, pressed it and escaped the cage. From this experiment Thorndike developed the following three laws of learning:

- *Law of Exercise:* Repetition of the activity makes the student to retain the activity for longer period. This essentially constituted of two laws: *law of use* and *the*

law of disuse. The first relates to the strengthening of the connection of stimulus (cause) and response(the behaviour) by repetition and the second, the opposite of the first, relates to the weakening of connection when not used frequently.

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- *Law of Effect:* Of the several responses, that occurs just before a satisfying state of affairs tends to be learned easily. Those that occur before an annoying state of affair tend to be forgotten or rejected. In other words if the consequence to a behaviour is satisfying, then the behaviour is likely to be learnt. In this connection the role of reward and praise have positive effects of strengthening the learned behaviour whereas punishment and rebuff have the opposite effect on the behaviour being learned.

- *Law of Readiness:* Effective learning takes place when the student is ready to learn. The educational implication of this law is quite clear. A child who is ready for a specific type of learning is far more likely to profit from such learning experiences than another who is not ready. Earlier in this unit, we have discussed about the importance of readiness to learn and the teacher's role in understanding children's readiness.

These laws of learning drawn by Thorndike from his experiments have influenced classroom practices even though several researchers found limitations of these laws in their practical uses.

E6. Considering trial and error method of learning, give an example that you have experienced as a teacher.

1.3.4 Participation/Doing

Learning by doing or through participation is considered as effective means for meaningful learning. Doing gives the real experience of solving real life problems. It is a way of combining thinking and reasoning with the practical act of manipulating objects for solving a problem. Undoubtedly it promotes self-learning and self-assessment which are the ultimate goal of learning process. But, in classroom situations, individual work cannot always be conducted. Therefore, encouraging students for participation in small group work always proves beneficial for learning. Research findings consistently show that the more pupils are involved as active participants in small group activities, the better they do. The more provisions for group activities are arranged in the classroom situation, the more participation is expected from the students. What are the benefits of participation in enhancing learning? Well , it promotes:

- Active and meaningful learning in a contextual situation;

● Sharing of experience among each other;

● Pooling combined resources for successful completion of the task;

● Searching, debating and coming out with innovative and alternative ways of solving problem;

● Developing social qualities like helping, sharing, fellow feeling, and accepting responsibility;

● Developing personal qualities like self-confidence, self-esteem, courage to ask questions.

Considering participation in group tasks has positive effect on learning, it seen that in actual situation all the students cannot participate in equal degree in all group works. What can you do then to increase the level of participation in students in the classroom activities? You may consider the following points:

● Ideally, the goal of increasing participation is not to have every student participate in the same way or at the same rate. Instead, it is to create an environment in which all participants have the opportunity to learn and in which the class explores issues and ideas in depth, from a variety of viewpoints.

● There are always different types of students. For example, some students who do not speak often in class are reflective students who typically develop ideas and questions in their minds before speaking; others are shy students who feel uncomfortable speaking in front of groups (at least initially). Many students who frequently volunteer to contribute are active students, who typically think while they speak. Therefore it is necessary to create conditions that enable students of various learning preferences and personalities to contribute. For this you will need to take extra steps to encourage quiet students to speak up and, occasionally, ask the more vocal students to hold back from commenting in order to give others a chance.

● There is a need to provide pupils with training and support for group discussion. For this you need to:

  – model the way you want pupils to interact with each other,

  – elicit ground rules for talking in pupils' own words, and

  – provide the kind of collaborative activities that promote active involvement of all pupils.

● Collaborative group work is important for enhancing pupil participation. The key features of effective group work discussions include pupils:

  – asking questions,

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    –   actively and persistently seeking help from peers,

    –   providing help that is detailed, and

    –   checking that the help given is understood by the recipient.

E7. State the two basic qualities of an active student.

1.3.5 Learning Through Discovery/Inquiry

Discovery learning is a method of inquiry-based instruction. Jerome Bruner is often credited with originating discovery learning in the 1960s. He argues that *"practice in discovery for oneself teaches one to acquire information in a way that makes that information more readily viable in problem solving"*. Discovery learning takes place in problem solving situation where the student draws on his/her own experience and prior knowledge. It is a method of instruction through which students interact with their environment by exploring and manipulating objects and performing experiments. In this approach the students are actively involved to find out rules, principle and hence develop their minds by using insight and intuition to go beyond the data to find relationship and organizing structures. The method is based on the following principles:

- Principles of activity

- Principle of logical thinking

- Principle of proceeding from known to unknown

- Principle of purposeful experiences

- Principle of searching for alternatives.

Learning through enquiry involves the teacher posing the problem(s) and giving assistance, but making it possible for pupils to achieve discoveries collectively for themselves. For example, in a whole class enquiry situation pupils took on the role of scientists to enhance the size and quality of flowers in the school garden. They approached the local horticulturist to educate them on the scientific ways of enhancing the quality and size of flowers. Some collected brochures on growing flowers from different sources. They collected information on organic and inorganic fertilizers and went to shop for procuring the required fertilizers in appropriate measures. Then they thought of varying different combination of organic and inorganic fertilizers on selected flowering plants and studied the result and found a unique combination of fertilizers to produce large size flowers which they tried on other flowering plants and found positive results.

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In this example the discovery learning was a group effort. Discovery learning can also be individualistic.

How can you encourage discovery learning?

● You should not tell your students about what they ought to know. Always pose a problem before them or considering any issue encourage students to identify problems. When you tell them the problem and the methods to solve it, you are depriving students of the excitement of doing their own finding and the opportunity for increasing their power as students.

● Your main goal of teaching for inquiry is to engage students in those activities which promote the process of defining, questioning, observing, classifying, generalizing, verifying and applying. The outcome of these processes is 'knowledge'.

● Your lessons should develop from the responses of the students and not from a previously determined, so called, logical structure. The 'content' of your lesson plan should be the responses of the students. Therefore, do not get frustrated by their 'wrong answers', false starts, irrelevant directions.

● Your basic mode of interaction with the students should be questioning, using both convergent (single/fixed correct answer) or divergent (multiple correct answer) questions. But the latter is more preferred as it encourages inquiry and acts as a means to engage young minds to probe unsuspected possibilities.

● You should encourage multiple responses from students. Do not ask for *'the reason'* but for *'reasons'*, not for *'the cause'* but for *'causes'*, and never *'the meaning'* but 'meanings'. When you insist on a single and definite answer, the students would stop searching for other possibilities and their mind would stop enquiring further.

● You should encourage 'student-student' interaction more than the 'student-teacher' interaction. In the traditional classroom interaction, students look for the teacher for the ultimate correct answer. When they seek teacher's response, they stop further searching for possible answers thus blocking their inquiry mind.

● You should measure the success of your lesson in terms of the changes in the inquiry behaviour of your students like the frequency with which they ask questions, the increase in relevance of questions, conviction in challenging opinions of other students, teacher and textbooks, the relevance and clarity of their challenges, the willingness to modify or change their position when data warrants it, increase in tolerance for diverse answers, increase in their skill in observing, classifying, generalizing etc.; their ability to apply generalizations, attitudes and information to novel situations.

● You should never try to conclude the lesson by summarizing the findings of the students. Any form of conclusion tends to have the effect of ending further thought. You may summarize the findings without closing the issue. You may say, *"We have arrived at this position which has further possible extensions which you may search for in next class."*

● Whether you like to promote discovery/inquiry mind in your students is entirely up to you. If you want it then you have to demonstrate it through your actions and beliefs. You need to be a student with an inquiring mind working along with your students.

E8. What are the principles of discovery learning?

1.3.6 Problem Solving

Let us consider a situation:

> **Situation 5:** *Ms.Geeta, the mathematics teacher, taught the concept of a triangle in the elementary class. She asked the students about different types of triangle. Students were not able to answer this question and this became a problem for them. They carried this assignment home. They thought over the problem and drew different types of triangles taking into consideration of sides and angles. They formulated hypotheses as follows:*
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> ● *Sides are unequal,*
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> ● *Two sides are equal,*
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> ● *Three sides are equal,*
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> ● *One angle is 90° and other two angles together are 90°*
>
> ● *One angle is more than 90°and other two are less together than 90°*
>
> ● *Each angle is 60°*
>
> *For each of the hypothesis the students named the triangle differently. Thus the students were able to solve the problem.*

From the above situation it can be inferred that problem challenges students to find a solution using previous knowledge. The problem should be put forward in clear words and should be according to the understanding and experiences of the students. The student does analysis and synthesis of the problem with the help of the teacher and tries to find out the solution.

Thus we can say that problem solving involves the following features:

- A goal to be reached;

- A felt difficulty / need to reach the goal;

- Challenging the felt difficulty through conscious, planned and purposeful attack;

- Reaching the goal or arriving at satisfactory solution to the problem at hand.

Problem solving has the following *steps*:

- *Identifying and defining the problem:* Problem arises out of felt need and out of existing students' activities and environmental activities. The students should be able to identify and clearly define the problem.

- *Analysis of the problem* – The problem should be properly analysed.

- *Stating clearly the relationships* between different concepts.

- *Formulating hypotheses:* Possible solution may be formulated basing on the nature of the problem

- *Testing the hypotheses* – Each hypothesis is to be tested to solve the problem.

- *Verification of the result* – The solution of the problem is to be verified number of times to test the validity of the hypotheses.

The teacher plays a vital role in presenting the problem and solving the problem by the students. The following are ***the roles of the teacher***:

- Create the problem situation.

- Create fear-free atmosphere in the class.

- Assist the student in perceiving, defining and stating the problem.

- Help the student in analysing the problem.

- Encourage the student to formulate and to test the hypotheses

- Help the student to develop critical thinking, open mindedness and spirit of enquiry and discovery.

E9. State the steps of problem solving.

1.3.7 Learning as Meaning Making

Read the following situation.

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Situation 6: *Ms. Sushmita, the English teacher, was helping her students in Class VI to write an essay on 'The Rainy Season'. To initiate it, she asked a simple question to the students to react, "What comes to your mind when I say 'It is raining'?" Everyone in the class was eager to respond. Some of the responses are as follows: "I love to dance in the rain."*

"It's muddy and nasty everywhere."

"Rain brings flood and misery."

"It's green all around in the field."

"When rain drops fall on our tin roof, it is music for me and I begin to hum with it."

"Mosquitoes, flies, insects are all around along with several diseases. I only wish rain is not there."

"It's so cool and comfortable after the heats and sweats of summer."

"Can see colourful umbrellas in my street, I love to have one."

"Can see variety of colourful flowers, little frogs and paper boats; what a fun when it rains!!"

"Cold with running nose, fever, head ache come with rain."

"Cloudy sky with sun not visible, it is very gloomy."

The list of responses is never ending. Do you notice any incorrect or irrelevant response in all these statements? Each statement is about rain and reflects the perception of the individual child. If you try to draw a meaning of rain, you will surely fail. You can ask for the meaning of anything and you will receive as many responses as the number of respondents but all different responses. What are the reasons for such differences in meaning of an object or a concept?

Well it is perception which varies from person to person. Perception of an individual can be understood from the way he/she acts. When it is raining, some people will run for the shelter while others will enjoy walking in it. Although, there is no disagreement on *'It is raining'*, their actions indicate differences in their perceptions, and the meanings they make of the incident. Thus different people perceive different things about the same situation. But more than that, we assign different meanings to what we perceive. What we perceive is largely a function of our previous experiences, our assumptions and our purposes (needs). We do not change our perceptions until and unless we are frustrated in our attempts to do something based on them. If our purposes are met by

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our meaning (perception) of things and processes, we do not change those even if others tell those to be "incorrect". Only when the meanings or perceptions we hold about something do not help us to understand new things or to solve new problems, then we search for alternative meanings which work for achieving our purposes. The ability to learn is seen as the ability to change or reject inappropriate perceptions and to develop new and more workable meaning. In short, learning is meaning making – changing old ones in favour of workable alternative meanings. When learning is meaning making, students are the meaning makers. The learning process in this context is student centred entirely dependent on the student.

In the traditional teacher-centred, syllabus-driven teaching, we consider all the students in a class to be of same or similar ability level and have nearly similar meaning of objects and events. Hence, the belief with which we teach in the class is that all learning in the class occurs in the same way. This is not true when we consider learning as meaning making. The meaning maker has no end to his/her educative process. He/she continues to create new meanings, to make new transactions with his environment.

To facilitate meaning making learning, your *role as a teacher* is as follows:

● Before initiating any learning activity in the class you should have a clear knowledge of the previous experience of each student relating to the activity.

● Besides the previous knowledge, you should have intimate knowledge of the interests, attitudes and typical personality characteristics of the students which have bearing on their perception.

● You need to create a congenial environment in the classroom and school in which the students would feel free to express their viewpoints on the issues being discussed.

● You should record each student's perceptions on the issue on the black board so that all the statements are visible to all students.

● You need to create opportunity for each student to explain his/her viewpoints so that in the process everyone could understand the perception of others and would get chance to assess his/her own position on the issue and may like to modify or change the meaning so far held by him/her.

E10. State the importance of perception in meaning making.

1.4 PROCESS OF TEACHING

All of us have experienced teaching in different forms from our school days. But if somebody asks, *"What is teaching?"* the most common and simple answer would be, *"what a teacher does in the classroom is teaching"*. And since there are different types of teachers, there are different types of teaching. Traditionally, our classroom practices are teacher dominated and hence teacher-centric. Everything that happens in the classroom are determined, transacted and assessed by the teacher. The student has no say in the teaching – learning processes that are transacted in the classroom. The teacher is instructing and directing the students to do what he/she desired. Teaching meant transmitting information, facts, and concepts, as prescribed in the syllabus, to the students. However, with the shift from teacher-centred classroom practices to student-centred practices, student and learning are more focused where the roles of teachers and the practices of teaching have undergone modification. There is no single way of learning and therefore there are a variety of teaching models to suit to the desired way of learning.

In this section three approaches of teaching that have importance in to-day's classroom practices have been discussed.

1.4.1 Teaching for Behaviour Modification

We have learnt that learning is a relatively permanent change in behaviour. Behaviour means different for different persons. Some are of the belief that behaviour is sum total of all the personality traits or characteristics that an individual possesses, while some others believe behaviour to be the observable actions that an individual demonstrates. The behaviour modification approach to teaching is based on the second belief. When we change or modify the observable behaviour of a child, we are directly or indirectly trying to help child to learn.

Observable behaviours are mainly of two types: *elicited behaviour* and *emitted behaviour*. When we make a child to behave in a desired way by adopting some means, we are trying to elicit or draw out the behaviour from the child. For example, when we make child run by offering a chocolate, we are trying to elicit or draw out the behaviour of running from the child. On some occasions you might have experienced that an individual without any visible external cause demonstrates a particular behaviour normally you had not noticed earlier in him/her. We categorize such behaviour as emitted behaviour. A little child humming an unknown sweet tune, a student solves a difficult problem in an unusual method, or a girl demonstrates a dance pose which was not taught in her dance class are some examples of emitted behaviour.

When a child is made to demonstrate these two observable behaviours, i.e. elicited and emitted, as normal occurring behaviours, then we say that the behaviour modification has taken place in the child. There are two phases of behaviour

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modification: the first phase is concerned with making sure the elicited or emitted behaviours occur again and again as and when required and the second is to continue the process of modification to refine the existing and acquired behaviours to acquire more and more new behaviours. The process of habituating the child (or for that matter any organism, human being, or animal) to repeat and modify both the types of behaviours is called *conditioning* by the psychologists. There are two major types of conditioning depending on the two types of behaviours: *Classical conditioning* i.e. conditioning of elicited behaviours, and *Operant conditioning* for conditioning the emitted behaviours.

Classical conditioning: Ivan Pavlov, a Russian physiologist, did pioneering work on classical conditioning (around 1890s). He noticed that in his laboratory, hungry dogs began to salivate when they were about to be fed, even before they could see or smell the food. Strangely, they seemed to be salivating at the mere sight of their keeper or even when they heard his footsteps. This simple observation led Pavlov to a series of carefully designed experiments involving ringing of a bell or sounding a buzzer – neither of which ordinarily leads to salivation - and immediately presenting dogs with food, a stimulus that does lead to salivation. After considerable number of such combined presentations of sounding of bell and then food, the dogs salivated with sounding of the bell even if food is not presented.

In Pavlov's experiments, the bell is referred to as a *conditioned stimulus* (CS), the food is a natural or an *unconditioned stimulus* (UCS); and salivation in response to food is an *unconditioned response* (UCR), whereas salivation in response to the bell or buzzer is a *conditioned response* (CR). Initially, ringing of the bell or sounding of the buzzer is a *neutral stimulus* (one that does not lead to a response) for salivation.

In general terms, a stimulus or situation that readily leads to a response can be paired with a neutral stimulus to bring about classical conditioning. This is also called respondent conditioning because the elicited behaviour occurs in response to a stimulus.

Classical conditioning is very much perceptible in classroom practices, virtually at all times, irrespective of the other kinds of learning going on at the same time. And it is largely through these unconscious processes that students come to like or dislike schools, subjects, and teachers. For example, a school subject is a neutral stimulus that evokes little emotional response in the beginning assuming that it is new to students. The teacher, the classroom, or some other distinctive stimulus in the student's immediate environment may act as a conditioning stimulus. This conditioning stimulus might be pleasant (like well-ventilated and comfortable classroom, a friendly teacher) or unpleasant (like dark and hot room, a hard teacher with threatening voice). Following successive pairing of subject matter with the distinctive stimulus, the emotions and attitudes associated with conditioning stimulus becomes classically conditioned to some aspects of school. Learning to dislike mathematics is a typical case of adverse case of classroom processes, and an example of classical conditioning. Love for mathematics learning (at least the emotional part) can also be created with similar process of classical conditioning.

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Operant conditioning: Operant conditioning is the outcome of a series of elaborately designed experiments by B.F. Skinner (around 1940s) with rats and pigeons. In general terms, operant conditioning is to strengthen (Skinner calls 'reinforce') the behaviour emitted by an organism (Emitted behaviour is called operant) so that the probability of its occurrence increases. This increase is the result of reinforcement. The key concern of Skinner was to discover the relationship between reinforcement and behaviour and to clarify how behaviour is affected by its consequences.

Skinner differentiated between two of his most important terms: *reinforces* and *reinforcement*. For example, a reward or food is the reinforces and presenting food when a response is emitted is the reinforcement. The occurrence of the emitted behaviour and also shaping behaviour by modification of emitted behaviour can be possible through variations in the schedule of reinforcement. Reinforcement always strengthens the occurrence of the emitted behaviour. However, there are two types of reinforcements – positive and negative. *Positive reinforcement* (reward) involves the presentation of pleasant stimulus followed by an emitted behaviour which strengthens the occurrence of the behaviour. Whenever a teacher smiles at the students, says something pleasant to them, praises for their work, assigns high grades he/she is using positive reinforcement.

Negative reinforcement (Relief) occurs when removal of an aversive or unpleasant stimulus following an emitted behaviour strengthens the occurrence of the behaviour. Threats of punishment, failure, detention, humiliation, ridicule and several others are examples of aversive stimuli given by teachers in the classroom which when removed provide relief to the students followed by the occurrence of the desired behaviour emitted by the students.

You have to realise that *punishment* is not reinforcement. Punishment is inflicted either by presenting a painful stimulus or by removing a pleasant stimulus which invariably causes painful feelings, both physical and emotional, in students. Giving physical punishments, scolding or threatening in the class, and detaining after class hours are some examples of punishments given in schools.

Operant conditioning has been applied in developing several technology of teaching. Prominent among them are programmed learning or programmed instruction and recently in the computer assisted learning.

Relevance of Behaviour modification approach:

Behaviour modification approach has made us aware of relevance of several common classroom practices as given below.

- *Repetition is important for learning* follows from all theories of behaviour modification.

- *Repetition without reinforcement* does not enhance learning.

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- *Variations in presenting the reinforcers help modification of behaviour.*

- *Punishment is not very effective for eliminating undesirable behaviour.*

- *Interest in work and in improvement is conducive to learning.*

The major criticism against the behaviour modification approach is that it only considers the observable behaviour for modification and hence for learning. It might be quite suitable for animals and for very young children. But with the advance in age there is mental development, and the observable behaviour may not reflect the actual intention of the individual. A school age child demonstrates some behaviour only to attract the attention of others and to avoid punishment. Hence, any modification of manifest behaviour may not actually result in learning.

E11. What is the way of modifying behaviour through operant conditioning?

E12. What is the difference between negative reinforcement and punishment?

1.4.2 Teaching for Development of Cognition

The dictionary meaning of cognition is the art of knowing. Usually it is concerned with knowing, understanding, processing and using information and these are considered as mental abilities or components of intelligence. Cognitive development refers to the stages and processes involved in child's intellectual development.

There are several theories of development of cognition. Among all the theories, Piaget's theory provides a comprehensive picture of cognitive development from birth to the age of 14 or 15 when cognitive development attains the peak. Piaget conceives of cognitive development as consisting of a series of stages, each characterized by certain kinds of behaviours and certain ways of thinking and solving problems. All the age specific stages have been grouped under four broad stages:

- Sensori-motor (0 – 2 years of age),

- Pre-operational (2 – 7 years),

- Concrete operational (7 – 11 or 12 years) and

- Formal operational (11 or 12 – 14 or 15 years)

The descriptions of the characteristics of the child's behaviour at each stage can be valuable in helping you as a teacher to understand your students' level of cognition. Knowing the cognitive status is important as any form of learning is greatly influenced

by the way a student thinks, reasons and processes information. Some major characteristics at the four stages of cognitive development are provided in Table 1.

Table 1 Piaget's Stages of Cognitive Development

Stage	Approximate Age	Some Major Characteristics
Sensorimotor	**0 – 2 years**	• Intelligence related motor activities, • Concerned with present and nearby incidents and objects, • No language and no thought, • No idea of objective reality,
Preoperational • *Pre-conceptual* • *Intuitive*	**2 – 7 years** 2 – 4 years 4 – 7years	• Egocentric thought, • Reason dominated by perception, • Intuitive rather than logical solutions • Inability to conserve,
Concrete Operations	**7 – 11 or 12years**	• Ability to conserve, • Logic of class and relations, • Understanding of numbers, • Thinking bound to concrete objects and experiences • Development of reversibility in thought.
Formal Operations	**11 or 12 – 14 or 15 years**	• Complete generality of thought, • Propositional thinking, • Ability to deal with hypothetical ideas and situations, • Development of strong idealism.

(Source: Lefrancois, 1994 p.60)

Piaget's theory tells us that the child is born with a mental/cognitive structure which develops and attains maximum growth around the age 14 or 15 years. The major trends of the cognitive development during the four stages are as follows:

• During the first two years of life, the child performs activities mostly driven by sense organs and some motor activities. For an infant at this stage, objects exist

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when they can be seen, heard, touched, tasted or smelled and when they are removed from the infant's immediate sensory experience, they cease to exist.

● Towards the end of this sensorimotor period, the child can identify the objects around him/her and can imitate several actions of others. And at a later stage, the child can imitate the actions in absence of the actions or objects (called deferred imitation). This indicates that the child can observe the action minutely, internalize the actions and reproduce it signifying the early form of intentional action. Intentional actions are also part of intelligent activity.

● Piaget defines 'operations' as mental activities subject to certain rules of logic. According to him, operations in true form do not appear before 7 years of age. But with development of language ability, the child tries to reason out in a crude way during the pre-operation period. These reasoning are mostly pre-logical – egocentric (everything moving around the self), and intuitive, mostly driven by emotion and passion.

● The intelligence as is commonly understood begins to appear towards the end of the pre-operation stage i.e., around age of 6 or 7 years (incidentally this is the beginning of schooling). It is during the concrete operation period i.e. from 7 – 11 or 12 years of age, children make a fundamentally important transition from a pre-logical form of thought to logical thinking that apply to real, concrete objects and events. Three important mental abilities develop during this period with manipulation of concrete objects and events. They are *conservation, classification and seriation*.

Conservation is the realization that quantity or amount does not change when nothing has been added to or taken away from and object or collection of objects, despite changes in form or arrangement in space. For example, to test the conservation of number, expose the children to two collections of marbles/beads as shown below.
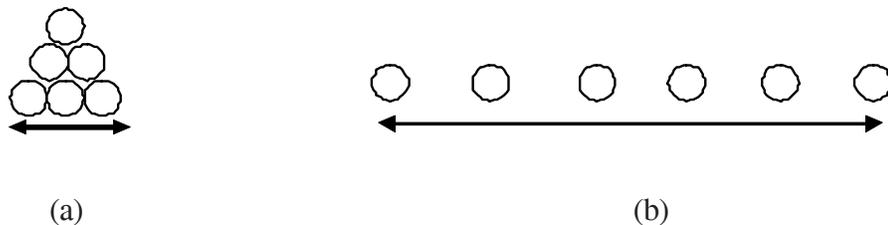

(a)   (b)

Fig. 1 Arrangements of Marbles

If these two arrangements of marbles are shown to children in pre-operation stage, almost all would say that the collection (b) has more marbles because they have not yet developed the ability of conservation of numbers. Similar conservation tasks in area, volume and mass have revealed that it is during the concrete operation stage, children develop this ability.

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Classification is to group objects according to their similarities and differences. Classification involves comparing and contrasting the objects on different characteristics like size, shape, colour, weight, use, material etc. A child in pre-operation stage is not capable of classifying objects and cannot compare more than two objects at a time.

Seriation is the ability to arrange similar objects in a definite order (increasing or decreasing).

Besides these three, the ability to deal with numbers, a direct product of classification and seriation, develops during the stage of concrete operations.

● The stage of formal operation is the final stage of cognitive development. It is formal because the subject matters with which children can now deal are mostly imaginary or hypothetical, abstract and free from concrete objects and events. The thinking process at this stage involves propositional reasoning following the *"If, then..."* logic like *"If A>B and B>C, then what is the relation between A and C?"* Such problems involving abstract and propositional logic cannot be solved by children in concrete operation stage.

Lev Vygotsky, the famous Russian psychologist, adds two elements in his theory of cognitive development. He stresses the impact of *culture* and *language* on the cognitive development. According to him, without culture, our intellectual functioning is limited to apelike, elementary mental functions. With intensive interaction with the elements of culture and a healthy language development, we become capable of higher mental functions involved in thinking, reasoning, remembering and so on.

Further Vygotsky states that a child progresses through three stages in developing language functions:

i. *Social (External) Speech (before age 3 or 4 years),* used largely to control others or to express simple concepts;

ii. *Egocentric Speech (3 – 7 years)* is mostly talking about self and is usually spoken out loud. It has a role in controlling and directing the child's own behaviour;

iii. *Inner Speech (above 7 years)* is marked by unspoken verbalizations that control thought and behaviour.

Vygotsky argues strongly for language related activities in schools and inclusion of cultural elements in the curricular interactions in and outside of the classroom.

Considering the children in primary schools most of them are in the concrete operation period while those in the upper primary school are in formal operation period. As discussed these two periods, especially the concrete operation stage is very crucial for cognitive development. Therefore you need to develop your teaching strategies for development of cognition of children. Following are some points to note.

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- In your strategy of teaching you have to strike an optimal balance (in Piaget's language *'equilibration'*) between using previous experience, old learning and behaviour (*assimilation*), and making new changes (*accommodation*). Striking balance or equilibration helps the child in adapting the change in behaviour and action.

- While providing learning experiences, maturation levels of the children have to be recognized. Maturation unfolds the hereditary characteristics which helps us to make appropriate learning provisions. You cannot ask a child to sing a song loudly when she has not developed full control over her speech-producing organs which develops in course of maturation.

- Cognitive development depends directly on the child's day to day activities and experiences with real objects and events. Provision should be made for a relatively large amount of activities, both physical and mental, relating learning to real objects and events, especially before the formal operations stage.

- Social interaction i.e. interaction with others is fundamental to the development of notions about others, about things and about self. Such interactions, predominantly verbal in nature, help in development of language abilities and understanding relations both of which are crucial for cognitive development.

- Understanding children is important on the part of a teacher. When a child responding to the task shown in Fig1 earlier states that in Fig.1 (b) there are more number of marbles, we cannot understand the child's intention clearly if we just conclude that he/she has committed an error. Rather, if we probe as to why the child thinks it to be correct, then perhaps we can understand his/her capabilities better than suggesting the correct response directly. In this way we can know the strengths and limitations of the students and make appropriate strategies for development of their cognition.

- Language is the primary symbolic expression of our thought. Therefore, giving children more chance to speak freely is not only helping to develop his/her cognition, but also to understand the child better through his/her expressions.

E13. Why should we provide more teaching-learning materials for children reading in primary schools?

E14. What is the importance of group learning for cognitive development of children?

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1.4.3 Teaching for Construction of Experience

A student constructs his/her own knowledge on the basis of interaction with his/her environment. The following two assumptions are basis of constructivist learning:

- Knowledge is actively constructed by the student, not passively received from the environment.

- Coming to know is a process of adaptation based on and constantly modified by student's experience of the world.

Put simply, the experience of a student is more important in learning new things. He/she alone can modify his/her previous experience in order to solve a problematic situation and thereby constructing new experience or acquiring new knowledge. But how does the process of construction of knowledge take place?

The construction of knowledge takes place in the following ways:

- *Connecting new idea with the previous knowledge/experience* helps in constructing new knowledge. If one knows counting the objects, one can connect it to learn addition, but at this stage cannot directly learn percentage. By manipulating various objects and events in the immediate environment, one develops mental images and when one comes across a new object, one tries to interpret the new object in terms of the known objects.

- *Focusing on the interrelationships among concepts,* new ideas/knowledge is constructed. If we can establish connections of similarity and dissimilarity among the related concepts, learning new things would be easier and more meaningful.

- *Forming mental images both at the initial stage of learning and mental representations of interrelationships* is the key process in construction of knowledge. Suppose a child encounters a new object with similarity with an orange that he/she had known earlier. If after seeing it he/she fails to relate it with orange and form its mental representation, then at a subsequent time the same object (say apple) shall be a new one for him/her. In other words forming mental representations is the construction of knowledge.

- *Interacting in social groups or on social themes help* to make learning more meaningful. Social interaction makes the student realize the different real world problems. He/she asks questions, responds to others, reflects on the problem, gains multiple interpretations of the problem and finally has an overall mental representation of the problem which he/she tries to solve mentally. As a result of the mental representations of the different aspects of the problem, solution emerges signifying new construction of knowledge.

What then are your roles as a teacher in the construction of knowledge of your students?

The *roles of a teacher* are as follows:

- Facilitating students in their efforts to learn without directly instructing them on any new concepts.

- Being sensitive to the previous experiences of each and every student in the class.

- Providing authentic (real-world and contextual) tasks.

- Providing as many materials and experiences from the immediate environment as possible. Manipulating materials and events so that the students can gather more experience.

- Providing real-world, context-based learning environments rather than predetermined instructional sequences for making learning more realistic, relevant and contextual.

- Focussing on realistic approaches to solve real-world problems.

- Providing or/and encouraging the students to come out with multiple representations or alternative solutions when engaged in solving a problem.

- Allowing students to ask questions and encouraging them to raise intelligent questions.

- Fostering reflective practice. By encouraging raising intelligent questions, indirectly put pressure to think reflectively.

- Supporting cooperative and collaborative learning in the classroom.

- Connecting the activities in the school with those outside the school.

- Encouraging self-analysis and self-assessment of their learning progress.

E15. What is the role of previous experience in constructing new knowledge?

1.5 LET US SUM UP

- Learning is a process which causes relatively permanent change in human behaviour, knowledge, habits and those aspects of personality that are necessary to meet the demands of life.

- Learning is continuous, intentional, goal directed and active process that results as the interaction of the individual with his/her environment.

- Maturation, environment, readiness to learn, and motivation are some of the factors that affect learning.

- Children learn through various methods like imitation, observation, trial and error, participation, discovery, and problem solving. Meaning making through perceiving objects is also a powerful method of learning.

- Besides the traditional instructional process of teaching, behaviour modification approach has several impacts on the classroom teaching-learning processes.

- Learning for cognitive development and learning to construct knowledge have lot of potentials towards learning of children specifically for those in the primary schools.

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1.6 MODEL ANSWERS TO CHECK YOUR PROGRESS

E1.   Any three from the list given;

E2.   (i) Intrinsic motivation comes from within whereas extrinsic motivation is dependent on others to provide. (ii) Intrinsic motivation is longer lasting than the extrinsic motivation.

E3.   By showing the model is punished for the deviant behaviour.

E4.   (i) help the student to focus attention on the specific aspects, (ii) encourage mental rehearsal of the actions, (iii) provide scope/activities to practice the observed actions, (iv) motivate the student to learn from observation.

E5.   (i) providing reward and (ii) Discussing with student and encouraging for self-assessment.

E6.   Law of exercise, Law of effect, and Law of readiness.

E7.   (i)Actively participating in all activities, and (ii) Asking probing questions.

E8.   Principles of activity, Principle of logical thinking, Principle of proceeding from known to unknown, Principle of purposeful experiences, Principle of searching for alternatives.

E9.   Identifying and defining the problem, Analysis of the problem, Formulating hypothesis,

Testing the hypothesis, and Verification of the result.

E10.   Meaning of an object or an event comes from our perceptions, When we change or modify our perceptions we change or modify the meaning earlier

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formed thus we also modify our experience or gather new experience. Thus perception shapes our learning.

E11. By variation of providing reinforcements.

E12. Negative reinforcement provides relief as the unpleasant stimuli is removed and thus strengthen the occurrence of the desired behaviour. On the other hand punishment is unpleasant and hinders in occurrence of the desired behaviour.

E13. Concrete operations are strengthened by manipulation of variety of concrete objects, hence during the primary school years (age 7 – 11 years) provision of more teaching-learning materials is necessary.

E14. Group learning provides scope for more social interactions which is necessary for healthy cognitive development.

E15. Previous experience connects similar elements/concepts from the new situation and helps in new construction.

1.7 SUGGESTED READINGS AND REFERENCES

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- Arthur, J.& Cremin. T(2006), Learning to Teach in the Primary School, Newyork: Routledge

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1.8 UNIT-END EXERCISE

1. Give a definition of learning process and explain its characteristics.

2. Explain with suitable examples the four processes of observational learning. How does imitation help in observational learning?

3. Describe the processes of modifying the emitted behaviour with examples from classroom practices.

4. State the role of a primary school teacher in development of cognition of her students.

5. Examine the relationship between learning for meaning making and teaching for construction of knowledge.