UNIT 13 DEVELOPING LEARNING SKILLS

Structure

13.1 INTRODUCTION

With rapid social change and technological advancement, education is becoming more accessible to people at their convenience in terms of time, place and pace, through the open learning system. Through (OLS) people are becoming more responsive towards education.

In any system of education, learning outcomes and students achievement is of major concern as these are thought to be the determinants of evaluative aspect of education. Though the academic achievement of students depends on various factors such as the students desire to learn, instructional strategies, study materials, students' study skills, etc., the learning skills of students are thought to play an important role in the academic achievement. Researches focusing on students' learning skills and difficulties in learning from text have found that most students do not have appropriate and efficient strategies necessary for learning on their own. Students generally need guidance.

There can be many possible explanations regarding why students lack the strategies necessary for independent learning. However, the most obvious reason is the lack of systematic instruction on learning strategies in our institutions. Students' lack of control over strategy appears to be another well supported explanation of why so many students are not effective and efficient independent learners. Adequate learning skills among students enable them to become independent learners both in and out of schools. In this unit, we discuss the skills of learning independently.

13.2 OBJECTIVES

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

- define the meaning of learning process skills;

- discuss the needs and characters of learners;

- identify the learning skills to be acquired by the learners;

- differentiate between the learning skills and the study skills;

- identify the various study skills required by the learner;

- discuss different problem-solving strategies;

- acquiant yourselves with how to teach thinking skills.

13.3 LEARNING SKILLS

Learning skills have been understood differently by different people and have been used inter-changeably with study skills. Nevertheless, they all talk about competencies or skills associated with acquiring, organising, synthesizing, remembering, and using information and ideas read in books, observed or listened to in different situations.

Learning is a life long process, and in the whole spectrum of education, our focus is on enhancing certain competencies and skills in learning. Hence, skills in learning refer to students' development of confidence and competence in learning. While confidence in learning depends on the students' motivation, self-interest, positive attitude to learn, etc., competence in learning comes from specific activities a student is engaged in while doing a particular learning task.

In a conventional sense, the three R's i.e., reading, writing and arithmetic are the three basic learning skills. However, there are a number of sub-skills involved in each of these and they are interrelated and complementary to each other. In addition to these, there are certain subject-specific learning skills which are required to accomplish learning activity in that particular subject. These subject-specific learning skills differ from subject to subject. For example, the skills for learning mathematics vary considerably from the skills required for learning a language or any other subject, say music/dance.

13.3.1 Stages in the Process of Learning

It is evident from the above that essentially there are three stages in the process of learning; namely, acquiring, synthesizing, and applying new information knowledge. There are different skills or a set of skills required in accomplishing each stage and each of these functions requires specific skills to do it effectively. For example, acquiring information or knowledge can be accomplished through reading, listening, observing, etc. The skills required in these stages are:

Acquisition

Acquiring new knowledge/information is one of the most important pre-requisite of the learning process. We acquire most of our knowledge through reading, listening and observation. While one interacts with text, listens to someone or observes certain event, a number of new concepts, new ideas, new words and new symbols come all along in the way. The act of analysing these concepts, ideas, symbols etc. is to find out their underlying meaning and making sense out of them, is known as acquisition.

Reading

It is one of the major means of acquiring new knowledge. It is a constructive process which involves both reconstructing an author's message and constructing one's own meaning using the print. The process of reading requires the use of complex thought procedures to interpret printed symbols as meaningful units and comprehend them as thought units in order to understand a printed message (Collins and Cheed, 1993).

Listening

It is another important means of acquiring new knowledge. It is a "selective process of attending to hearing, understanding and remembering oral (and at times visual) symbols" (Barker, 1971; p.71). The process of listening begins with perceiving a message, interpreting it and understanding the meaning. Effective listening requires the listener to hear what the speaker said, without a biased pre-selection (I hear what I want to near) interpret it accurately, and understand the meaning. Usually, the interpretation part in listening is difficult because of the symbolic nature of communication (Gleans and Brilhart, 1993).

Observation

It is similar to listening, except that in observation, interpretation and understanding are based on the visual symbols unlike in listening; where it is essentially based on the aural symbols. It is a process of perceiving visual symbols, interpreting them, understanding the meaning and relating it with prior knowledge.

As in listening, the limitation in this is that the process of observation is selective, i.e. determined by the observer's interest. At the same time, one need not hear or observe everything that is said to be spread around your eyes. How to select what is crucial and not waste the time in hearing/seeing that is not crucial-important, is a problem for every person and hence one has to learn the skill of listening/observing systematically and not take it as natural process.

Synthesizing

It requires the student to make sense out of the information acquired and relate it to the previous knowledge. While synthesizing the ideas, the learner categorizes, organises, and combines the newly-learned ideas; and creates, devises, designs, explains, generates, modifies the ideas to totally new situations to be able to see a set of abstract relations among them.

Application

It is an important and final step in the process of learning. Most of what we learn is intended for application to problem situations in real life. Application refers to the use of the abstraction of theory, principle, concept, idea or information correctly in an appropriate situation.

Check Your Progress

Notes : a)   Write your answers in the space given below.

b)   Compare your answers with the those given at the end of the unit.

1. What does students' learning depend on?

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2. Name the stages in the processes of learning.

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13.4 LEARNING STYLES

In any classroom it is not very likely that any two students learn the same thing; in the same way; at the same place. We are finally beginning to realize that in order to assist each pupil and to capitalize on his or her natural inclination to understand, we must be able not only to diagnose his or her style of learning but to accept it. There are many styles of learning, and there is no evidence to suggest that one is better than another. What is better is the style that fits each person most comfortably; what is not better is to try to fit a person into a learning mode that seems alien and strange. Once we accept (and appreciate) the idea that there are different ways of learning, each valid for particular students, then we can be free to explore various ways of teaching in order to accommodate the vast array of learner differences that confront us.

Each of us has a style of learning as individual and as our own personality. These styles could be categorized as visual (reading), aural (listening), and physical (actively doing things).

Each classroom is likely to include students whose styles of learning vary widely. Although teachers cannot cater completely to each student's particular style, they can attempt, utilize the strengths and reduce or modify the weaknesses of those in their classes.

An individual's basic style of learning is probably laid down early in life and is not subject to any fundamental change. For example, a pupil who likes to learn by listening and speaking (aural style) is unlikely to change completely and become an outstanding reader.

In the interest of effective motivation, it is important to be sensitive to each student's learning style. If, for example, some students seem to learn best by reading, you might want to suggest books to them, but to call on them more often in class; to encourage them to experience more physical or verbal learning, may not be advisable. On the other hand in some cases, you might find it beneficial to encourage students to read more but not to the point of exasperation. Once we identify and become aware of each student's particular style of learning, we can build on that style, along with helping him or her experience other modes of learning. All this leads to effective learning.

We all have our preferences for learning, our own learning styles. Recently educational psychologists have begun to concentrate on the importance of learning styles. Learning styles can be defined as the normal variations in internal and external preferences for the setting and manner in which learning takes place.

Everyone has preferences for studying. Some like noise, while others can't stand any noise. Some like to hear lectures, some prefer discussion, and some would rather personally experience the thing being studied. Each student has his/her own specific preference.

One mistake is consistently made while analysing the learning styles. Learning styles illustrate the preferences of students for learning, and it is wrong to think that a student with a visual preference cannot learn from a lecture. Students need not always operate in their preferred mode of learning. However, there is some evidence to suggest that when students are allowed to learn using their preferred style, their achievement is more.

Check Your Progress

Notes : a) Write your answers in the space given below.

   b) Compare your answers with the those given at the end of the unit.

3. What are the various categories of learning styles?

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4. What mistake we make while analyzing learning styles?

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13.5 LEARNING STRATEGIES

In the previous section, we have talked about the learning styles, now we will talk about the learning strategies. Certain relatively generic skills facilitate learning in a broad range of situation like; reading with speed, accuracy, and comprehension; critical thinking; general principles of problem-solving, and "learning to learn" skills and study skills. As a part of the recent emphasis on cognition and human information processing, a great deal of research has been done on the development of effective strategies for learning, and on how these strategies may be taught to individuals who do not develop them spontaneously.

Learning strategy could be divided into five categories; which are:

i) Rehearsal strategy involves actively repeating (saying, writing) material or focussing on the key parts. For brief rote learning tasks, rehearsal may involve repeating key terms aloud, copying the material, taking verbatim notes, or underlining important parts.

ii) Elaboration strategy involves making connections between the new and the familiar. For rote learning, elaboration strategy includes forming mental images to associate with the material, generating sentences that relate to the items to be learned to more familiar items, or using mnemonic devices like the keyword method. In more complex meaningful learning, elaboration strategy includes paraphrasing, summarizing, creating analogies, taking notes that go beyond verbatim repetition to extent or comment on the material, answering questions, and describing how the new information relates to the existing knowledge.

iii) Organizational strategy involves imposing structure on the material by dividing it into parts and identifying superordinate-subordinate relationships. In simple rote learning, organisational strategy involves breaking lists into chunks. Organisational strategy for complex meaningful learning includes outlining the text, creating a hierarchy on network of concepts, or creating diagrams showing their relationships.

iv) Comprehension monitoring strategy involves remaining aware of what one is trying to accomplish, keeping track of the strategy one uses and the success achieved by them, and adjusting the behaviour accordingly. This strategy includes self-questioning to check understanding, taking action when one does not understand, using statements of objectives to guide study, establishing sub-goals and assessing progress in meeting them, and modifying strategies; if necessary.

v) Affective strategy includes establishing and maintaining motivation, focusing attention, maintaining concentration, managing performance, anxiety and managing time effectively. These relatively generic learning strategies and related cognitive skills are not only worth teaching to elementary and secondary students but are helpful in your own learning.

Check Your Progress

Notes : a) Write your answers in the space given below.

b) Compare your answers with the those given at the end of the unit.

5. Name the categories in which the learning strategies could be categorised.

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6. For rote learning, which strategy is appropriate?

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7. What are comprehension monitoring strategies?

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13.6 STRATEGIES FOR READING WITH COMPREHENSION

Children's awareness of and ability to use strategies for remembering what they learn emerge gradually and uncertainly. So they often use an inefficient strategy. As they do not possess knowledge that should enbale them to use a more efficient strategy; some of the strategies for reading with comprehension are given below:

13.6.1 Metamemory

Metamemory is the knowledge about how memory works and how to memorize effectively. Children only gradually come to learn that some kinds of material (meaningful, organized,

interesting) are easier to learn than others; that recognition tests are easier than recall tests; that paraphrased recall is easier than verbatim recall, or that active rehearsal will produce better results than silent reading. Training studies showed that children who were given metamemory strategy usually learned more than controlled children but often reverted to their pre-training behaviour unless continually reminded of using the strategies.

13.6.2 Metacognition

The term metacognition refers to the knowledge about cognitive processes and how they function, and the term metacognitive awareness refers to a person's conscious monitoring of his or her own cognitive strategies during the process of applying them.

13.6.3 Metacomprehension

A particularly interesting sub-topic in research on metacognition is the study of metacomprehension; the strategy that readers use in monitoring, evaluating, and repairing their comprehension during reading. Children can use monitoring strategy that helps them understand what they read and remember in an organised way. This strategy includes identifying relevant background knowledge, generating and responding to questions about the material, making connections between its parts, drawing inferences from it, and summarizing and organizing it. Unfortunately, students rarely receive instruction in these comprehension-monitoring strategies in typical classrooms. Thus, it is important for teachers at all grade levels to be aware of this strategy and prepare themselves to teach them to students who do not use them spontaneously.

13.6.4 Strategies Used by Skilled Readers

Skilled readers use strategies appropriate for the purpose of reading, monitor their comprehension as they read, and take corrective actions (repair strategies) in response to ambiguities and comprehension failures. In particular, they use strategies for; (1) clarifying task demands, (2) reading for meaning, (3) focusing on important content rather than minor details (reading for remembering), (4) monitoring their comprehension as they read, (5) checking and reviewing to make sure that goals are being met, (6) taking corrective action when comprehension fails, and (7) recovering from disruptions so that text processing can continue.

Check Your Progress

Notes : a) Write your answers in the space given below.

b) Compare your answers with the those given at the end of the unit.

8. What do you mean by Metamemory?

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9. What do you mean by Metacomprehension?

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13.7 STUDY SKILLS

To learn efficiently from texts, students must be able not only to comprehend what they read but also to retain and use the information. This requires the use of effective skills for independent learning. Even school students differ considerably in the nature and outcomes of their study skills.

Surface-level versus Deep-level Learners

Surface-level learners try to memorize the material so as to be able to reproduce it, whereas the deep-level learners try to understand the material, develop insights, and think about how it would be used. The surface-level learners are less likely to enjoy reading the text and are nervous in testing situations. Study skills which students use are as follows:

13.7.1 Note Taking

To retain material for future use, it is usually necessary not only to study it in an active, systematic way but to be able to take notes or in some other way preserve key ideas in a form that makes them easy to refer to later on.

13.7.2 Underlining

Underlining and highlighting important materials are among the study techniques used by most of the school students. Underlining appears to be less effective than other note taking techniques. However, it is comparatively passive, and it psychologically defers the active learning process to some future time. Also, many students use it ineffectively because they underline too much or underline before they have absorbed enough of the material to know which parts are most important. Thus, underlining may be most useful if done only after reading through the material the first time.

13.7.3 Marginal Comments and Coding Systems

Marginal comments include questions like rephrasing of difficult sentences, and definitions of unfamiliar words. The coding systems include colour coding (using markers) to indicate main ideas and separate them from supporting evidence, circles around to indicate new terms, arrows indicating relationships between ideas, boxes to contain related ideas, marginal numbers to indicate sequential patterns, marks stars to indicate the important ideas, or question marks to indicate disagreement with the author. Marginal comments or coding systems involve the reader more actively in the author's presentation than mere underlining does.

13.7.4 Summarising

Note taking in the form of written summaries is likely to facilitate learning. Good summaries condense the material and focus on the important ideas. There are six rules essential to effective summarizing: (1) delete trivial material, (2) delete redundant material, (3) substitute a superordinate term for a list of subordinate items when possible, (4) substitute a superordinate event for a list of subordinate actions when possible, (5) select a topic sentence if the author has provided one, and (6) write your own topic sentence, if necessary.

Simply by telling the students these rules is sufficient to improve performance for some. Others need training in skills like: delete redundant information with red pencil, delete trivial information with blue pencil, write in superordinates for any lists, underline topic sentences if provided, write topic sentences where required. Students who practice these skills and also check their performance using a check-list gain the most.

Check Your Progress

Notes : a) Write your answers in the space given below.

b) Compare your answers with the those given at the end of the unit.

10. Differentiate between surface-level and deep-level learners?

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11. Write 2-3 sentences on marginal comments and coding systems?

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17.8 PROBLEM-SOLVING STRATEGIES

Besides being able to read with comprehension and study efficiently, students need to learn, how to solve problems effectively – not just in mathematics, but in any subject area. A problem exists when a person perceives a need to achieve some goal but does not immediately know how to achieve it. Some problem solving strategies are discussed below:

13.8.1 Algorithms

Well-structured problems present both a clearly defined goal and all the information required to solve the problems using appropriate algorithms (fixed rules or procedures that guarantee correct answers if followed precisely, such as the rules for whole-number additon). In contrast, ill-structured problems are more, difficult to define, let alone solve. The person is aware that a problem exists but may not be clear about what information will be required to solve it, where this information can be obtained from, or how to apply it. There may not even be a single correct answer.

13.8.2 Heuristics

Ill-structured problems must be attacked by using heuristics-general rules of thumb and procedural guidelines for processing information and solving problems, such as, identifying what information is given and what is required. Heuristics do not guarantee solutions the way algorithms do, but they are applicable of a broad range of problems and allow people to discover solutions for themselves. Thus, well-structured, home-work problems in Mathematics or Science are solved using algorithms but ill-structured problems such as predicting changes in market conditions or discovering cures for diseases require Heuristics.

Educational psychologists have long been interested in identifying ways to teach people to solve problems effectively. Pessimists believe that problem-solving cannot be taught directly although students will benefit from frequent opportunities to develop their problem-solving skills through practice. Optimists, on the other hand, believe that problem-solving skills can be developed directly by teaching students effective problem-solving heuristics. John Dewey had suggested steps for effective problem-solving:

1. Presentation of the problem : Become aware of the problems or be made aware of them.

2. Definition of the problem : Define the problem by identifying the present state and the desired goal states and consider the implications for the solution. Sometimes, a problem can be defined in different ways, with various solution implications.

3. Development of hypotheses: Given the problem definition, generate hypotheses for solving it.

4. Testing of hypotheses: Identify the advantages and disadvantages associated with each proposed solution.

5. Selection of the best hypotheses : Identify the solution that offers maximum advantages and the fewest disadvantages.

Contemporary views of problem-solving reflect the ideas about human information processing. Expert problem solvers do not proceed in the rigid manner implied by Dewey's stages (in particular, they do not generate a large number of hypotheses and then test each one). Instead, they conceptualize the problems by identifying key features and relate them to background knowledge and then identifying only one or a few promising hypotheses for testing. For example, physicians diagnosing medical problems do not begin by listing every conceivable source of the symptoms. Instead they ask questions designed to quickly narrow the search to a few probable diagnoses and then pursue them.

The task environment is the large structure of facts, concepts, and their interrelationships within the problem is embedded. The problem space is the problem solver's mental representation of that task environment. The problem space must simplify the task environment enough to allow the person to address the problem within the ones of working memory and yet be an accurate representation to foster effective problem-solving efforts.

Accurate representation of the problem is the key to the success of this method. If the problem is represented inappropriately, the resulting solution efforts will fail, and the person will have to begin all over again. In well-structured problems, accurate representation may be followed by activation of algorithms that lead directly to a solution. On the other hand, in ill-structured problems, the person may have to rely on heuristics such as reasoning by analogy from more familiar problems, working on sub-parts before dealing with the whole, working backwards from proposed solutions, or testing the most promising hypotheses first.

Check Your Progress

Notes : a) Write your answers in the space given below.

b) Compare your answers with the those given at the end of the unit.

11. What do you mean by algorithms?

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12. What do you understand by heuristics?

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13.9 TEACHING THINKING SKILLS

There are many reasons for teaching/thinking in the schools. There is evidence that when thinking skills are taught as part of the curriculum, test scores in academic areas as well as scores on intelligence tests improve.

There is more to teaching/thinking skills than an attempt to boost test scores. Today, we are facing a glut of information. Teachers are called upon to teach more material as the amount of knowledge increases. Any parent who remembers science class may look at what his or her child is learning and realize that much of it is new. With this information explosion, we are more than ever being forced to evaluate and compare, to decide and act. Having information is not enough, people need to be trained to do something with the information. They need to learn to think independently. Preparing students for this is a part of the school's responsibility.

Unfortunately, many students, cannot properly use the information they possess. Many people are biased in their decision-making and do not see long range consequences, nor do they consider all alternatives. Good thinking involves, among other things, the ability to use evidence skillfully, to suspend judgement in the absence of evidence, to anticipate consequences, to see similarities and analogies that are not superficial, to apply problem-solving techniques in fields other than those in which they were learned, to listen carefully to other people; and to look for unusual approaches to complex problems.

What types of thinking are required?

If we can agree that teaching students to think is an important concern, the next step is to decide what types of thinking are required. Some argue that each discipline has its own logic and reasoning skills and that reasoning skills do not bridge subject differences. However, most authorities today do not agree with this argument, claiming that there are thinking skills that can be developed and that they are necessary and valid for use in many disciplines. Many lists of thinking skills that students need are available, although no list can be seen as complete.

Table 13.1 : Twenty Nine Thinking Skills

1. Comparing	11. Reorganizing	21. Imagining
2. Classifying	12. Setting	22. Logical deduction
3. Estimating	13. Prioriting	23. Identifying pros/cons
4. Summarizing	14. Setting criteria	24. Identifying propaganda
5. Hypothesizing	15. Goal setting	25. Identifying
6. Synthesizing	16. Problem-solving	26. Reaching consequences
7. Sequencing	17. Decision-making	27. Observing
8. Predicting	18. Justifying making	28. Creating/designing
9. Evaluating	19. Making assumptions	29. Interpreting
10. Translating	20. Using analogies	

The Table 13.1 shows twenty-nine different thinking skills that are commonly found in the literature. The term higher order reasonsing skill is often used to describe elaborate and complex thinking skills such as analyzing, comparing, inferring, interpreting, and evaluating.

Higher order thinking is not routine and often leads to multiple solutions to problems. Table 13.2 shows the application of higher order reasoning skills in Science, Social Studies and Literature. The term critical thinking refers to thinking that is involved with analyzing and focusing on what to believe or do in a particular situation.

Table 13.2 : Higher Order Reasoning Skills

	Science	Social Studies	Literature
Analyze	Identify the components of a process or the features of animate and inanimate objects.	Identify the components of an argument or the elements of an event.	Identify the components of literary, expository and persuasive discourse.
Compare	Compare the properties of objects or events.	Compare the causes and effects of separate events and of social, political, economic, cultural, and geographic features.	Compare meanings, themes, plots, characters, settings, and reasons.
Infer	Draw conclusions, make predictions, pose, hypotheses, tests, and explanations.	Predict, hypothesize and conclude.	Explain motivations of characters in terms of cause and effect.
Evaluate	Evaluate the soundness and significance of findings.	Evaluate the credibility and significance of arguments, decisions, and reports.	Evaluate form significance, completeness and clarity.

How can thinking skills be injected into the classrooms?

If you, as a teacher, were asked to develop a thinking skills programme for your own classroom, how would you go about doing it? The following suggestions can help introduce thinking skills materials into the classroom.

i)   Identify which thinking skills should be taught and emphasized upon. Choose a set of thinking skills that are most important to your discipline.

ii) Identify comprehension pitfalls in your subject. For instance, a common problem in Mathematics and Science is over-reliance on formula that are not understood. You may find that in reading, students understand the literal meaning of a paragraph but have difficulty making inferences from it. A thinking programme may benefit students by addressing such pitfalls.

iii) Know the process by which the skill is to be taught. If you are teaching a lesson on comparison and students had difficulty in understanding exactly how to compare things in a reasonable fashion, you have to demonstrate a series of steps that must be taken to compare.

    a)   Present the objects or ideas to be compared;

    b)   Have the students observe and describe them one at a time;

    c)   Compare the objects or ideas and make a list of their similarities;

    d)   Repeat the process, making a list of differences;

    e)   Identify the criteria used in making the comparisons;

    f)   Summarize the significant similarities and differences.

iv) Encourage active student participation in reasoning. This can be accomplished in a number of ways. A teacher might ask questions requiring students to consider the pros and cons of each issue and specifically point out the reasoning skill being used. Students might be asked to compare or show their understanding of a skill such as making anologies.

v)   Make abstract concepts which are concrete and relevant. Whenever dealing with an

abstract concept, ask students to apply the concept to relevant everyday occurences and generate many examples to show where the concept can be applied.

vi) Use probing questions. Not all teacher's questions encourage thinking. Often, questions require no more than one or two-word answers and usually require only recall. Teachers can ask probing questions. However, these questions can be built into the lesson. This is not to say that questions that deal with facts and information are not important. They however, after asking factual questions, ask students such questions that require them to think.

vii) Actively involve the children in generating questions. Student generated questions can stimulate thinking. One possibility is to ask students when reading to translate head and sub-heads into questions.

viii) Develop listening and observing skills. These skills are basic to communication and thinking. Students may need help in developing the ability to actively listen to their fellow students during class.

ix) Encourage parents to help develop their children's thinking skills. Parents can encourage their children to generate questions and ask their children to imagine what will happen next in a story, to explain why they feel a particular way, and to support their opinions.

Check Your Progress

Notes :   a)   Write your answers in the space given below.

b)   Compare your answers with the those given at the end of the unit.

14.   List ten thinking skills.

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15.   Why teaching-thinking skills is important in schools?

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13.10   LET US SUM UP

In this unit, we started our discussion with the concept of learning skills. Learning skills refer to students' development of confidence and competence in learning. There are three stages in the process of learning, namely; acquiring, synthesizing and applying new information. We also discussed about learning styles. These styles are broadly categorised as Visual (reading), Aural (listening), and Physical (actively doing things). Learning strategies were then highlighted. There are given categories of learning strategies. These are, rehearsal strategy, elaboration strategy, organizational strategy, comprehension monitoring strategy and affective strategy. We discussed certain strategies such as: Metamemory, Metacognition, Metacomprehension and others. Study skills were also touched upon. Study skills are note taking, underlining, marginal comments and coding systems and summarising. Problem-solving strategies like; Algorithms and Heuristics were discussed. In the end, we presented why thinking skills should be taught in the schools. Twenty nine thinking skills were given. How thinking skills can be taught in schools was also touched upon.

13.11   UNIT-END ACTIVITIES

1.   Observe students of your class and study, what learning styles each student of the class follows. Also study the impact of learning styles on the students' academic performance.

2.   Chalk out a programme to develop thinking skills in your students. Carry out the programme and assess the effectiveness of the programme.

3.   What type of study skills do you find among your students? How do they help them in their academic achievement?

13.12 ANSWERS TO CHECK YOUR PROGRESS

1. Students' learning depends on their motivation, self-interest, positive attitude to learn, etc.

2. There are three stages in the process of learning. These are: Acquiring, Synthesizing and Applying new information.

3. The categories of learning styles are: Visual (reading), Aural (listening) and Physical (actively doing) things.

4. The learning style of a student illustrates his/her preference for learning. Hence, it is wrong to think that a student with a visual preference cannot learn from a lecture.

5. Learning strategy could be divided into five categories. These are: rehearsal strategy, elaboration strategy, organization strategy, comprehension monitoring strategy and affective strategy.

6. Elaboration strategy is appropriate for role learning.

7. Comprehension monitoring strategy involves remaining aware of what one is trying to accomplish, keeping track of the strategy one uses and the success achieved with them, and adjusting the behaviour accordingly.

8. Metamemory is the knowledge about how memory works and how to memorize effectively.

9. Metacomprehension is the strategy which readers use in monitoring, evaluating, and repairing their comprehension during reading.

10. Surface-level learners try to memorize the material so as to be able to reproduce it, whereas deep-level learners try to understand the material, develop insights and think about how it would be used effectively.

11. Marginal comments include questions, rephrasing of difficult sentences, and definitions of unfamiliar words. Coding systems include colour coding to indicate main ideas, circle around to indicate new terms, arrows indicating relationship between ideas, etc.

12. Algorithms are fixed rules or procedures that guarantee correct answers if followed precisely, such as the rules for whole number addition.

13. Heuristics are general rules of thumb and procedural guidelines for processing information and solving problems, such as, identifying what information is given and what is required.

14. Ten thinking skills are: classifying, estimating, hypothesizing, summarizing, synthesizing, sequencing, predicting, evaluating, reorganizing and setting.

15. Teaching thinking skills is important in schools because it improves test scores of students in academic areas as well as in intelligence tests. Moreover, with a lot of information pouring in everyday, students have to compare, evaluate, decide and act independently. They need to learn to think independently.