
UNIT 11 DOMAINS OF LEARNING

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11.1 INTRODUCTION

You have studied about the nature of the learning process in Unit 10. Learning, as you know, leads to change in behaviour. Behaviour can be understood as a complex sum total of a person's ways of knowing or interacting with the environment. This process of knowing and interacting involves a large gamut of activities related to one's intellect, feelings and skills. Learning, therefore, is associated with all these aspects of behaviour in an integrated manner. Educational psychologists, in an attempt to understand learning processes, have tried to analyse and categorize them into broad areas or domains of behavioural patterns at the level of intellect, emotions and skills.

In this unit you will study about the domains or areas in which learning seems to take place. Since learning is a process which leads to change in behaviour, the learning process should have certain outcomes which can be observed and measured. This unit therefore, deals with the areas of learning and learning outcomes in the various domains of learning. Since learning is the crux of the educational process, the educational implications of learning in various domains shall also be taken up.

11.2 OBJECTIVES

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

- discuss that learning is associated with cognitive (intellect), affective (feelings) and psychomotor (skills) aspects of behaviour;
- relate learning abilities in the three domains in terms of learning outcomes or learning objectives; and
- discuss the implications of learning in cognitive, affective and psychomotor domains for teachers and curriculum planners.

11.3 DOMAINS OF LEARNING

Human behaviour has a dynamic quality, i.e., it keeps changing in response to various stimuli it receives from the environment. From infancy, we are continually learning new skills, gaining information about the environment around us, and developing certain beliefs and attitudes. These, in a way, form the domains or areas of learning. Let us try to know more about these domains of learning, namely cognitive, affective and psychomotor. These domains are not mutually exclusive. Rather they overlap each other. Therefore learning is not considered to belong to any particular domain. In other words, for example, psychomotor development

requires proper knowledge or understanding (cognitive development) on the part of the students. For greater clarity we shall discuss each domain of learning separately.

11.3.1 Cognitive Domain

The word 'cognitive' arises from 'cognition' which means 'to know' and knowing is an integral part of seeking knowledge. Therefore, in educational processes, learning mainly focuses upon the cognitive domain. Learning processes in the cognitive domain are associated with those mental operations which are used to manipulate information from the environment. Thus the cognitive domain involves a number of activities varying from exposure to information to its organization or processing in the learner's mind. This information can include visual forms which would involve seeing, or it could be verbal i.e., hearing/listening.

Various psychologists and educationists have tried to analyse the learning at the cognitive domain. Prominent among them are Bloom, Grunlund, Mager, etc. We discuss here six levels of learning of the cognitive domain.

- a) **Knowledge** : Possession of knowledge or information is the foundation from which all higher thinking grows. Recall or recognition of specific elements in a subject area, i.e., memory level operations are involved at this level. Data, facts, concepts or principles are memorised at this level of learning.
- b) **Comprehension** : The second level of learning is comprehension. Information is not useful unless it is understood. At this level, those mental operations which help in understanding of facts, concepts, principles and generalizations are included. This level incorporates the previous level too i.e., knowledge. In other words, the meaningful processing of information takes place after the recognition or identification of any kind of information. One way we can check whether students have comprehended the information they possess is to ask them to state that information in their own words. Alternatively they can be asked to give examples of the concept or generalisation being learnt. Comprehension or understanding may involve any of the following processes:
 - **Translation** : Here the known concept or definition is transformed by the student into his own words or phrases. In other words, the student may give a meaning to a concept, definition or a principle in his or her own words.
 - **Interpretation** : Here the student tries to see interrelations among the various recognizable components of any information (data, facts, concepts, principles, generalization, theory, etc.)
 - **Extrapolation** : This involves some kind of predictions or drawing conclusions keeping in mind the situations which are beyond those given to the student.
- c) **Application** : Information becomes meaningful when it is applied to a new, not previously encountered situation. The mental operations at this level involve the use of concepts, principles or theories in real/concrete situations. Now a days there is an increasing emphasis on developing application abilities among the students. Generalisations can be used to solve new problems. Previous knowledge can be used to estimate answers, predict outcomes. In other words, students should be able to apply their knowledge of whatever they learn to real life situations.
- d) **Analysis** : Creative thinking and problem solving begin with analytic thinking: mentally taking something apart to understand better the relationship of the parts to each other and to the whole. When information gathered is broken down into its constituent elements or parts, such that the relationship among parts become clear, we say that the information is being analysed. At this level of learning, the student can analyse principles, concepts, theories, etc.
- e) **Synthesis** : It involves putting together of the components or the parts of a concept, principle or generalisation so as to form a whole. Synthesis involves arranging and combining the various parts in such a way so as to form a pattern or structure which might not have been clearly perceptible earlier. The student should be able to put or arrange various parts of a concept into a whole.
- f) **Evaluation** : The mental operations at this level involve making of judgements which may be based either on the criteria of consistency/logic or may involve some comparison with standards or norms. Making a judgement is the most complex level of learning.

Student's values (intellectual, aesthetic, social or moral) are usually reflected in cognition at this level of evaluation.

All the six levels of mental operation have been taken up (in increasing order of complexity) in the hierarchy of levels in learning. Thus, any cognitive level should involve the earlier ones as a prerequisite to carry out the cognitive processes. It has been found that knowledge, comprehension and application are more clearly linked in the hierarchy than the three other levels in the cognitive domain.

Gagne also proposed various kinds of learning. His categorization can broadly be considered as cognitive behaviour at simple and complex levels. At the simple level it is more of memorisation. Here a student reproduces or recognizes a specific symbol(s) as response when provided with specific stimuli in the form of questions or any data. This is more of associated learning. In complex cognitive learning, the student may have to deal with situations where there may not be any pre-determined sequence of stimuli. The complex level of cognitive learning may involve classification, analysis and ultimately problem solving also.

Classification of learning is the basis of concept learning wherein the student tries to identify an appropriate class or category to which the object or event belongs to. The analytic behaviour is when the learner is able to see relationships between the components of concepts and their generalisation in a particular situation. Thereby, the learner learns the principles or generalizations with specific patterns of combination of some concepts related under specific conditions.

Problem solving is when a student is able to select relevant principles and sequence them so as to come to a solution. A problem situation is essentially a situation where the direct solution is not foreseen by the student. This is the highest level of learning and involves other levels of cognitive processes. Problem solving behaviour also includes an element of creativity or divergent thinking.

The cognitive domain of learning involves a number of processes which vary from simple memorization level to the complex level of problem solving. As a teacher you should clearly understand the nature and kind of learning in the cognitive domain. This is also because this domain constitutes the major chunk of formal or classroom learning. Transmission of knowledge to the students is one of the primary functions of the teacher.

Check Your Progress 1

Notes : a) Answer the following questions.

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

i) What are the major domains of learning?

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ii) Explain in brief the domains of learning.

a) Cognitive learning.....

b) Affective learning.....

c) Psychomotor learning.....

iii) Choose the most appropriate alternative in the following:

In the cognitive domain the highest form of learning is:

- a) concept learning
- b) learning of principles
- c) problem solving

iv) Choose the most appropriate alternative.

The levels of cognitive learning categorised by Bloom are from:

- a) understanding to problem solving
- b) knowledge to evaluation
- c) application to evaluation
- d) comprehension to synthesis

11.3.2 Affective Domain

While learning, the student as a person/individual is wholly involved in intellectual abilities. In other words, the learning situation influences the feelings, interests, emotions and attitudes of the student. That is why we find that some students have more interest or aptitude for a particular subject as compared to others. Besides this observation, it is also true that educational objectives also deliberate upon development of desirable beliefs, values, attitudes, etc., along with seeking knowledge. Therefore, learning in the affective domain includes changes in interest, attitudes, values, and feelings. All these behaviours ultimately lead to better adjustment abilities in the student in the society.

As compared to the cognitive domain, learning situations and processes are not so well defined and identified in the affective domain. The learning processes cannot be specified here with so much clarity and objectivity. In fact, there is an overlap of cognitive learning and the affective domain. Moreover, the assessment of affective learning may not be so precise as it can be for cognitive learning.

In the cognitive domain, the main organising principles were from simple to complex, from concrete to abstract, etc. In the affective domain which deals with attitudes, interests, and values, it is very difficult to work on these principles. The main organising principle in the affective domain is the degree of internalization, i.e., the extent to which the feelings or emotions are incorporated by the student as a part of his or her personality. The main organizing principles in the affective domain are :

- a) **Receiving** : This means the sensitivity of a student to certain stimulus pattern of stimuli (phenomena) and his willingness to receive or attend to them. Receiving consists of (i) awareness of the stimuli, (ii) willingness to receive, and (iii) selected attention.
- b) **Responding** : This level of learning goes beyond the receiving level. After giving attention or perceiving the stimulus or object, the student actively responds to the object.
- c) **Valuing** : This level of the affective domain implies perceiving a concept as having worth and consequently revealing a consistent preference or commitment in behaviour towards it.
- d) **Organization** : For situations where more than one value is relevant, the student organises the values into a system and also determines the inter-relationships among them.
- e) **Characteristics** : After the values have been organized in the individual's mind, they control his/her behaviour to some extent. This is the stage of internalization, the degree of internalization depends upon the consistency of the internal organization of the student.

Learning in the affective domain does not seem to lend itself to such exact assessment as it could in the cognitive domain.

Check Your Progress 2

Notes : a) Fill in the blanks.

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

i) Learning in the affective domain influences.....

ii) As compared to the cognitive domain, the measurement of learning in the affective domain is

iii) The principles of learning in the affective domain are.....
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11.3.3 Psychomotor Domain

This domain pertains to the manipulative or psychomotor skills which can be developed under the supervision or guidance of an expert or skilled person. For example, the skill of driving a car can be acquired effectively under the direct supervision of a skilled instructor. Learning psychomotor skills has three characteristics. They are:

- **Responsive chains** : Learning of skills involve a chain of motor responses i.e., one muscular movement leads to another muscular movement.
- **Coordination** : The coordination of perception and motor acts is essential in skill learning. For example, a person who learns the skill of driving a car has to coordinate movements of various parts of his body.
- **Response patterns** : Skill learning involves organisation of stimulus and response patterns. For example, a child with mastery on riding a bicycle commits minimum errors while riding a bicycle. The skill becomes a habit.

Dave (1969) attempted to classify learning situations in the psychomotor domain into five categories. They are : initiation, manipulation, precision, articulation, and naturalisation (mechanisation and internalisation).

The first three categories are quite clear. Here articulation emphasizes the coordination of a series of acts which are performed appropriately in terms of time, speed and ease. Naturalization refers to the highest level of proficiency or skill whereby an act becomes a routine to be performed with natural ease by a person.

Another classification (Kibler, 1970) has child developmental psychology as its frame of reference:

- **Gross body movements** : This class of skills includes movements of limbs in isolation or in coordination with other parts of the body.
- **Finally coordinated movements** : This class of skills includes coordinated movements of the various parts of the body, such as hand-finger, hand-eye, hand-ear, hand-eye-foot, hand-eye-foot-ear combinations, etc.
- **Non-verbal communication behaviours** : This class of skills includes facial expressions, gestures, body movements, etc., to convey messages.
- **Speech behaviours** : This class of skills includes sound production, sound-gesture coordination, etc.

Harrow (1972) operationally defined 'psychomotor' and developed a classification which also deals with sub-categories of psychomotor behaviour and along with concrete examples. This classification is more useful to teachers of physical education. Thus the psychomotor domain covers any observable movement of one's body that belongs to the domain of learning. Learning of skills, at times, is a component of cognitive and effective learning too. As compared to the affective domain, learning in the psychomotor domain can be assessed with much more precision.

There are five stages of psychomotor learning: perception, set, guided response, mechanisms and complex overt response.

- **Perception** is the process of becoming aware of objects, qualities or relations by way of sense of organs.
- **Set** is a preparatory adjustment of readiness for a particular kind of action.
- **Guided response** is the early step in the development of skills. It is the overt behavioural act of a learner under the guidance of a teacher. Readiness is a prerequisite for this kind of response.

- **Mechanism** means that learned response has become habitual. At this level, the learner has achieved a certain confidence and the degree of skill to perform an act which is part of his repertoire of possible responses to stimuli.
- **Complex overt response** will show that the learner can perform a complex motor act, as he has attained a higher skill.

After going through the three domains of learning, you might have observed that the cognitive domain is a better developed level of learning. Firstly 'by its very nature' it favourably lends itself to the construction of models in levels of learning and secondly it has captured the attention of teacher in the formal learning situations. By and large, it is the cognitive learning which is evaluated in the school situations.

Compared with the cognitive domain, the affective domain is less developed. The affective aspect of learning is less observable than the cognitive aspect and in most cases is less susceptible to rigorous measurement. Coming to the psychomotor domain, as physical and art education are comparatively neglected in the school curriculum, so lesser efforts have been made in this domain at the school level.

Check Your Progress 3

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

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

i) Explain the following terms:

a) Articulation

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b) Naturalisation

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ii) List the categories of learning in the psychomotor domain keeping in mind the child developmental psychology.

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11.4 LEARNING OUTCOMES

In the earlier section we discussed three domains of learning. As teachers, we are equally concerned with the outcomes of learning i.e., the terminal behaviour in terms of performance or achievement by the student. What kind of learning outcomes are there? Learning outcomes should be measured and interpreted in terms of different categories of learning capabilities. Learning outcomes, in a way, constitute the objectives of teaching-learning experiences. The objectives or expected learning outcomes have to be based on the level of learning in the three domains. When considered in a broader perspective, learning outcomes are derived from the curriculum (a sum total of teaching-learning experiences) which in turn is derived from the broader aims of education. Thus intended or expected learning outcomes are specific objectives signifying the levels of learning in any of the three domains i.e., cognitive, affective and psychomotor. When the specific objectives describe the desired learning outcomes in terms of specific acts or behaviour, they are called behavioural objectives. The behavioural objectives indicate the conditions or context under which the behaviour should occur. They also indicate minimum standards of performance.

Formulation of specific objectives helps distinguish various aspects of learning such as affective, cognitive and psychomotor. It also helps in making learning more functional and articulative at various levels i.e., cognitive, affective and psychomotor. They also help you in planning proper learning situations, identify specific learning problems of students as they facilitate specific assessment of learning.

Specific objectives are formulated in the beginning of instructional planning. Statement of specific objective should have the following characteristics:

- The statement of an objective should include the kind of behavioural outcome expected (as a result of learning), and (b) the content to be covered.
- An objective should be stated in terms of student's behaviour or learning outcomes.
- A behavioural objective should clearly indicate (with respect to the learner)
 - specific action verb (performance)
 - conditions under performance to be shown, and
 - the extent to which performance to be shown (minimum standards)

Let us explain these characteristics with the help of an example. After giving background information on Iron and Oxygen, we can state the objective as follows : The student will be able to write the formulae of two compounds of Iron and Oxygen.

This is a behavioural objective at the comprehension level in cognitive domain. If we try to analyse the statement of the objective in terms of criterion requirements, we find :

- action verb - write formulae
- condition - Iron and Oxygen as starting elements
- standard of performance - two compounds

This kind of analysis helps in formation of specific learning outcomes in any of the three domains of learning.

Check Your Progress 4

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

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

i) What is a behavioural objective?

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ii) List the requirements for stating behavioural objectives.

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iii) Write a behavioural objective in each domain in the subject of your choice.

a) Knowledge level in cognitive domain

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b) Comprehension level in cognitive domain

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c) Application level in cognitive domain

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11.5 EDUCATIONAL IMPLICATIONS

The process of learning which leads to change in behaviour is not a simple one, it encompasses a number of activities. Education in itself is a process which leads to behavioural development. Therefore, learning is central to the process of education. Education is development of body, mind and spirit. If we try to correlate physical, intellectual, emotional and spiritual development with the domains of learning, we find that development of intellect falls in the cognitive domain, while emotional and spiritual development is concerned with the affective domain and physical development is through skills which comprise of the psychomotor domain. We can therefore, conclude that identifying the various types of learning activities and learning outcomes is the core of the educational process. The sub-categorisation of the three domains of learning into finer levels helps in understanding the nature of learning and thereby effective planning and assessment of learning activities. The levels of learning within the major domains allow the teachers to move from simple and preliminary levels of learning to successively more complex ones. When considered with reference to the frame work of the psychology of child development, the learning activities can be suitably designed for the specific age groups of the students.

Identification of learning at various levels in the different domains and then formulation of specific behavioural objectives as learning outcomes will help in designing or planning instruction and also evaluation. These objectives serve as guidelines in learning, instruction and evaluation. As instruction is planned from the broader curriculum, the curriculum planners have to take into consideration the intended learning outcomes when they plan the total learning experiences. Moreover, evaluation as a comprehensive process should provide feedback to reevaluation of objectives. Clarity and specificity of objectives has a crucial role in identifying and planning instructional activities as well as evaluation material.

Thus, specific objectives provide a clear direction to educational activities (curriculum planning, instruction and evaluation). They provide a concrete basis for systematising and planning educational programmes whether curricular or co-curricular.

Check Your Progress 5

- Notes :
- Write your answer in the space given below.
 - Compare your answer with the one given at the end of the unit.

How are specific objectives helpful to you as a teacher?

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11.6 LET US SUM UP

In this unit, we have discussed three domains of learning as cognitive, affective and psychomotor. Within each domain the levels of learning were identified. Familiarity with levels of learning can help you in the identification of intended learning outcomes i.e., specific objectives. Emphasis was laid on formulating objectives in behavioural terms as this would help you in systematic planning of not only learning situations but evaluation of learning also.

The significance of specific objectives is not restricted to planning of instruction and evaluation, rather they provide guidelines to curriculum planning as well. Thus specific objectives are the fundamental basis of educational programmes.

11.7 UNIT-END EXERCISES

- Compare the nature and assessment of learning in the major domains.
- Discuss the significance of specific objectives in educational processes. Support your answer with suitable examples.

11.8 ANSWERS TO CHECK YOUR PROGRESS

1. i) Cognitive (intellectual abilities), affective (emotions/feelings) and psychomotor (skills) domains.
 - ii) a) intellectual abilities
 - b) emotions/feelings
 - c) skills
- iii) i) c (problem solving)
- iv) ii) b (knowledge to evaluation)
2. i) Attitudes/feelings/values
- ii) Difficult/less specific
- iii) Receiving, responding, valuing, organizational, and characteristics
3. i) a) Articulation : Coordination of action performed with efficiency in terms of time, speed and ease.
- b) Naturalisation : Performance in skill with natural ease and almost no conscious effort so that it is like a habit.
- ii) Your answer might have included the following categories : Gross body movements, finally coordinated movements, non-verbal communication, speech behaviours.
4. i) When learning outcomes or objectives are stated in terms of specific behaviour or performance by the learner, the learning outcomes are observable and measurable.
- ii) The requirements are:
 - specific act or performance to be shown by the students.
 - conditions under which performance is to be displayed.
 - minimum standards of performance.
- iii) Your answers may vary. We present an example here for your understanding.
 - a) It represents the repetition of responses that have been practiced through learning experiences. After learning, memory is the major requisite for correct performance.
 - b) After giving background information on Iron and Oxygen, the student will be able to write the formulae of two compounds of Iron and Oxygen.
 - c) At his level, the nature of the problem is not new. Students have experienced in finding out solutions for similar problems. So they use previously knowledge to solve new problems.
- 5) The objectives are helpful in the various ways. Your answer might have included the following advantages:
 - Help in planning the broader curriculum.
 - Serve as guideline in designing instruction.
 - Help in evaluating expected learning outcomes.

11.9 SUGGESTED READINGS

Hergenhahn (1990) : *Theories of Learning*, Prentice Hall, New Delhi.

Rao, S. Narayan (1990) : *Educational Psychology*, Wiley Eastern Limited, New Delhi.

Sprinthall, R.C. and Sprinthall, N.A. (1974) : *Educational Psychology : A Developmental Approach*, Addison-Wesley Publishing Company.