

SUBJECT:- TEACHING OF SCIENCE

TOPIC :- EVALUATION IN SCIENCE

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EVALUATION IN SCIENCE

INTRODUCTION:- Evaluation is a continuous appraisal of the achievement of the aims of education, the methods of teaching, and the learning experiences with a view to do continuous improvement to make education dynamic and self developing. The primary purpose of evaluation, in addition to gaining insight into previous or existing initiatives, is to enable reflection and assist in the identification of future change.

Definitions:-

According to Stufflebeam, "A study designed to assist some audience to assess an object's merit and worth".

According to St Leger and Wordsworth Bell, "The critical assessment, in as objective a manner as possible, of the degree to which a service or its component parts fulfills stated goals".

Conclusion:- It is concluded that it is an attaining objective knowledge and scientifically or quantitatively measuring predetermined and external concepts as well as value laden judgements of the programs outcomes and worth.

Purposes of Evaluation:- Evaluation helps us to set tasks and goals which are higher than what we aspired for earlier, thus facilitating advancement of education. According to Deane, N.H. the purposes of evaluation are

1. Providing information for grading and promoting students and reporting to parents
2. Evaluating the effectiveness of a single teaching method or to appraise the relative worth of several methods
3. Motivating the students
4. Selecting the students
5. Collecting information for effective educational and vocational counselling.

In the broader aspect the purposes are:-

1. Learning level: It can improve the pupils learning by the following way
 - (i) clearing the intended learning outcomes
 - (ii) giving short term goals to work
 - (iii) Providing feedback concerning learning progress.
 - (iv) giving information for over coming learning problems and selecting future learning experiences
2. Teaching level: Information from developed evaluation techniques can also be helpful to assess and improve instruction. It can be only possible if:
 - (a) Instructional objectives should be appropriate and attainable

Instructional materials should be useful.

The instructional methods should be effective

Guidance and counselling level: The results of evaluation are very important and useful for guidance and counselling. The selection of curricula, extra curricular activities, vocational decisions, personal and social adjustment problems, abilities, attitudes, interests of students. The more clear picture is more effective the guidance and counselling will be

School administration level: - A continuous evaluation programme in the school helps the evaluation on which to base administrative decisions concerning grouping etc.

Curricula development level: The teachers committees are formed in each major content area to develop units of work in their respective fields. They are supposed to perform following functions

State and intended learning outcomes that the student are expected to perform at the end of the unit
Making a list of instructional materials and learning activities.

Classroom research level: Evaluation is also helpful for school research programme. It helps to study the comparative effectiveness of different curricula and different methods of teaching.

TYPES OF EVALUATION:- According to P.W. Airasian and G.F. Madans the evaluation procedure is classified as

1. Placement evaluation 2. Formative evaluation. 3. Diagnostic evaluation. 4. Summative evaluation

1. Placement evaluation:- It determines pupil performance of at the beginning of instruction. It helps to know the knowledge skill and objectives of the instructions so that instruction should be given to the students according to its needs interest.
2. Formative evaluation:- It is used to know progress that occurred during instruction and to provide continuous feedback to both teacher and the student. Feedback given to students reinforce learning successes and select any short coming in learning.
3. Diagnostic evaluation:- It is called for when learning difficulties persist. It helps to detect the underlying causes of the problems and to formulate a suitable plan of remedial action.
4. Summative evaluation:- This is concerned with making judgements, to which extent the instructional objectives have been achieved. The techniques used include teacher-made achievement tests, rating of laboratory skills, models and project reports.

Evaluation PROCESS: The evaluation process consisting following steps:

1. Formulation of objectives: The objectives containing knowledge application, skills, attitudes, appreciation etc. The main emphasis is given on knowledge objective these days. But all other objectives should be given due stress to develop child's abundant development.
 - i) the needs and capabilities of students.
 - (ii) The nature of the subject matter.
2. Defining objectives in terms of Behavioural changes: Once the objective of teaching is realized, it is expected that pupils will develop some new behaviour patterns e.g. particular group of students have been taught a particular portion of the syllabus say optical instruments with the view to achieve the knowledge objective. It is easy to test the behaviour than the objective. The content is the means to bring about the behavioural change and to test the change.

Some objectives of science teaching are defined in terms of behaviour pattern -

Objective I: - To acquire the knowledge about scientific facts, terms, concepts, procedures etc are use in daily life.

Behavioural changes: 1) The pupil retains and recalls the information imparted. 2) He can establish the relationship

- 3) He will be able to compare and contrast the situation.
 4) He will classify the facts. 5) He can draw the inferences from scientific data.

Objective II: To apply knowledge of science in everyday life.
Behavioural changes: 1) He can identify the principle involved in a specific situation. 2) He can suggest a modified behaviour in a new situation. 3) He can predict from facts.

Objective III: It is to develop scientific thinking.

Behaviour changes: 1) The pupil can develop keen and eager systematic observation. 2) He will develop objective outlook. 3) He can develop scientific attitude for solving dogmas and superstition.

Objective IV: It will include: Behaviour changes are

- 1) The pupil can develop the ability to manipulate.
- 2) He will be able to prepare improvised apparatus.

Objective V: It includes: Behaviour changes are

1. The pupil will become eager to know about nature.
2. He will develop different hobbies relating to science.
3. He will appreciate the gifts of science.

3: Developing the learning experiences: The defined objectives and the behavioural changes are brought about through particular learning situations. The student learns the content of a syllabus to attain the behaviour. It springs from contents and grows towards behaviour.

It emerges from behaviour in relation to content. The students can get learning experiences through a number of ways T.V, radio library, Science clubs.

Method to develop learning experiences :- 1) Contrast method
2) Identification Method.

4 Devising and adopting assessment Method :- A number of tools and techniques must be devised to test the change in behaviour. A battery of tests should be there to for complete assessment of the personality of the child. It may include different tests are as follows

1. Personality tests
2. Achievement tests
3. Aptitude tests
4. Intelligence tests

5. Interest Inventories
- 6) Teacher's Observation
- 7) Interview
- 8) Records
- 9) Sociometry
- 10) Pupil Products

QUESTION PAPER :- The question paper must be framed taking into account the following steps.

- 1) Planning and preparing design
- 2) Preparing the blueprint
- 3) Designing Questions
- 4) Editing the Question Paper
- 5) Administering the test
- 6) Scoring Key and the marking Scheme
- 7) Evaluating the Paper.

1 Planning and Preparing Design :- The teacher will consider the following points to plan and prepare design

- i) weightage to objectives i.e. Selection of objectives and

and allotting marks to each

- (ii) Weightage to different areas of content
- (iii) weightage to different forms of questions
- (iv) Scheme of options (v) Sections in the question Paper

2 Preparing the blueprint: - The design of the question Paper will be given a concrete shape in the form of a blue print. A blue print is a three way grid having content spread along the vertical axis and objectives to be tested along horizontal axis. The following points follows:

- i) objectives to be tested (ii) Subject matter to be covered
- (iii) The form of questions.

3. Designing questions: In the next step. Its design is based on the blue - print. it necessitates the following

- i) Defining the objectives. (ii) Chaining the objectives to the specifications (iii) complete knowledge of the subject matter

4) Editing the question Paper: - The step involves following measures.

- (i) Assembling the questions on the basis of their form.
 - Section A - objective type
 - Section B - Short answer type
 - Section C - Essay type

(ii) General instruction should be given at the beginning of a question Paper.

(iii) Implications to teachers to facilitate objective testing & Scoring

5) Administering the test: It involves predetermining among other things, time of testing, Place of testing & giving of instructions

6) Scoring Key and Marking Scheme: A Scoring Key is prepared for the objective questions & a marking Scheme is prepared for the essay & short answer type. The marking Schemes is necessary as it indicates.

- i) The no. of Steps or pts expected in the answer
- ii) The outline of each Step of pt expected in the answer.

7) Evaluating the paper: - A few questions need to be asked. If the scores are too high it may be assumed the test was too easy for class. If scores are low the test was difficult for class. Hence the teacher must review the question paper & involves three Steps.

- i) Questionwise Analysis
- ii) Critical analysis
- iii) Item analysis.

Sample design: - 1. Allocation of marks by abilities to be tested:

Ability	Marks	Ability	Marks
Knowledge	45	Skill	6
Comprehension	26	Analysis	6
Application	17	Total	100

2. Allocation of marks by course content areas

Content area	Marks
(i) Mechanical	38
(ii) Electricity	24
(iii) Light	15
(iv) Heat	12
(v) Sound	11
Total	100

3. Allocation of marks to question type:

Question types	No. of questions	Marks
Short answer (SA)	17	44
Structured (ST)	4	56
		<u>100</u>

Blue Print :-

S.N	Content Area	Abilities								Total
		K		C		A		S	Am/Sn	
		SA	ST	SA	ST	SA	ST	ST	ST	
(i)	Mechanics	3	14	3	6	3	3	3	3	38
(ii)	Electricity	3	6	3	3	3	*	3	3	24
(iii)	Light	3	5	*	5	*	2	*	*	15
(iv)	Heat	6	*	3	*	3	*	*	*	12
(v)	Sound	5	*	3	*	3	*	*	*	11
	Total	20	25	12	14	12	5			
		45		26		17		6	6	100

Conclusion:- It is process of appraisal of value of evidences of achievement of a student collected. It provides experiences and activities to the achievement of objectives. It is evaluates the Marks of question and arrange the content area.

References:- 1) SONI ANJU
2) Wikipedia.com.