APPENDIX - Q

INTEGRATION OF TEACHING SKILLS
UNIT - EIGHT

System Approach to Teaching Science

Synopsis :

1. Programme
2. Terminal Behaviours
3. Flow Chart
4. Instructional Material
5. Points for Discussion
6. Guidelines for Students and Supervisor

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1. Programme :

   1. Reading Instructional Material
   2. Discussion
   3. Practice on Unit Teaching
   4. Co-curricular Activities :

      Science Exhibition
      Science Quiz Competition
      Science Essay Competition
      Science lectures
      Science Visits.

2. Terminal Behaviours :

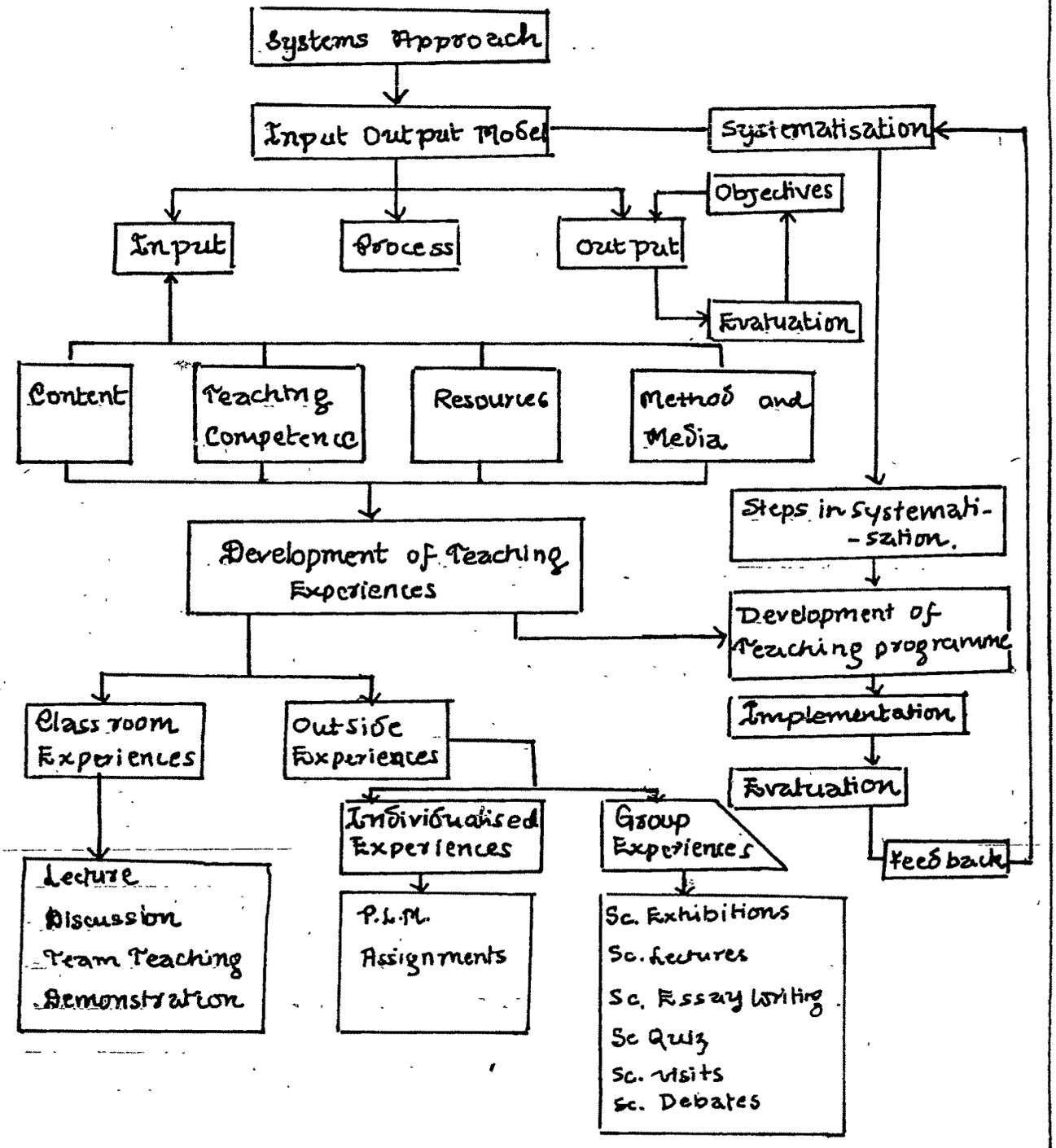
   1. Student teacher will recall the meaning of systems approach.
   2. Student teacher will recall the procedural outline of applying systems approach to unit-teaching.
   3. Student teacher will apply the systems approach to develop unit plan.
   4. Student teacher will develop ability to teach in classroom through the prepared unit plan.
   5. Student teacher will develop ability to organise science exhibition.
   6. Student teacher will develop ability to organise science co-curricular activities in schools.

FIG : A-8

FLOW CHART

SYSTEMS APPROACH TO TEACHING

[With special refrance to science]



7. Student teacher will be able to integrate different types of teaching namely, classroom teaching, individualise teaching and project oriented teaching for unit-teaching.

Instructional Material

Systems Approach to Teaching

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Synopsis :

I Introduction
II System Approach
III Steps involved in Systems Approach

1. Development of Instructional Objectives
2. Defining learners entrance behaviour
3. Selection of Content
4. Organisation of Objectives in Sets
5. Content Organisation
6. Selection of Method and Media
7. Developing Learning Experiences
8. Development of Instructional Programme
9. Implementation of Programme
10. Evaluation and Feedback

(I) Introduction : You have been provided with adequate exercises to develop teaching skills and use them in integrated form in classroom teaching. The practice lessons after the controlled classroom in teaching has provided you an opportunity to develop your own style of teaching. Within couple of weeks you will develop sufficient confidence to teach in classroom. The present unit will help you to extend your classroom teaching to outside the classroom walls. Students as learners will be interacting with environment not only in class, but outside the class, while playing, working with toys and at home. As a matter of fact they will be experiencing more outside classroom walls wherein they interact by active participation, individual oriented and volunteerly with self developed curiosity. These characters of outside classroom experiences make them learn more and depend on themselves compared to textual learning. It is of vital importance for teacher to relate these experiences to the classroom teaching. Not only he related but will create some activities which will be similar to the environmental experiences so as to increase the effectiveness of classroom teaching. In short teacher to achieve his curricular objectives will not only depend on experiences that are provided in classroom but also to create experiences outside the classroom and use those experiences which occur naturally at his residence, residential colony, school campus, places of social and recreative activities the child come across. The synthetic teaching with these three components namely -

(a) classroom teaching (b) teaching through co-curricular activities (b) teaching using outside school campus experiences requires planning, meaningful organisation of activities, and relating them to the curricular objectives. In the following pages you will find a systematic method of organising teaching-learning process on the scientific principles called systems approach.

(II) Systems Approach : This is a methodology of organising instruction by following systematic steps based on scientific principles. The major steps applicable in this context are as follows :

1. Development of instructional objectives in the form of terminal behaviours.
2. Defining learners entrance behaviour.
3. Selection of content for achievement of objectives.
4. Organising the objectives into sets, which require specific type of experiences.
5. Content organisation for different sets of objectives.
6. Selection of Methods and media for different sets of objectives and contents.
7. Developing the learning experiences for different objectives taking into method and media decided over.
8. Development of instructional programme.
9. Implementation of programme.
10. Evaluation and feedback for further refinement.

Many of the steps mentioned above have been already referred to in the earlier part of instructional material and exercises. These steps in the present unit are applied at broader level considering the experiences of outside classroom. In this unit the emphasis will be to plan for the complete unit by application of these steps. The details on each step are presented in the following pages.

Step 1 : Development of Instructional Objectives in the form of Terminal behaviours : Youhave already developed the skill of writing the objectives for teaching period plans. Similafly in this case you will be stating objectives for one complete unit. While specifying objectives for unit you will be considering development of skills, attitude and appreciation along with knowledge and understanding level objectives. A single unit will be running for a longer time, the chances of achieving higher level and process oriented objectives will be more compared to the period planning.

Step 2 : Defining the Learners Entrance Behaviour : The unit on controlled classroom practice teaching for understanding variables that affect classroom conditions you have experienced that, the

mode of presentation and type of experiences to be provided are dependent on previous knowledge of learner, intelligence, age group learners social, economical and cultural background and many other related variables. While framing the unit plan, one should be clear about the characters of the group with reference to these variables. If necessary the information should be collected from school records and learnerss A general information sheet may help to collect the required data from learners.

Step 3 : Selection of Content : Usually the textbook prescribed by Department of Public Instruction contains required content material. However, teacher may find it insufficient, he may have to depend upon the reference material available from school library. This usually happens due to differences between the objectives set by teacher and curriculum, teachers' deeper insight into the problems of teaching and learner characters. For a teacher it should be noted that achievement of objectives is of greater importance than to decide about which specific experiences are to be prescribed by text material. The content and learning experiences are dependent on the set objectives. However, it should be noted that there is no one way of achieving the set objectives. Depending upon the teacher and other teaching variable a variety of content and experiences can be thought of to teach same objectives.

Step 4 : Organisation of Objectives into Meaningful Sets : The units of teaching as provided in the curriculum are big enough requiring a series of periods for eight to ten days. Naturally all the objectives that are set for the unit will not be achieved in one or another period. Some of the objectives of knowledge and understanding level can be clubbed meaningfully that can be achieved in one period, to form sub-units. The process-oriented objectives cannot be set for single period, they will cut across all the periods and cumulatively act in achievement of objectives. While grouping the terminal behaviours into set, the teacher should consider that, it should be able to achieve in one period, the objectives mentioned should require similar type of experiences, the set of behaviour should have logical continuity and the mode of teaching techniques accessable for a period. The set of behaviours those requiring practical work can be grouped together, the terminal behaviours achievable through homework can be seperated, and those achievable by group project can form another group.

The Tabulation format presented below will be helpful in forming 6 sets of terminal behaviours.

Content	Specific objectives in Behavioural Terms	Basic Mode of Presentation/Activities	Facilities required and time duration
Cluster 1			
Cluster 2			
Cluster 'n'			

Step 5 : Content Organisation for Different Sets of Objectives : This step goes along with the previous step. As the objectives have been grouped, the content has to be analysed, reorganised and divided corresponding to the requirement of each set of objectives. The so formed set of objectives and content forms a subunit, which may require a period, a practical work session, a days home work, or a project work.

Step 6 : Selection of Method and Media : Once the subunits have been formed, the selection of method and media will more or less get structured. During this stage, the availability of different methods and media, resources available, time duration available are to be considered along with the nature of objectives and content. The so tabulated matrix will represent the blue print of the unit. The blue print mentions the sequence of content flow, sequential major activities, and the facilities required along with time duration.

For the convenience of understanding the methods used in teaching, can be classified into three categories namely (a) methods usuable in classroom teaching like discussions, learners, team teaching, and similar techniques, (b) method to be used for individualised learning namely, home assignment, self instructional material like PLM, and (c) method usable in outdoor learning like science exhibitions, science visits, quiz programmes, environmental observations etc.

Step 7 : Developing learning experiences : This step is very much similar to the phase developing learning experiences in classroom teaching. The objectives set for each subunit, the mode of presentation decided, the availability of time and learner characters will have direct bearing in forming the learning experiences. As explained earlier learning experience are bits of learning moves that are framed by teacher which progressively help in achievement of objectives. Each subunit will be taken separately and a list of sequential learning experiences to be provided, will be ~~tha~~ set at this stage.

Step 8 : Development of Instructional Material : The development of detailed plan of learning experiences, organising and sequencing as a teaching plan is one type of instructional material. Similarly preparation of notes to be presented, development of charts, pictures etc. are the other type of materials to be prepared and used as per the requirement. Sometimes this step involves extensive work, if teacher has decided to prepare PLM, slide and tape, video cassette, etc.

Step 9 : Implementation : At this stage, the planned material is ready to use and tryout. Since the complete work is planned, any teacher using the programme will find it highly useful and can teach with ease. However, teacher may modify some of the parts as per the contextual needs.

Step 10 : Evaluation and Feedback : To be sure of achievement of the set objectives, the teacher will administer a unit test prepared on the basis of objectives. The performance of students on the test, their reactions over the programme, and experiences of teacher while implementing will be the dates on which she will appraise the unit teaching. Such an appraisal will help teacher to further modify the programme and use whenever required.

Teachers Manual :

Discussion Session
Duration : 90 Minutes

Guidelines for discussion on Systems Approach

1. Meaning of systems approach - a few examples from different areas of education.
2. Relation between systematisation, scientific method information of systems approach.
3. Steps involved in systems approach - procedural details and significance.
4. A few case examples are to be shown.
5. Demonstration briefly taking one example about systematisation.
6. Role of different methods/media in teaching through systems approach.
7. Impact of modern advancement in media technology and its impact.
8. Role of integration co-curricular activities, home assignment and classroom teaching.

Students Manual

Duration : 15 days of Internship

Guidelines for Practice Unit Teaching :

Students,

By this time you have gained confidence to plan and teach through period plans, on your own. Your teaching style will get refined as you practice more and more during these two weeks. Apart from teaching in classroom, now you can also concentrate to provide learning experiences as home assignment, co-curricular activities and practical works. All the types of teaching together acts as an instructional system. You have to plan for one complete unit and teach the same class continuously as mentioned in instructional material. During this session of classroom unit teaching, you will be doing following activities :

1. Preparing unit plans, instructional material and try out in practicing school.

2. All student teachers as a group in the practicing school will arrange a science exhibition with the help of school students.
3. Following are a few activities suggested of which you have to select at least one and organise in the practicing school.
   (a) A visit of your class students to botanical garden, science museum, industrial campus, or any other centre which has potentials for science learning.
   (b) Organising a science quiz programme between two divisions of the school or with a class forming sub-groups.
   (c) Organising science essay competition for the class students,
   (d) Organising a science bulletin display board at one of the corners of school.
   (e) Organising guest lectures on science topic from good orators and scientists.

Teachers Manual

System Approach to Science Teaching

The supervisor will have to act as an overall organiser for the group. He should guide student-teachers to select suitable units and plan for unit teaching. He will divide the whole group into small groups of two to three students and allot some co-curricular activity of their interest. He will meet the principal of practicing school along with group leader to get necessary facilities from school for conducting all the activities. During these two weeks student teachers will be doing individualised work of unit teaching and group activities as they have opted. Every day stock taking regarding the development of work by each individual and as a group should be carried on along with discussing about various problems the student teachers may be facing to evolve possible alternative solutions.
