

SYSTEMS APPROACH

Educational technology makes available a wide range of instructional media at the curriculum planning level. The instructional process has become so complex these days because of the shift in technological focus from the classroom to curriculum planning. The number of objectives to be reached as a result of the instructional programme has increased. The amount of material to be taught and the media to be utilised has also enormously increased. The number of students and teachers involved in the total instructional system has also increased by leaps and bounds. In such a situation, there is great need for comprehensive and detailed planning. The curriculum should not specify any student *behavioural objectives* but should also suggest the *strategies* for helping the students to reach the objectives and *evaluation instruments* to measure their success. This is called the *systems approach*, an operational planning concept, borrowed from the engineering sciences and *cybernetics*, which deals with self-regulating and self-sustaining systems.

Definition of a System

Webster's dictionary defines a system as "a regularly interacting or independent group of items forming a unified whole." A system is "a group of objects related or interacting so as to form a unity." It also defines a system as "organised or established procedure," or "a methodically arranged set of ideas, principles, methods or procedure." *Systems analysis* essentially is a systematic way of identifying goals of any system and scientifically working out different steps to move towards these goals suggesting 'models' for application.

The approach in general includes the following steps :

- (a) an analysis of the existing situation,
- (b) setting up of goals for the desired situation,

- (c) defining mechanisms to evaluate the achievements of goals,
- (d) generating alternative solutions,
- (e) choosing the best possible solution through cost-benefit analysis,
- (f) detailing the design of the system,
- (g) outlining the monitoring mechanisms for the system, and
- (h) working out the solution.

Systems approach is a rational problem-solving method of analysing the educational process and making it more effective. System is the process taken as a whole incorporating all its aspects and parts, namely pupils, teachers, curriculum content, instructional materials, instructional strategy, physical environment and the evaluation of instructional objectives. Hence, it may be seen that the purpose of the systems analysis is to get the "best equipment in the best place for the best people at the best time and at the best price." "The systems approach in instruction is an integrated, programmed complex of instructional media, hardware and personnel whose components are structured as a single unit with a schedule of time and sequential phasing."

Components of an Instructional System

Systems approach is a systematic attempt to coordinate all aspects of a problem toward specific objectives. In education, this means planned and organised use of all available learning resources, including audio-visual media, to achieve the desirable learning objectives by the most efficient means possible. The systems approach focusses first upon the learner and the performances required of him. Only then it makes decisions regarding course content, learning experiences and the most effective media and instructional strategies. Such a system incorporates within itself the capability of providing continuous self-correction and improvement. It is concerned with all elements of instruction including media. Its purpose is to ensure that the components of the organic whole will be available with the proper characteristics at the proper time to contribute to the total system fulfilling the objectives.

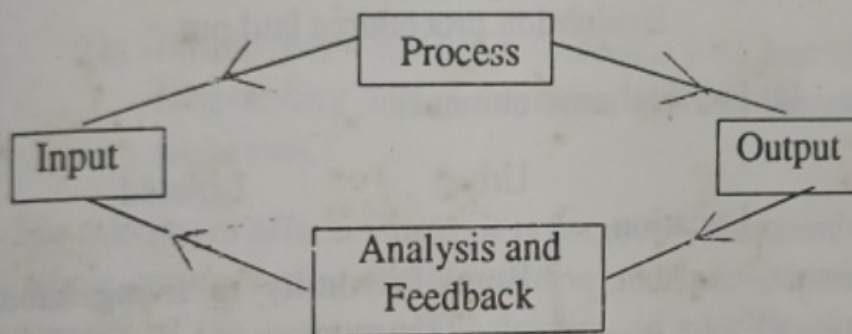
The procedural steps in the systems approach in education are as follows:

1. Defining instructional goals, behavioural objectives and stating them in operational, measurable terms.
2. Determining functions related to the achievements of these goals by proper aids like films, recordings, videotapes, etc.
3. Defining learner characteristics and requirements.
4. Choosing appropriate methods suitable for effective learning of the topic.
5. Selecting appropriate learning experiences from many alternatives available.
6. Selecting appropriate materials, facilities, equipment, resources, environment, tools required for student experiences.
7. Defining and assigning appropriate personal roles—teachers—team teaching members—supporting personnel—students.
8. Implementing the programme—test with a few pupils in typical and appropriate condition.
9. Testing and evaluating the outcome in terms of original objectives measured in student performance.
10. Refining and revising if necessary to improve production and efficiency of the system to improve student learning.

In an *instructional system*, the teacher or instructor and the resources made use of by him are included as components of the system. There is provision for continuous evaluation and self correction, for realising the stated objectives. In the systems approach to instruction, the teacher has to plan completely the utilisation of selected resource material and the classroom activities (each pupil working alone; small groups of pupils, 4 to 6, working alone or with teacher guidance; large groups working alone; very large groups requiring the use of mass communication media). The teacher should have a good overall view of the subject, know his/her limitations, know all about his/her pupils and the individual differences in their learning capacities and plan accordingly. The systems approach involves continuous evaluation of

learning outcomes and utilisation of knowledge gained by analysis of results of evaluation to suitably modify the plan of approach to achieve the stated objectives.

In brief the *systems approach applied to educational situations* involves the following interlinked and interdependent stages: (a) Explicitly stated standards of output performances, including sequenced behavioural objectives and post test ; (b) Planned input and processes involving structural learning materials and methods suitably geared to the needs of a particular group of learners ; (c) Monitored output which is used to revise, improve and evaluate the instructional system, providing feedback to the learner and teacher, and (d) A degree of in-built flexibility to adjust to individual situations.



The parts of the instructional system noted above can be analysed into their possible components as follows:

Institutional planning—Application of systems approach—an example.

1. INPUT

Pupils : (a) age

(b) minimum prescribed entry qualification, attainments (entry behaviour) decided by (i) curriculum content (objectives) (ii) duration of the course.

(c) Desirable to consider (i) attitude (ii) aptitude of pupils.

Cost factor which is a constraint on input should also be considered in terms of its benefits.

(a) Job opportunities after passing out.

(b) Location of the Institute } Rural
 } Urban

(c) Hostel facilities—cost—finance involved.

II PROCESS

1. Curriculum } need-based
 } well-defined objectives—anticipated
 } behavioural changes in pupils
 } Suggested strategy and lines of approach
 } (media, methods)
 } Evaluation procedures laid out

2. Institute (a) Physical environment

	Urban	Isolated
Location	} Rural	Proximity to living habitat
		Transport
		Adequacy of space

(b) Buildings, Classrooms etc.	well lighted—cross ventilation
	fixtures and suitable furniture

Library	} Books	Designed and organised for optimum use
		} Journals

(c) Facilities

Laboratory workshop	sufficient number of equipments
Society Service Centre	
Recreational facilities	
Hostel facilities for boarding pupils and staff	
Background	
Suitable general qualifications	

- | | |
|--------------|--|
| (d) Teachers | Professional qualification or training
Industrial experience
Attitude—job satisfaction |
|--------------|--|

Constraints to get suitable teachers	Finance Location of institution
--------------------------------------	------------------------------------

III FEEDBACK

- | | |
|--|---|
| (a) Evaluation by public organisations, boards, universities | Internal
External
Part internal and part external performance |
|--|---|

- (b) Employees—Initiative—adequacy of knowledge skill—adaptability and ability to apply knowledge to practical situations.

For maximum effectiveness, it is necessary to consider the system as a whole remembering the interaction and inter-dependence of the components of the systems. Full details and specifications about the interacting factors should be clearly defined. Systems approach in education may be applied to institutional planning and development in its varied aspects (Macro level) or it may be used at the classroom level with its concern of a specified topic during a brief period (Micro level).

Curriculum objectives in terms of anticipated change in student behaviour should be well-defined. Teacher and pupils should know what is expected upon completion of an instructional unit. The evaluation should aim to reflect pupils' skills, knowledge, concepts developed through available teaching material and the teacher. Based on evaluation results, more appropriate instructional materials and teaching strategies could be selected to ensure achievement of stated objectives. It may be necessary also to change the prescribed entry behaviour of input based on the results of evaluation. The curriculum should be modified if end-product is not suitable to fill in the need.