

System Approach

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Learning Objectives

At the end of this session participant should be able to

- discuss general system theory
- describe various elements of a general system theory
- describe briefly various components of a system approach to medical education and program planning
- list the advantages of system approach

System

- A system is a set of elements that functions as a whole to achieve a common purpose
 - Human body
 - Car
 - Solar system
 - A pendulum
 - Medical Education system
 - Medical Institution
- A system has functional identifiable parts that communicate efficiently and affect each other
- System concept can be applied to all fields of science, research, technology, industry, education, management and organizations

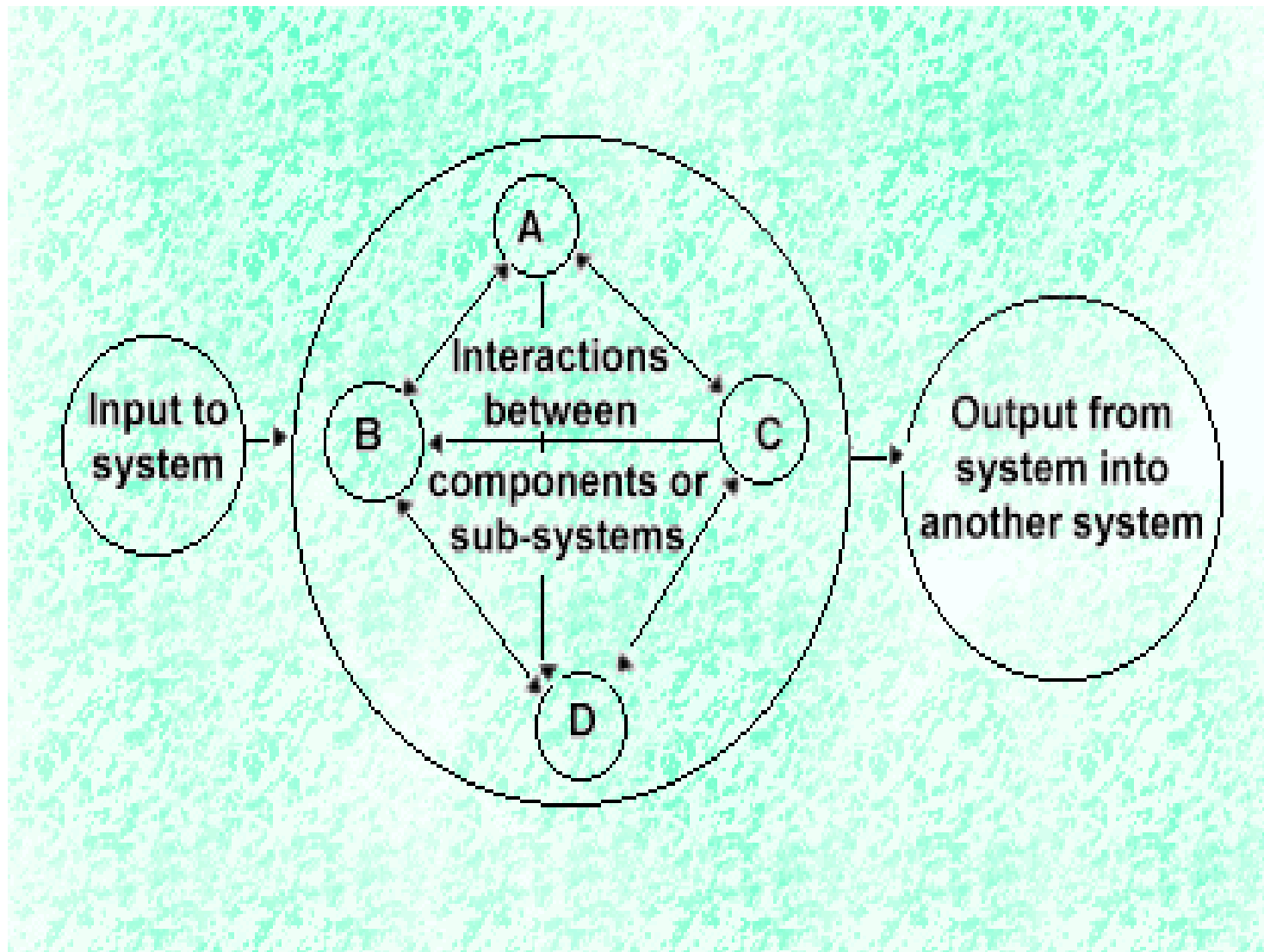
System Approach

- System approach is an approach that entails analysis of problems and come up with blend of solutions
- Tackling problems in an advanced disciplined manner keeping priorities in mind.
- System approach in teaching is a rational, problem solving method of analyzing educational process and making it more effective

4 main foundations of system approach

- Input
- Process
 - Subsystem
 - Interdependence of subsystems
 - Positive energy
 - Open systems interact with the environment
- Output
- Feedback

A typical system



Human Body as a system

- Input
 - Food, Water, Oxygen
- Process
 - CNS
 - CVS, RS
 - GI, Excretory etc
- Output
 - Carbon dioxide
 - Excreta – Feces, Urine

Medical Education System

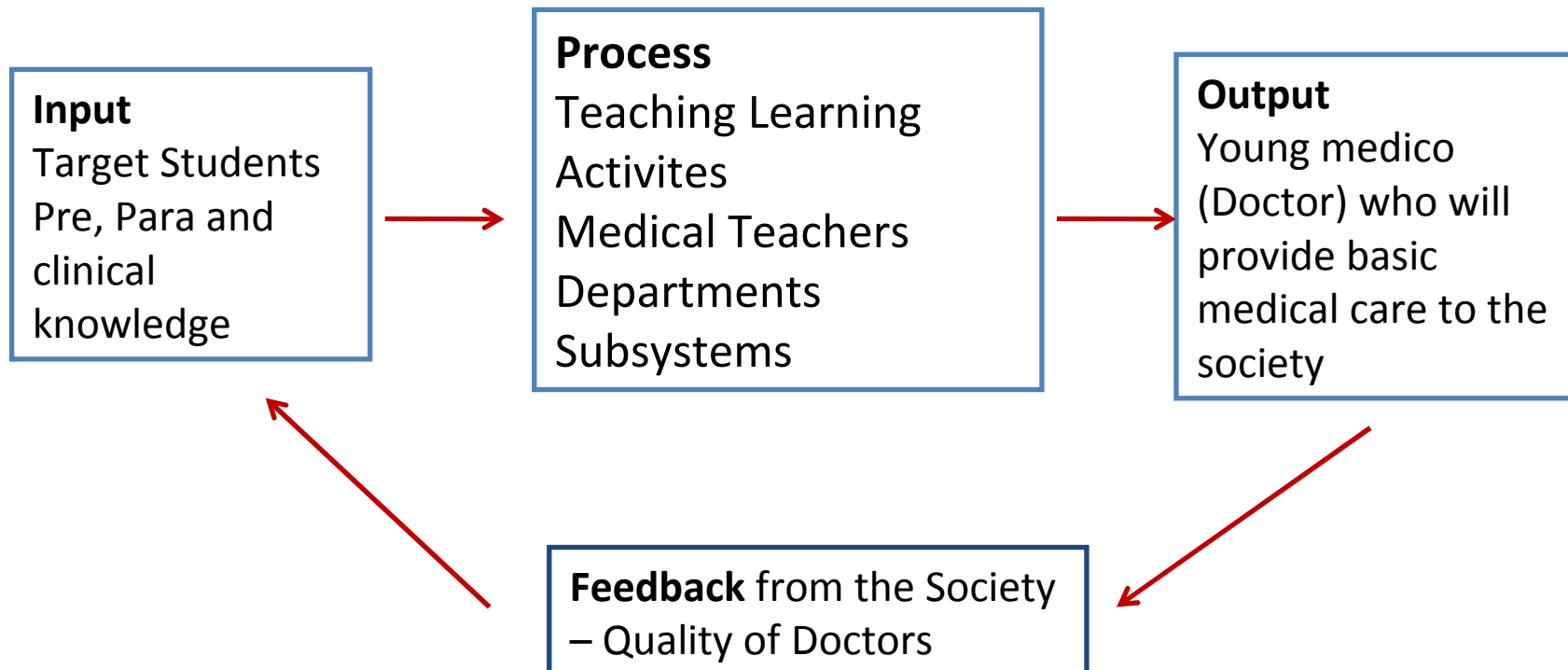
- Medical Council of India
 - Mission, Goals
- Medical Colleges
- Departments

Medical Institute as a system

- Input ?

Process?

Output?



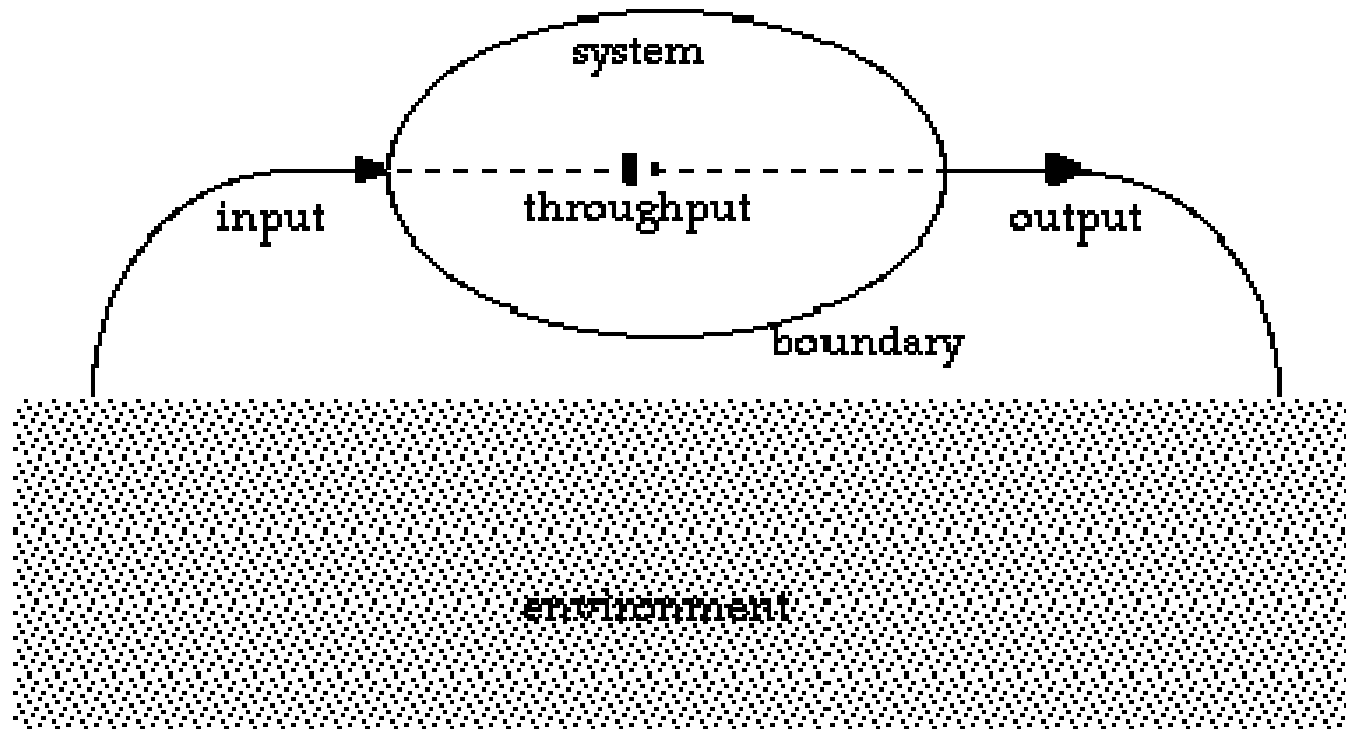
Concept of General System Theory

- Proposed by Ludwig Von Bertalanffy in 1940s
- A system is a dynamic network of interrelated parts
- Each and every part is important in constituting the whole
 - If one part does not function → Problem in the system
- System as a whole is much more than sum of its part
- System as a whole functions differently than the parts of the system

General system theory

- All systems studied by physicist are “**closed**” – they do not interact with outside world e.g. Solar system, an atom, a pendulum
- A living organism will die without environment and therefore is a “**open**” system because it interacts with the environment
 - Input
 - Output
 - Boundry
 - Transformation of input to output is called throughput

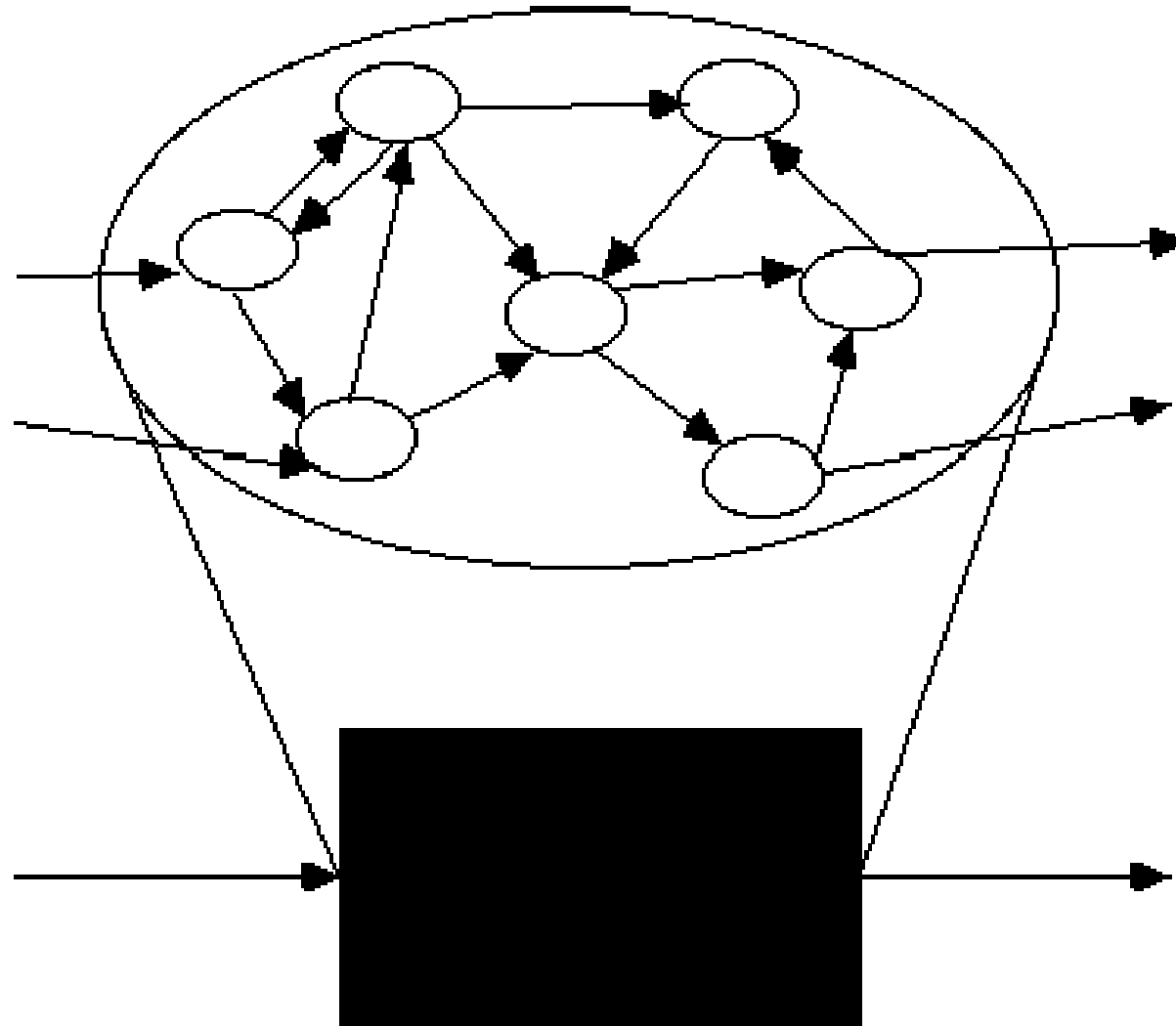
An open system in interaction with environment



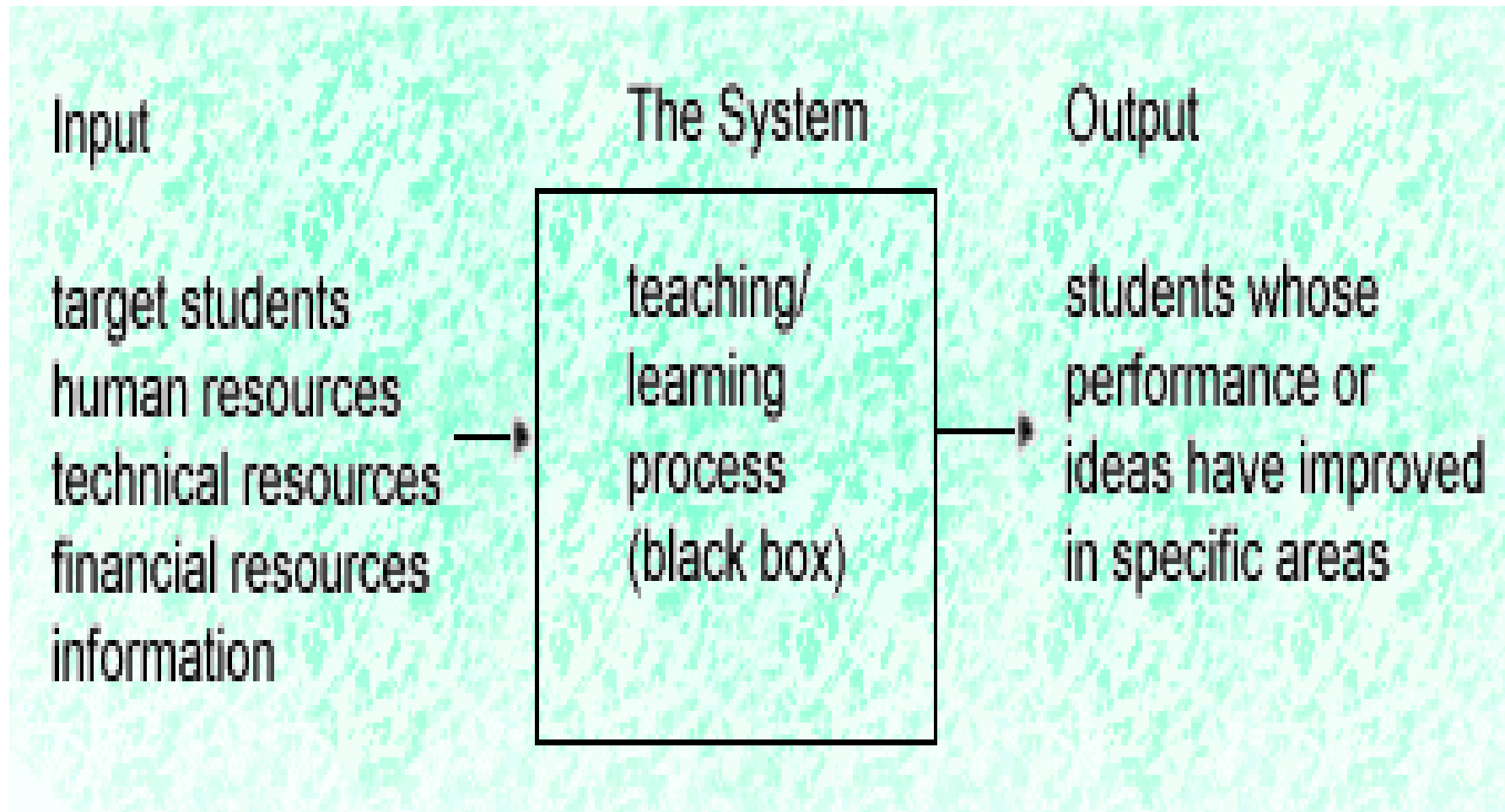
General system theory

- Individual parts of a system are called **subsystem**
- Group of interacting systems combine to form **supersystems**
 - Human → Family → City
- When we know what is going on in each every subsystem (depicted as white box)
 - Classical medicine is based on this reductionist view
- When we cant see what is happening to what goes in i.e. subsystems are not clearly defined (depicted as black box)

a system as a "white box", containing a collection of interacting subsystems, and as a "black box", without observable components.



The 'systems' model of the educational process



System Approach in Education - Steps

- **INPUT**

- Formulation of Objective
- Pre-assessment of pupils entry behavior
- Desirable attitude and aptitude
- Content to be taught and instructional material to be used is planned
- Cost factor

System Approach in Education - Steps

- **PROCESS**
- Deciding suitable teaching strategies
 - Appropriate Teaching Learning media, methods
 - Selecting appropriate evaluation procedures
 - Formulating a time table
- System Operation/ Implementation
 - Role and function of elements
 - Teaching, pupils, material resource
- Evaluation of learning outcome objectives

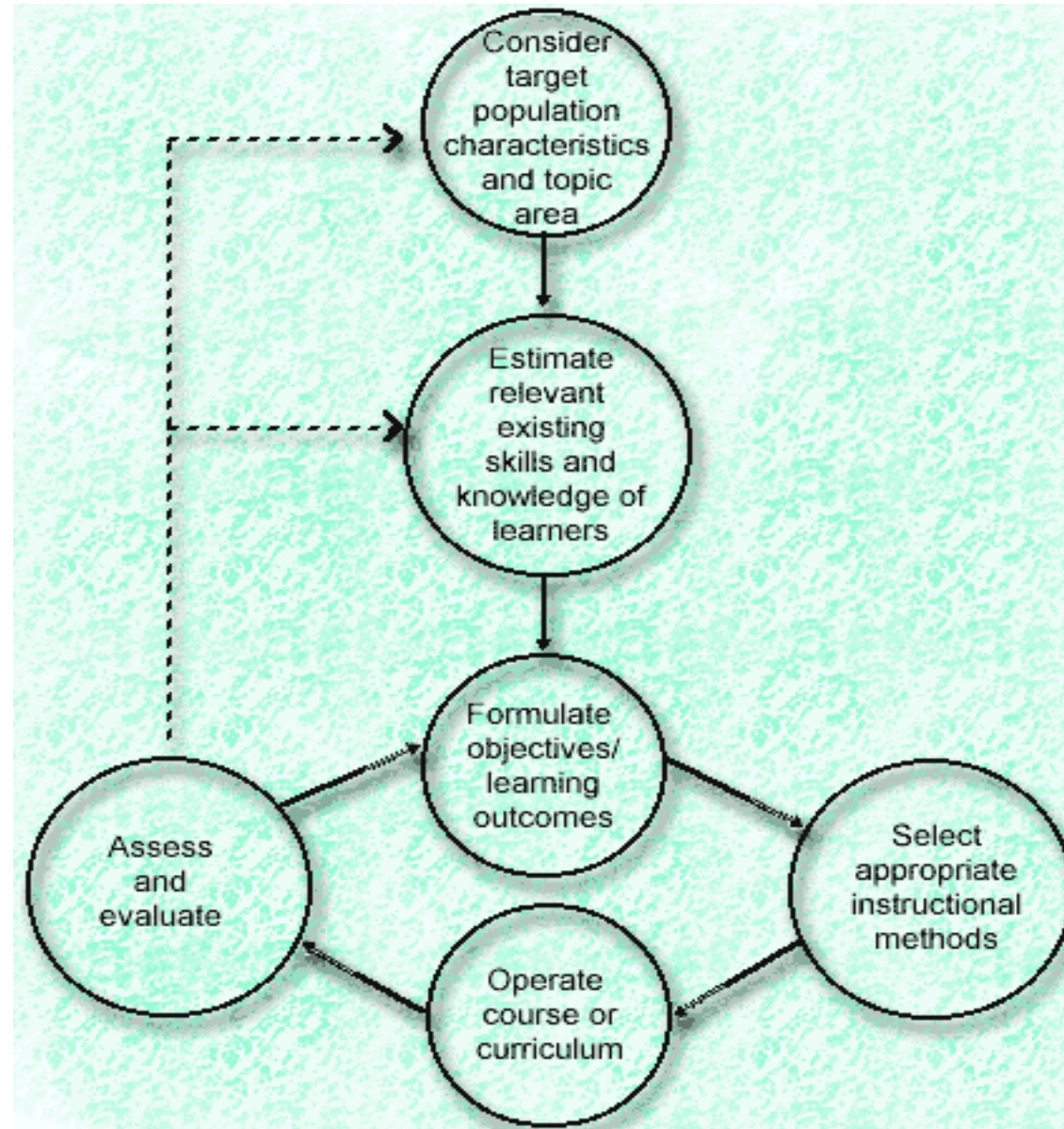
System Approach in Education - Steps

- **OUTPUT**
- Attainment of desired objectives → Achieved
 - System is allowed to continue
- Attainment of desired objectives → NOT Achieved
 - System needs to be modified
 - Restructure
 - Reorganize
 - Replan

Steps of System Approach in teaching

- Understanding and analyzing the *present situation*
- Framing the *goals* for the desired outcome
- Identifying the *various tools for evaluating* the obtained goals
- Creating *alternative* situations
- Finding out *solutions* considering cost benefit analysis
- Making *framework* of the system
- Making design of the *supervision* of the system
- Making framework to *introduce the new solution*

The various stages in the systems approach



Advantages of System Approach in Education

- Framework for planning, decision making control and problem solving
- Participants can identify the intent of the program
- Learners know what they are expected to learn is documented
- Instructors know what they will be teaching
- Knowledge, skills and behaviour expected to change are identified
- Provides a model for identifying problems so that steps can be taken for correction and improvement of quality of education

Characteristics of a Good System

- Effectiveness
- Efficiency
- Dependability
- Flexibility
- Acceptability

Problems in Medical Education System

- In the present system - Interns do not learn clinical skills during internship?
- Problems of education in a private medical institution?

Further Reading

- Ahn AC, Tewari M, Poon CS, Phillips RS (2006) The Clinical applications of System Approach. PLoS Med 3(7):e209 doi:10.1371/journal.pmed.0030209
- Basic Concepts of System Approach: <http://pespmc1.vub.ac.be/sysappr.html>
- Siddiqui MH: System Approach in Teaching. Indian J. Applied Research 2013, vol. 3:84-86
- System approach in science and engineering:
<http://www.creatingtechnology.org/sysapp.htm>
- The System Approach: <http://silvae.cfr.washington.edu/ecosystem-anagement/system.html>