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Directorate of Distance Education

M.A. [Education]

I - Semester

348 14

INNOVATION IN EDUCATION

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SYLLABI-BOOK MAPPING TABLE

Innovation in Education

Syllabi	Mapping in Book
BLOCK 1: INNOVATION, CULTURE AND GROWTH, EDUCATIONAL EXPERIMENTS AND FACTORS	
UNIT - I: Innovation Meaning and Principles Barriers to Change Suggestions for the Promotion of Innovativeness in Students Instructional Media.	Unit 1: Innovation (Pages 1-12)
UNIT - II: Emergence of School Culture setting Culture and the School Characteristics of Culture Education and Culture Social Demand for Education Leadership Role of the Teacher	Unit 2: Emergence of School (Pages 13-28)
UNIT - III: Innovations from Educational Experiments Educational Experiments of Rabindranath Tagore - Froebel's Kindergarten - Basic Education and Gandhiji - Bertrand Russell - Principles Underlying Self- Learning Devices - Child Development Theory.	Unit 3: Innovations from Educational Experiments (Pages 29-48)
UNIT - IV: Factors on Innovations Growth of Culture - Growth of Civilization - Factors Responsible for the Resistance to the Growth of Culture - Social Effects of Innovations - Inventions - Principle of Equality - Innovation and Educational Goals.	Unit 4: Factors of Innovations (Pages 49-61)
BLOCK 2: NATIONAL TRENDS AND EDUCATIONAL TECHNOLOGY	
UNIT - V: National Trends in Educational Innovations Science Education in Developed and Underdeveloped Countries - Role of Science and Culture in the Future - Role of Education - Need for Improvement in Science Education - UNESCO - Modification of Educational Systems.	Unit 5: National Trends in Educational Innovations (Pages 62-79)
UNIT - VI: Educational Technology Meaning - Media and Learning - Characteristics of Teaching Devices - Basic Principles - Types of Machines - Teaching Machines and Teachers - Courseware Development - Uses of CAI System.	Unit 6: Educational Technology (Pages 80-94)

UNIT - VII: Programmed Instruction

Meaning - Principles - Types - Merits and Demerits - Preparing the Learning Materials for Programmed Instruction - Role of Computer in Instruction - Teaching Machines.

**Unit 7: Programmed Instruction
(Pages 95-112)**

UNIT - VIII: Modernization

Meaning - Innovations and Educational Goals - Education and Modernization - Concept of Modernization - Difference between Modernization and Modernity - Technological Change, Industrialization and Modernization - Characters - Role of Education in Modernization.

**Unit 8: Modernization
(Pages 113-123)**

BLOCK 3: FREEDOM, ALTERNATIVE SCHOOLS AND DISTANCE EDUCATION

UNIT - IX: Freedom for Innovation

Institutional Autonomy - Needs - Privileges - Effects - Advantages - Disadvantages - Individual Autonomy - Teacher's Autonomy - Autonomy for Students - Freedom in Learning Situations - Autonomy in Institutional Structure

**Unit 9: Freedom for Innovation
(Pages 124-135)**

UNIT - X: Alternative Schools

Dalton Plan - Winnetka Plan - Howard Plan - Platoon Plan - Educational Alternatives in Public Schools - De-Schooling Society - Concept of De-schooling - Arguments Advanced for De-schooling Society - Ivan Illich - Important Ideas - Learning Resources - Criticism - Non Classroom Learning.

**Unit 10: Alternative Schools
(Pages 136-146)**

UNIT - XI: Distance Education

Introduction
Meaning and Definition Need of Distance Education
Different Formats and Innovative Elements
Correspondence Courses
Open University

**Unit 11: Distance Education
(Pages 147-159)**

BLOCK 4: SYSTEM APPROACH, LANGUAGE LABORATORY AND NETWORK

UNIT - XII: System Approach

Meaning - System and System Approach - Phases - Application - Developing Instructional Model - Assessment Phase - Defining the Problem of Instruction - Learning Characteristics - Assessing the Situational Variables - Selection and Designing - Selection of Instructional Method - Media and Aids - Advantages.

**Unit 12: System Approach
(Pages 160-171)**

UNIT - XIII: Language Laboratory

Needs - Equipments and Set-ups in a Language Laboratory - Method of Providing Training - Laboratory Operation Procedure - Special Features - Advantages - Audio Cards - Limitations - CCTV - Advantages - Video Cassette and Compact Disc - Tele Lecture - Tele Conferencing - Types

**Unit 13: Language Laboratory
(Pages 172-185)**

UNIT - XIV: Network

Aims of Forming Networks - LAN and WAN - Host and Terminal - Functioning of Network - Uses of Network - Educational Technology for Exceptional Children - Cybernetics - Classroom Instruction and Communication - Instructional Medium and Instructional Aid - Types - Methods.

**Unit 14: Network
(Pages 186-196)**

CONTENTS

INTRODUCTION

BLOCK I: INNOVATION, CULTURE AND GROWTH, EDUCATIONAL EXPERIMENTS AND FACTORS

UNIT 1 INNOVATION 1-12

- 1.0 Introduction
- 1.1 Objectives
- 1.2 Innovation: Meaning and Principles
 - 1.2.1 Barriers to Change
 - 1.2.2 Suggestions for the Promotion of Innovativeness in the Students
- 1.3 Instructional Media
- 1.4 Answers to Check Your Progress Questions
- 1.5 Summary
- 1.6 Key Words
- 1.7 Self Assessment Questions and Exercises
- 1.8 Further Readings

UNIT 2 EMERGENCE OF SCHOOL 13-28

- 2.0 Introduction
- 2.1 Objectives
- 2.2 Culture Setting
 - 2.2.1 Culture and the School
- 2.3 Characteristics of Culture
 - 2.3.1 Education and Culture
- 2.4 Social Demand for Education Leadership
 - 2.4.1 Role of the Teacher
- 2.5 Answers to Check Your Progress Questions
- 2.6 Summary
- 2.7 Key Words
- 2.8 Self Assessment Questions and Exercises
- 2.9 Further Readings

UNIT 3 INNOVATIONS FROM EDUCATIONAL EXPERIMENTS 29-48

- 3.0 Introduction
- 3.1 Objectives
- 3.2 Educational Experiments of Rabindranath Tagore
- 3.3 Froebel's Kindergarten
- 3.4 Basic Education and Gandhi
 - 3.4.1 Bertrand Russell
- 3.5 Principles Underlying Self-Learning Devices
 - 3.5.1 Child Development Theory
- 3.6 Answers to Check Your Progress Questions
- 3.7 Summary
- 3.8 Key Words
- 3.9 Self Assessment Questions and Exercises
- 3.10 Further Readings

UNIT 4 FACTORS OF INNOVATIONS 49-61

- 4.0 Introduction
- 4.1 Objectives
- 4.2 Growth of Culture and Civilization
 - 4.2.1 Factors Responsible for the Resistance to the Growth of Culture
- 4.3 Social Effects of Innovation
 - 4.3.1 Inventions
 - 4.3.2 Principle of Equality
- 4.4 Innovation and Educational Goals
- 4.5 Answers to Check Your Progress Questions
- 4.6 Summary
- 4.7 Key Words
- 4.8 Self Assessment Questions and Exercises
- 4.9 Further Readings

BLOCK II: NATIONAL TRENDS AND EDUCATIONAL TECHNOLOGY

UNIT 5 NATIONAL TRENDS IN EDUCATIONAL INNOVATIONS 62-79

- 5.0 Introduction
- 5.1 Objectives
- 5.2 Science Education in Developed and Underdeveloped Countries
- 5.3 Role of Science and Culture in the Future
 - 5.3.1 Role of Education and the Need for Improvement in Science Education

- 5.4 UNESCO: The Modification of Educational System
- 5.5 Answers to Check Your Progress Questions
- 5.6 Summary
- 5.7 Key Words
- 5.8 Self Assessment Questions and Exercises
- 5.9 Further Readings

UNIT 6 EDUCATIONAL TECHNOLOGY 80-94

- 6.0 Introduction
- 6.1 Objectives
- 6.2 Educational Technology: Meaning
- 6.3 Characteristics of Teaching Devices
 - 6.3.1 Media and Learning
- 6.4 Types of Machines
 - 6.4.1 Computer Assisted Instruction and its Uses
 - 6.4.2 Innovation and Educational Goals
- 6.5 Answers to Check Your Progress Questions
- 6.6 Summary
- 6.7 Key Words
- 6.8 Self Assessment Questions and Exercises
- 6.9 Further Readings

UNIT 7 PROGRAMMED INSTRUCTION 95-112

- 7.0 Introduction
- 7.1 Objectives
- 7.2 Programmed Instruction: Meaning
 - 7.2.1 Programmed Instruction: Principles
- 7.3 Types of Programmed Instructions
 - 7.3.1 Programmed Learning: Merits and Demerits
- 7.4 Preparing the Learning Material for Programmed Instruction
 - 7.4.1 Role of Computer in Instruction
- 7.5 Teaching Machines
- 7.6 Answers to Check Your Progress Questions
- 7.7 Summary
- 7.8 Key Words
- 7.9 Self Assessment Questions and Exercises
- 7.10 Further Readings

UNIT 8 MODERNIZATION 113-123

- 8.0 Introduction
- 8.1 Objectives
- 8.2 Meaning and Concept of Modernization
 - 8.2.1 Innovation and Educational Goals

- 8.3 Education and Modernization
 - 8.3.1 Difference between Modernity and Modernization
- 8.4 Answers to Check Your Progress Questions
- 8.5 Summary
- 8.6 Key Words
- 8.7 Self Assessment Questions and Exercises
- 8.8 Further Readings

BLOCK III: FREEDOM, ALTERNATIVE SCHOOLS AND DISTANCE EDUCATION

UNIT 9 FREEDOM FOR INNOVATION 124-135

- 9.0 Introduction
- 9.1 Objectives
- 9.2 Autonomy in Institutional Structure
 - 9.2.1 Individual/Student Autonomy
- 9.3 Teacher Autonomy
- 9.4 Answers to Check Your Progress Questions
- 9.5 Summary
- 9.6 Key Words
- 9.7 Self Assessment Questions and Exercises
- 9.8 Further Readings

UNIT 10 ALTERNATIVE SCHOOLS 136-146

- 10.0 Introduction
- 10.1 Objectives
- 10.2 Alternative Schools: An Introduction and Dalton Plan
 - 10.2.1 Dalton Plan
 - 10.2.2 Winnetka Plan
 - 10.2.3 Howard Plan
 - 10.2.4 Platoon Plan
- 10.3 De-Schooling and Ivan Illich: Important Ideas
 - 10.3.1 Learning Resources and Non-Classroom Learning
- 10.4 Answers to Check Your Progress Questions
- 10.5 Summary
- 10.6 Key Words
- 10.7 Self Assessment Questions and Exercises
- 10.8 Further Readings

UNIT 11 DISTANCE EDUCATION 147-159

- 11.0 Introduction
- 11.1 Objectives
- 11.2 Distance Education: An Introduction
 - 11.2.1 Teacher Trainees Beliefs
 - 11.2.2 Types of Distance Education

- 11.3 Distance/Correspondence Education and its Need
 - 11.3.1 Different Formats and Innovative Elements
- 11.4 Answers to Check Your Progress Questions
- 11.5 Summary
- 11.6 Key Words
- 11.7 Self Assessment Questions and Exercises
- 11.8 Further Readings

BLOCK IV: SYSTEM APPROACH, LANGUAGE LABORATORY AND NETWORK

UNIT 12 SYSTEM APPROACH

160-171

- 12.0 Introduction
- 12.1 Objectives
- 12.2 Instructional Design and its Functions: Developing the Model
 - 12.2.1 System Approach
 - 12.2.2 Phases or Steps of System Analysis
- 12.3 Criteria for Evaluating System Analysis Project
 - 12.3.1 Application of System Analysis in Education
- 12.4 Answers to Check Your Progress Questions
- 12.5 Summary
- 12.6 Key Words
- 12.7 Self Assessment Questions and Exercises
- 12.8 Further Readings

UNIT 13 LANGUAGE LABORATORY

172-185

- 13.0 Introduction
- 13.1 Objectives
- 13.2 Language Laboratory and its Need
 - 13.2.1 Need and Equipment in Language Laboratory
- 13.3 Method of Providing Training and Language Operation Procedures
 - 13.3.1 Advantages of the Language Laboratory
- 13.4 Audio Cards, CCTVs, Compact Disc, Tele-Lecture and Tele-Conferencing
- 13.5 Answers to Check Your Progress Questions
- 13.6 Summary
- 13.7 Key Words
- 13.8 Self Assessment Questions and Exercises
- 13.9 Further Readings

UNIT 14 NETWORK

186-196

- 14.0 Introduction
- 14.1 Objectives
- 14.2 Network: An Introduction
 - 14.2.1 Aims of Forming Networks: LAN And WAN
- 14.3 Educational Technology for Exceptional Children
 - 14.3.1 Importance of Educational Technology for Exceptional Children
 - 14.3.2 Instructional Medium and Instructional Aids Types Methods
 - 14.3.3 The Effective Use of Teaching Aids
- 14.4 Answers to Check Your Progress Questions
- 14.5 Summary
- 14.6 Key Words
- 14.7 Self Assessment Questions and Exercises
- 14.8 Further Readings

INTRODUCTION

NOTES

Education is a very important and integral part of society that governs the social functioning. It deeply connects with the wants and ambitions of every society. This is the reason that education cannot remain unaffected by any social change that takes place around us. Hence, any advancement in technology has a direct or indirect impact on the methodology of education in the current scenario.

In general, there is active participation and involvement of radio, television, computers, machines, films, and now the Internet and multimedia, in providing education and educational material to students. These are all parts of the innovation process in education. This is referred to as educational technology. The significance of educational technology has increased due to its capability to achieve desired goals related to making education universal, preparing teachers and upgrading curricula in every phase of education.

Educational Technology (ET) is the efficient organization of any learning system adopting or adapting itself to methods, processes, and products to serve identified educational goals. This involves systematic identification of the goals of education, recognition of the diversity of learners' needs, the contexts in which learning will take place, and the range of provisions needed for each of these. The challenge is to design appropriate systems that will provide for and enable appropriate teaching-learning systems that could realise the identified goals. The key to meeting this challenge is an appreciation of the role of educational technology as an agent of change in the classroom, which includes not only the teacher and the teaching-learning process but also systemic issues like reach, equity, and quality.

This book, *Innovation in Education* is divided into fourteen units that follow the self-instruction mode with each unit beginning with an Introduction to the unit, followed by an outline of the Objectives. The detailed content is then presented in a simple but structured manner interspersed with Check Your Progress Questions to test the student's understanding of the topic. A Summary along with a list of Key Words and a set of Self-Assessment Questions and Exercises is also provided at the end of each unit for recapitulation.

BLOCK - I
INNOVATION, CULTURE AND GROWTH,
EDUCATIONAL EXPERIMENTS AND FACTORS

NOTES

UNIT 1 INNOVATION

Structure

- 1.0 Introduction
- 1.1 Objectives
- 1.2 Innovation: Meaning and Principles
 - 1.2.1 Barriers to Change
 - 1.2.2 Suggestions for the Promotion of Innovativeness in the Students
- 1.3 Instructional Media
- 1.4 Answers to Check Your Progress Questions
- 1.5 Summary
- 1.6 Key Words
- 1.7 Self Assessment Questions and Exercises
- 1.8 Further Readings

1.0 INTRODUCTION

Innovation can be defined as the process which makes changes into something which is already established. The change can be radical or incremental. Innovation is necessary in the field of education so that it can prepare the students to suit the ever changing demands of the world. It prepares the students to adjust in a competitive world.

It is important that education must be provided in an unconventional way and it is only through innovation that it can be achieved. Innovation must be introduced in such a way that education becomes easier to access, is cost effective and yield great results.

In this unit, the meaning and importance of innovation has been analysed. The unit will also discuss the barriers related to innovation and the introduction of instructional media approaches in the field of education. The unit will also highlight the types of teaching aids and steps involved in the instructional media approach.

1.1 OBJECTIVES

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

- Discuss the meaning of innovation
- Analyse the barriers related to innovation

- Explain the role of instructional media approach
- Interpret the procedure of instructional media approach
- Discuss the forms of teaching aids

NOTES

1.2 INNOVATION: MEANING AND PRINCIPLES

Education is a social institution which serves the needs of the country by educating the future generations of the society. It should be comprehensive and sustainable and must suit according to the ever changing world. It thus, becomes imperative that teachers must change their practice of teaching with time so that they can adapt themselves and their methods of teaching in our globalized world. They are expected to innovate the theories related to teaching and learning so that it prepares students to adjust in the world.

In order to adjust in this changing world, innovation and evolution plays a critical role. Hoffman and Holzhter opines that ‘Innovation resembles mutation, the biological process that keeps species evolving so they can better compete for survival’. Innovation is therefore, considered as a process which brings positive change. If one does not give much importance to innovation, then the economy will stagnate.

The need for educational innovations has become acute. ‘It is widely believed that countries’ social and economic well-being will depend to an ever greater extent on the quality of their citizens’ education: the emergence of the so-called ‘knowledge society’, the transformation of information and the media, and increasing specialization on the part of organizations all call for high skill profiles and levels of knowledge. Today’s education systems are required to be both effective and efficient, or in other words, to reach the goals set for them while making the best use of available resources’. (Cornali, 2012, p. 255).

1.2.1 Barriers to Change

Innovation is not merely about the final change that has taken place, but it is about the result and the conditions that must be in place to allow innovators to see the problem in new light, create potential solutions, refine their strategy and ultimately lead to acquire effective ideas, products, processes, strategies and platforms. For example, in biotechnology sector, one can see that in human genome project, how evidence from one cycle of innovation is captured and disseminated and that has been applied by many other scientists towards thinking through the next challenge.

In the education sector, this kind of work needs to be refined at the student, school and system levels that will subsequently require reconfiguration of many incentives that currently drive behaviors. In the present times, we have a publicly regulated system which is created to value stability over adaptation and as a result

we have some fundamental barriers to innovation. These barriers are discussed as follows:

- **Lack of clarity on the problem to be solved:** A significant number of ideological disagreements about the purpose and the role of public education rights and parent’s rights creates confusion for the policy makers.
- **Weak technology infrastructure:** Most of the district and schools plan only for technology acquisition and not for upgrades and maintenance, thus, it is tough for the teachers and users to trust in the adoption of technology tool that may not be supported over time. This in turn inhibits innovation in technology applications.
- **Misaligned labor market:** The profession of teaching, school leadership and educational management including administration are set up to value ‘seat time’ and longevity, with virtually no incentives or rewards for initiating innovative practices to drive student outcomes.
- **Weak knowledge base:** Fields of education such as medicine, which have professional knowledge standards, a constantly improving knowledge base such as Board Certification process for medical doctors, the knowledge base that is required for student achievements is relatively weak. As a result, there is no body of knowledge that is widely accepted as a prerequisite for entering a profession, nor a standard for advanced mastery.
- **Ineffective uptake and dissemination:** Enough amount of attention is not paid to diffusion of knowledge and innovation.
- **Policy is impenetrable to most innovators:** Innovations are rarely transformed into policy changes, whether they originate from social entrepreneurs who operate outside the traditional system, where policy constraints are reduced, or from inside change agents who work around the traditional system constraints.
- **Local government is not aligned to support innovation:** Shift of political forces and school boards that are often taken as a step by political forces, lead to ‘spinning wheels’ in most districts ironically creates almost constant change for practitioners, but makes it nearly impossible to sustain any innovation long enough to truly understand its efficacy.
- **Isolation of research from problems of practice:** Research largely remains isolated from within the schools of education and is often aligned to tenure incentives rather than problem-based needs in the field. There is a very little sense of urgency to disseminate knowledge and being innovative ideas or knowledge into the development cycle and to scale.

NOTES

NOTES

1.2.2 Suggestions for the Promotion of Innovativeness in the Students

Innovations must be carried out and must focus the prioritization upon the students who are not being adequately served by the system and the problems of practice that had defied effective solutions to date, as they have most to gain from urgent action. It is imperative that one must not let the students slip through the loopholes of educational system.

Suggestions for the promotion of innovativeness in the students are as follows:

- Strengthen communication and cooperation thereby closing the knowledge gaps.
- Making use of ICT, providing educational technology accessibility to the students.
- Maintenance of supportive environment for the development of competencies among the students.
- Letting them gain lifelong learning experiences thereby, encouraging creativity among the students.

Check Your Progress

1. Why are innovations rarely transformed into policy changes?
2. What are the ways in which innovation can be promoted in students?

1.3 INSTRUCTIONAL MEDIA

According to author Romizowski (1988), instructional media refers to the devices and materials employed in teaching and learning. It includes chalks, blackboard, radio, television, films, slides, teacher made diagrams, video tapes, recorders and projectors, software and transparencies, cartoons, models, maps and photographs.

According to a renowned author Nkuuhe (1995), Instructional media are all devices and materials used in teaching and learning process.

Author Ogumilade (1984) also identifies instructional media as devices of hardware (equipment) and software (consumables) through which the learning process may be ensured and carried out.

In other words, instructional media is the collection of materials and equipment that are used for successful delivery of the teaching learning process. It includes hardware components such as chalks, duster, blackboard, pictures, maps, projectors and media devices as well as software components such as ideas, thoughts and senses. Thus, instructional media act as a key component in the teaching learning process and finally helping to bring out meaningful teaching- learning activity.

Instructional Media and Multimedia Approach

Instructional Media and Multimedia approach can convey information and provide many sources from which student can access the information. Multimedia approach will improve the teaching learning process. It is not restricted to a single type of learning style; it can provide the support of a wide range of activities. The approach aims at providing meaningful learning experiences through a mix of media in order to achieve predetermined objectives. It provides opportunity to gain mastery of competencies and skills. However, it is important that the choice of the media has to be done carefully so that one does not hamper or reduce the effect of the other. This will enable the learner to get access to information in dynamic environment.

NOTES

The procedure for adopting instructional-multimedia approach

The following stages will help a person in adopting the right approach:

- **First stage:** In the first stage, teacher initiates teaching through teaching and learning activities and then delivers a well prepared lesson plan based upon the formulated objectives. For this, the teacher may use the formulated objectives for the preparation of multimedia lesson plan.
- **Second stage:** In the second stage, teacher demonstrates a specific unit using multimedia. The teacher may also provide the learner with the programmed teaching material such as cassettes and CD.
- **Third stage:** Third stage is termed as the preparatory stage, as the learner starts learning independently in this stage. For that the student may discuss his learning material and problems related to it with peer groups and teachers.
- **Fourth Stage:** In the fourth stage, learner actively participates and uses variety of media and materials for self study.
- **Fifth stage:** In the fifth stage, the student integrates theory with practice while using multimedia resources.
- **Sixth stage:** In the sixth stage, learners find that the teaching learning material and resources must be organized to a higher level. Therefore, the students at this stage are involved in critical analysis which focuses on evaluation and reasoning.

Role of teacher in instructional and multi-media approach

A teacher has to adopt a number of methods and techniques. Teacher has to be aware of the different available media and their availability. He or she must be physically competent to use and demonstrate the use of the different instructional media. The teacher should be skillful enough to make a judicious choice of media and competent enough to mix them in a sequential and orderly manner. The role of teacher is of a facilitator or manager of activities. Therefore, the teacher has to lead his or her students for independent and individualized learning.

NOTES

Prerequisites for developing a multimedia instructional device

Let us discuss the prerequisites for developing a multimedia in instructional device.

- Planning
- Express the idea and purpose
- Develop the objectives
- Consider the learner
- Find related material
- Prepare the content outline
- Designing the multimedia device
- Identifying the factors or criteria for instructional media selection
- Select the media
- Make a story board
- Developed the script
- Production of the multimedia device
- Take the picture and keep a record
- Process the pictures
- Edit the picture edit the narration and captions
- Mix sound
- Prepare final copies
- Follow up
- Use the materials
- Evaluate for future use revise the materials
- Obtain the copyright for the materials

Advantages of the Instructional Media Approach

The following are the advantages of instructional media approach:

- Instructional media approach enables the learner to represent information using several different media.
- It can arouse the curiosity among the learner and provide them vivid impressions.
- It can take into account different learning styles, some people learn by interpreting text while others require more graphical representations.
- It can help develop a positive attitude among the learners towards the teaching learning process.
- Multimedia approach allows for self-pacing.

- The technique of simulation can be effectively applied through the instructional media approach.
- It helps in the development of higher order thinking skills.
- It provides the student the flexibility of ‘anywhere’ and ‘anytime’ learning.
- It helps in developing group and interpersonal skills.
- Effective remediation programs can be implemented through the multimedia approach.
- It can bridge the language barrier since audio is not the only means of communication.

NOTES

Disadvantages of the Instructional Media Approach

The following are the disadvantages of the instructional media approach:

- Sometimes when it requires highly sophisticated infrastructure facilities, it may lead to a heavy financial burden.
- Expertise and skill are required to operate the instructional media devices which will lead to the problem of non-availability of human resources.
- Not feasible in all the topics of study.

In early years, the only term used for teaching aids was audio-visual aids however, with the advancement and opening of new horizons in the field of electronic technology and communication media, new and improved equipments and aids for teaching and learning are developed, instead of mere teaching aids improved terms were used i.e. educational or instructional technology.

The present situation calls for a change at almost every level of education, so that practical and dynamic approach can be given to the existing and new field of education. The crux of this modern education is to awaken the hidden curiosity and interest of the learner, nourishing his behaviors, in order to develop basic and essential skills of lifelong learning as well as ability to think critically and to judge him and others in a more beneficial manner.

There are different types of audio-visual equipments ranging from simple hand-made charts to highly sophisticated projectors available in the markets. In the broadest sense, teaching aids can be categorized under two heads according to sociologists and authors Sampath Pannneerselvam and Santhan, (1998) as follows:

1. **Projected Aids:** Projected aids are those aids which involve an enlarged image of the material or text projected on a screen and which is at a distance from the projector. For example: film strips, slide projector, overhead projection, opaque projection, while using them, the room is either totally dark or may be partially dark. The bright colors and images on the screen catch the attention; sound and motion will make presentation more dynamic as compared to non-projected aids. Projected aids are

NOTES

equally effective for every age group as well as small or large group. The projected aids provide a useful learning experience to the students as it helps in explaining the concept to the students in a better way. It also provides better elaboration of the concept in the pictorial form.

2. **Non-Projected Aids:** Non-projected aids are most commonly used as teaching aids as they do not employ the use of projectors to project enlarged images of objects or text. They are inexpensive to use and are relatively less sophisticated as compared to projected aids. Some examples of non-projected aids include graphic aids, display boards, 3-D aids, activity aids and audio-visual aids.

Teaching aids may be classified as audio aids, visual aid, audio visual aids and activity aids. The various types of teaching aids are described as follows:

Audio aids: An audio-visual aid makes a lesson interesting and a memorable experience not only for students but for teachers as well. They play a vibrant role in focusing the attention of individual student towards the teacher or the topic. Human beings have five senses which are the doorway for effective learning, especially seeing, hearing and touching brings maximum knowledge for the individual. For example: radio and tape recorder represent that aids material which helps the learner to acquire the knowledge through his auditory senses.

Visual aids: Visual aids includes charts, picture models, graphs, D-aids, globes and maps, diagrams, posters, flash cards, photographs, micro projector, film strip and display boards. It represent that aids material which helps the learner in acquiring learning experiences through his visual senses.

Audio-visual aids: Audio-visual aids include television, Motion pictures, cartoon and comics, posters, video films and living objects represent all those equipments and aid material which helps the learner to get opportunity to utilize both his auditory and visual sensors for gaining the desired learning experiences.

Activity aids: Activity aids are those aids in which the students learn by engaging in some useful activities. These aids facilitate learning through sight and sound as well as through doing. The examples of such aids in teaching of biological sciences are as follows:

- Science excursions and visits
- Science exhibition and fairs
- Science museum and clubs
- Nature study corner and nature related projects and assignments
- Botanical garden and nursery
- Zoological place
- Aquarium and terrarium
- Experimentation in the laboratory and workshop, seminars and conferences, discussion panel.

Check Your Progress

3. State any advantage of instructional media approach.
4. What is the aim of instructional media approach?

NOTES

1.4 ANSWERS TO CHECK YOUR PROGRESS QUESTIONS

1. Innovations are rarely transformed into policy changes because policy is impenetrable to most of the innovators whether they originate from social entrepreneurs who operate outside the traditional system, where policy constraints are reduced, or from inside change agents who work around the traditional system constraints.
2. The following are the ways in which innovation can be promoted in students:
 - Strengthen communication and cooperation thereby closing the knowledge gaps.
 - Making use of ICT, providing educational technology accessibility to the students.
 - Maintenance of supportive environment for the development of competencies among the students.
 - Letting them gain lifelong learning experiences thereby, encouraging creativity among the students.
3. Instructional media approach enables the learner to represent information using several different media.
4. The instructional media approach aims at providing meaningful learning experiences through a mix of media in order to achieve predetermined objectives. It provides opportunity to gain mastery of competencies and skills.

1.5 SUMMARY

- Education is a social institution which serves the needs of the country by educating the future generations of the society.
- Innovation is not merely about the final change that has taken place, but it is about the result and the conditions that must be in place to allow innovators to see the problem in new light, create potential solutions, refine their strategy and ultimately leading to acquire effective ideas, products, processes, strategies and platforms.

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- Most of the district and schools plan only for technology acquisition and not for upgrades and maintenance, thus, it is tough for the teachers and users to trust in the adoption of technology tool that may not be supported over time.
- Innovations are rarely transformed into policy changes, whether they originate from social entrepreneurs who operate outside the traditional system, where policy constraints are reduced, or from inside change agents who work around the traditional system constraints.
- Research largely remains isolated from within the schools of education and is often aligned to tenure incentives rather than problem-based needs in the field.
- Innovations must be carried out and must focus the prioritization upon the students who are not being adequately served by the system and the problems of practice that had defied effective solutions to date, as they have most to gain from urgent action.
- In other words, instructional media is the collection of materials and equipment's that are used for successful delivery of the teaching learning process.
- Instructional Media and Multimedia approach can convey information and provide many sources from which student can access the information.
- Multimedia approach will improve the teaching learning process. It is not restricted to a single type of learning style; it can provide the support of a wide range of activities.
- A teacher has to adopt a number of methods and techniques. Teacher has to be aware of the different available media and their availability.
- The role of teacher is of a facilitator or manager of activities. Therefore, the teacher has to lead his or her students for independent and individualized learning.
- Instructional media approach enables the learner to represent information using several different media.
- In early years, the only term used for teaching aids was audio-visual aids however, with the advancement and opening of new horizons in the field of electronic technology and communication media, new and improved equipments and aids for teaching and learning are developed.
- The present situation calls for a change at almost every level of education, so that practical and dynamic approach can be given to the existing and new field of education.
- There are different types of audio-visual equipments ranging from simple hand-made charts to highly sophisticated projectors available in the markets.

- Projected aids are those aids which involves an enlarge image of the material or text projected on a screen and which is at a distance from the projector.
- Non projected aids are most commonly used as teaching aids as they do not employ the use of projectors to project enlarged images of objects or text.
- An audio-visual aid makes a lesson interesting and a memorable experience not only for students but for teachers as well.
- Visual aids includes charts, picture models, graphs, D-aids, globes and maps, diagrams, posters, flash cards, photographs, micro projector, film strip and display boards.
- Audio-visual aids include television, Motion pictures, cartoon and comics, posters, video films and living objects represent all those equipments and aid material which helps the learner to get opportunity to utilize both his auditory and visual sensors for gaining the desired learning experiences.
- Activity aids are those aids in which the students learn by engaging in some useful activities.

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1.6 KEY WORDS

- **Activity aids:** It refers to those aids in which the students learn by engaging in some useful activities.
- **Instructional media:** It refers to the collection of materials and equipment that are used for successful delivery of the teaching learning process.
- **Projected aids:** It refers to those aids which involve an enlarged image of the material or text projected on a screen and which is at a distance from the projector.
- **Non projected aids:** It refers to those aids which are most commonly used as teaching aids as they do not employ the use of projectors to project enlarged images of objects or text.

1.7 SELF ASSESSMENT QUESTIONS AND EXERCISES

Short-Answer Questions

1. Write a short note on the role of teacher in instructional multimedia approach.
2. What are the uses of multimedia approach in education?
3. What are the various stages involved in adopting instructional multimedia approach?

4. How is audio aid different from audio-visual aid?
5. What are the two main categories of teaching aids?

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Long-Answer Questions

1. Discuss the concept of innovation in education and its importance.
2. Explain the role of instructional media in education.
3. Compare the advantages and disadvantages of the instructional multimedia approach.
4. Analyse the barriers related to innovation in education.
5. Identify the prerequisites for developing multimedia instructional device.

1.8 FURTHER READINGS

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UNIT 2 EMERGENCE OF SCHOOL

Structure

- 2.0 Introduction
- 2.1 Objectives
- 2.2 Culture Setting
 - 2.2.1 Culture and the School
- 2.3 Characteristics of Culture
 - 2.3.1 Education and Culture
- 2.4 Social Demand for Education Leadership
 - 2.4.1 Role of the Teacher
- 2.5 Answers to Check Your Progress Questions
- 2.6 Summary
- 2.7 Key Words
- 2.8 Self Assessment Questions and Exercises
- 2.9 Further Readings

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2.0 INTRODUCTION

Culture is defined as the norms and social behaviour which are found in human societies. It is a complex whole which consists of various ranges of phenomena and is transmitted in societies through social learning. On the other hand, cultural setting has been defined as a setting which includes patterns of behaviour and beliefs which dominates a society. Individuals are taught to live in a society according to their respective cultural setting. The unit will discuss the concept of culture and cultural setting.

Education is one of the important means through which culture and customs can be understood effectively. Its main aim is to inculcate in children, the customs which are a part of our society. Culture and education are mutually dependent on each other as one of the main aims of education is to impart the value of social and cultural heritage.

It is important that a social leader and teacher have certain characteristics attached to their personality so that they can impart values properly. They can help in maintaining a level of trust and equality within the society.

In this unit, the relationship between culture and education has been analysed. The unit will explain the characteristic of a social leader and the role of the teacher in a society. The characteristics of culture and education have also been highlighted.

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2.1 OBJECTIVES

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

- Discuss the concept of culture setting
- Analyse the role of school as an important part of culture
- Interpret the characteristics of culture
- Discuss the relationship between culture and education
- Explain the importance of social leadership in a society
- Describe the role of a teacher in a society

2.2 CULTURE SETTING

Culture has been defined in a variety of ways in the field of social sciences, especially by sociologists. Ralph Linton, an American anthropologist has defined culture as the configuration of learned behaviour, and the result of behaviour whose component elements are shared and transmitted by the members of a particular society. According to his view point, culture has been observed as a social heredity that is passed on by the social group from generation to generation. Edward B Tylor, an English anthropologist in his own contribution to the discourse of culture viewed it as a complex whole which includes knowledge, belief, art, models, law, custom and any other capabilities and habit acquired by man as a member of society.

Though invention contributed largely to cultural development, over the period of time, diffusion benefited it more. Diffusion is defined as the process of adopting the characteristics of culture from other societies, irrespective of their means of emergence in the source society.

Invention and diffusion both have contributed to the development of culture. However, with the growth of the cultural base, societies were further set apart. It caused an expanded increase in the diffusion of traits and a simultaneous increase in the growth factor. At present, the growth factor of a culture has reached spectacular heights, especially in the case of western countries.

Custom

A habit once formed, becomes a normal way of life. Customs usually comprise mutual give and take, accompanied by compulsive responsibilities. Additionally, customs also abide by the law, in the absence of which they would hold no significance in the society. According to sociologists, Robert MacIever and Charles Page, custom sets of its own kind of social order which curbs the disagreements that arise between custom and law. Thus, customs streamline the entire social life of an individual. Law is not capable of covering all the aspects of social behaviour. Practices of rituals and customs add to the harmony within a social group. Often, the effect of customs crosses the boundaries of one's own community.

In certain cases, custom is the measure of the relations between two communities, for instance, it is the custom of the Bedouins of the Arabian Desert not to damage any water well even if it belongs to the enemy.

However, a few of the customs have no impact on the social control. These customs exist simply because they have been there since ancient times and people of all generation have been practicing them. However, in many traditional societies and religious rituals, customs are losing their significance. In other words, a custom is viewed just like a public opinion. It has a strong impact on life in social groups as it is the only factor which textually influences social behaviour.

Human beings who grow in an environment with certain cultural traits internalize and appreciate them. Any attempt to condemn, alter or influence the change is always met with serious resistance and antagonism. It is so because they are an inherent part of us. These values attached to the culture by individuals are of importance which calls for a diplomatic and gradual approach to change otherwise there will be instability and chaos. In societies, where certain attempts are made to bring an aspect of alien culture into the existing norms of the society, then violence may take place.

Cultural Norms

Cultural norm is an established standard of a group that expects in terms of thought and conduct. These expectation and resultant behaviors often vary from one culture to the next. It can be in various forms such as values, folkways and morals. In every society, there is a reinforcement of morals like rapes, murder, and robbery with punishment sanction by the laws for members to obey and respect them.

Ideal and real culture

Ideal culture consists of officially approved behaviour patterns while real culture consists of what people actually do in their day-to-day practices without due consideration to their official status like cheating, lying, fighting and so forth.

Subculture

A subculture is a group, smaller than a society, it is related to the larger culture in the sense that it accepts many of its norms but the subculture is also distinguishable because it has some norms of its own.

Cultural relativity

It is impossible to understand the behavioral patterns of other groups, if we analyse them only in terms of our motives and values. A trait which may be disruptive in one society may be vital to the stability of another.

Cultural shock

Cultural change occurs whenever new traits and trait complexes like traditional values, customs emerge to replace the old ones in content and structure.

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Cultural Lag

When the non-material element of the culture like norms values and beliefs attempt to keep pace with changes in the material element of the culture like technology then cultural lag takes place.

Acculturation

The context between one culture and another to change the existing traits is referred to as acculturation.

Enculturation

Enculturation is a process by which people become part of the native culture. It is done through the internalization of the morals loss and folkways of such culture to become a part and parcel of it.

Culture is not a simple accumulation of folkways and mores; it is an organized system of behaviour. Culture is always organized with cultural traits and complexes. Cultural traits are basically the smallest units of culture, for instance, shaking hands, offering prayers and saluting a flag and so on. The culture complex is intermediate between the trait and institution.

The concept of culture can be visualized as an ongoing repository which keeps on adding material and non-material elements that have been socially inherited by future generations from past generations. Culture is incessant because its patterns have surpassed the boundaries of time to recur in succeeding generations.

Culture keeps on getting improved as every generation has a new feature or quality to it. Accordingly, an outstanding equivalence comes into focus which connects the evolution of Homo sapiens with the growth and prosperity of the culture. This similarity cannot be elaborated upon since most conclusions about the Prehistoric period are based on material facts which reveal only part of the way of life of the people of those times. Cro-Magnon's main ability to think was great, but other characteristics related to the development played an active role in restricting a visible growth in learned behaviour.

2.2.1 Culture and the School

The characteristic mark of an educated man should be a positive attitude towards the good culture, that is, towards the ultimate objective values. This kind of attitude should be the cherished product of educational activity.

Each family, whatever maybe its nature complexion and membership has certain traditions customs or methods for rearing children and leading a social life. These cultural aspects can be adopted from other people in the society or can be transmitted from previous generations. Whatever may be the source, they form the part of the culture in which the child is brought up. They influence the life of the child from the very beginning and as he or she grows up from the powerful

ingredients of his or her learning process. Thus, to get an insight into the learning process of the child, it is almost essential to get an understanding of the culture in which he or she is born and the habits they acquire from the surrounding environment i.e. School.

School is a place where teachers teach under a pre-planned system (definite curriculum and examination system) and give specific doses of knowledge and experiences to the students of the school under a fixed timetable and once this process is over with the help of students interaction, students, as well as teachers, are evaluated to certify the degree of success that they have achieved.

Definition of school

According to an American educational reformer, John Dewey, school is a special environment where a certain quality of life and certain types of activities and occupations are provided with the object securing child development along desirable lines.

Characteristics of school

On the basis of the mentioned definitions, we can derive the following characteristics of school:

- School has special environment and is not merely a building which is used for teaching-learning process.
- In a school, life-related activities and experiences are provided to students to make the quality of life better.
- With the help of these activities and experiences, the development of the child is brought about on the desirable lines.
- Schools are established by all civilized societies. Here, young children and adults are prepared to get adjusted in the society.
- Schools make the students efficient and productive members of the society. Thus, schools work as miniature societies.
- Schools always work along the lines of the general welfare of the people in whatsoever manner it is possible. The role of school changes with the change and demand of the time.

School is an institution established by the society for the purpose of preparing the young to participate in that society. Thus, school is a social institution whose fundamental character is determined by the society it serves.

One of the first theorist and practitioners of democratic education was the novelist, Leo Tolstoy who founded a school for peasant children in Russia. The most prominent theorists to voice what has become a common justification for uniform, mass education, and critiqued Tolstoy's philosophy, was Emile Durkheim in his lecture at the Sorbonne in 1902-03. Durkheim was the father of modern

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Sociology and developed the sociological and anthropological school of functionalism. These lectures have since been published under the title ‘moral education’.

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Durkheim argued that the transition from primitive to modern societies occurred in part as ‘elders’ made a conscious decision to transmit what have deemed the most essential elements of their culture to the following generation. In moral education, Durkheim makes the case for an education system that preserves social solidarity by instilling three principles of secular morality in children: what he turns a spirit of discipline, attachment to social groups and self-determination.

Check Your Progress

1. How has Ralph Linton defined culture?
2. What do you understand by the term ‘enculturation’?

2.3 CHARACTERISTICS OF CULTURE

Culture defines a typical way in which the human beings live. It does not have a single point of origin. This means that no member of the human species emerged all of a sudden on this earth. The evolution of culture was gradual as well as was with the conversion of primates to human beings. Culture can be characterized in the following ways:

- Culture is man-made
- Culture is learned
- Culture is transmitted
- Every society has its own culture
- Culture is social, not individualistic
- Culture is ideal for a group
- Cultural satisfies human need
- Culture has adaptability
- Culture has integrative quality
- Culture shapes human personality
- Culture is both super individual and super organic

2.3.1 Education and Culture

Culture and education are inseparable as they are two sides of the same coin and are inter-dependent. Culture is a collective term for socially transmitted behaviour patterns. In ordinary language, culture means good manners and good taste. According to Charles Ellwood, an American sociologist, ‘culture includes man’s

entire material civilization, tools, weapons, clothing, shelter, machines and even the systems of industry’.

Sociologist, Brown opined that both material and non-material cultures are dependent upon each other. But culture cannot be defined; rather it can be described and explained. The culture of a group of people is the way of life of people, for instance it could imply the things its people value, the things that they don’t value, their habits of life, their work of art, what they do and what they don’t, their likes and dislikes and so on. By material elements, it implies a man’s material civilization such as tools, weapons, machinery, clothing and industry. By non-material elements, it implies language, art, religion, morality, law and the government. The two concepts ‘Education and Culture’ can be said to be distinguishable, as the primary definition of Education is Acculturation.

Every human society, whatever is its level of technical evolution devotes considerable attention to transmit its cultural heritage to the young. This trans-generational transmission of culture has helped to cement human solidarity to ensure the continued survival of societies over a long period of time. Before the emergence of schools as specialized agencies, education has taken place in the society, where the young and not so young individuals became educated by simply living their culture.

Education was in fact threatened by schooling, and most societies have been questioning the educational effectiveness of schools since they have been invented. In the case of Africa, it was not only sovereignty that was lost with colonialism. Its education was also lost, and had not been found or reinvented, in spite of well-documented post-colonial reforms.

The broad-based definition of culture gives us an idea that culture is a complex whole. In this complex whole, a child is born. He or she comes with his or her physiological endowment, but they are not sufficient to let him or her live peacefully and in harmony with his environment. A child has to learn to modify them and to put them to their maximum use in order to satisfy his or her own needs. This learning process implies that the society’s pattern of culture can be transmitted to the child. This process of transmission of culture when formally or informally organized refers to the education of the child. Therefore, the transmission of the cultural patterns is one of the important functions of education.

The various definitions of culture mentioned imply that our culture exercises a profound influence on us. Our way of life is determined to a great extent by it. One learns to see the world as our culture makes us see it. One can neither see it in accordance with our pure sensations, not in the light of their own institutions. For example, the appreciation of a beautiful flower is not an innate endowment.

It is the culture, in which we are born that guides our ideas towards such an appreciation. Most of those who visit Taj Mahal at Agra appreciate it and are enamored of its beauty. However, there are people who belong to the communist society and who look towards it not with the eye for beauty but with the notion of

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the misery caused to the labor in building the gigantic mausoleum. Their love for beauty is clouded with their feelings of misery which a powerful king might have caused to the innocent people who had been treated worse than the beasts of burden.

The example of Taj Mahal may give an impression that culture is subordinate to education. It will be an erroneous notion. Thus, education culture is an inclusive concept. When one talks of education, it talks about the education of being who is living in a cultural environment. This being is a product of biological combination but the biological happening of his birth is in a cultural context.

Education is a part of cultural pattern and its nature is determined by the culture in which it is organized. In fact, its very existence is determined by the culture of the people. Among people who are living in remote corners of a backward country, there is no need for a formalized system of education. Whatever patterns are necessary for their modest existence, they are transmitted informally from parents to the offspring. On the other hand, in highly developed technological societies, education is demanded in a highly organized form.

In describing the relationship between culture and education, emphasis has been laid on the transmission of culture through education. It may once again be reiterated here, that education is not only concerned with the transmission of culture but it also builds new cultural patterns. It brings changes in the existing culture. These changes are necessitated due to the cross culture contacts or the building of new knowledge which makes the old cultural patterns redundant. It is required that an individual is equipped to bring the cultural changes so as to meet his or her needs in a changing environment and is prepared to adjust his or her life with the changed cultural life in which they had been born or lived a portion of life, so that it may be a very major portion. There are certain characteristics of education and are as follows:

- Education is a product of culture
- Education functions towards the transmission of culture to the new generation
- Education leads to cultural changes
- Education equips the individual to adjust himself in the changing cultural patterns

Check Your Progress

3. What are the characteristics of culture?
4. How is the nature of education determined?

2.4 SOCIAL DEMAND FOR EDUCATION LEADERSHIP

The origin, nature, and development of personality had been considered in a variety of discourses. It is a central issue in the society as a discipline which centers on leadership and society. There had been presentation of a variety of models of leader's inner nature.

Culture is the hallmark and a distinguishing mark of human society. The term personality has been used in several terms, both popularly and psychologically. However, its comprehensive and satisfactory use is integrated. The dynamic organization of physical, mental and social qualities of an individual is apparent to others, in exchange of social life.

One can define a social leader's personality as the collection of habits, mindsets, behaviour and qualities of a person. These characteristics focus externally on specific and general roles and statuses. Internally, they are focused on self-consciousness and the concept of self, ideas, values, and purpose.

The characteristics of a social leader's personality are as follows:

- It is influenced by social interaction
- It is acquired over a period of time
- It refers to persistent qualities of an individual
- It is an individual unit
- It is not related to bodily structure alone

The type of characteristics which a social leader inherits is generally defined by the culture, as the one which prevails in a specific social group. Culture plays a vital role in influencing the personality of an individual as well as of the group. It has attracted the attention of the scholars of the culture and various schools of thought that are concerned with personality.

The relationship between the culture and social leadership belongs to one side, whereas the total social heritage available to the individual and to which he or she consciously and unconsciously responds belongs to the other side, the integral character of the individual being. It can be argued that the personality of social leaders is everything that makes an individual. Personality comprises of the total organized aggregate of psychological processes and states which pertains to an individual. Thus, the pattern of any culture basically determines the broad contours of an individual's personality. These individual personalities in turn provide evidence of the culture pattern and tend to strive for its perpetuation.

2.4.1 Role of the Teacher

It is important that a teacher should be given a right kind of training. This training will improve the overall personality of a student and will help her or him to achieve

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various goals in a life whether it is personally or professionally. The main role of a teacher has been elaborated in the following points:

1. A teacher must know and understand the relevant statutory and non-statutory curricula and frameworks, including those provided through the National Curriculum Framework for their subjects/curriculum areas, and other relevant initiatives applicable to the age and ability range for which they are trained.
2. A teacher must plan homework or other out-of-class work to sustain learner's progress and to extend and consolidate their learning.
3. A teacher must know a range of approaches related to the process of teaching and assessment. He or she must also analyse and include the importance of formative assessment.
4. A teacher must know how to use local and national statistical information to evaluate the effectiveness of their teaching, to monitor the progress of their students and to raise levels of attainment.
5. A teacher must also be aware of the current legal requirements, national policies and guidance on the safeguarding and promotion of the well-being of the children and young people.
6. A teacher must know how to identify and support children and young people whose progress, development or well-being is affected by changes or difficulties in their personal circumstances, and when to refer them to colleagues for specialist support.
7. A teacher must establish a clear framework for classroom discipline to manage learner's behaviour constructively and promote their self-control and independence.

The behaviour of teacher, in the classroom in particular, has a great bearing on the development and shaping of the behaviour of the students and in their participation in the teaching-learning process. The behaviour of the teacher should comprise of the two main components:

- Verbal components
- Non-verbal components

Sociologists McNergency and Carner (1981) regard teacher behaviour as a function of the characteristics of a teacher, his/her environment and the tasks in which the teacher engages.

Some of the important teaching skills are as follows:

- Stimulus variation
- Set induction
- Skill of reinforcement
- Fluency in questioning

- Probing question
- Recognizing and attention behaviour
- Skill of increasing pupil participation
- Skill of using blackboard
- Skill of using audio-visual aids
- Skill of pacing lesson
- Divergent question
- Planned repetition
- Completeness of communication
- Lecturing
- Skill of explaining

A healthy and good relationship between a teacher and his or pupils are vitally important in the give and take of the classroom life where they exist, there is less likelihood of the difficulties arising. A teacher should treat the children as individuals and must recognise and value their individual characteristics. Many of the factors which contributes to teacher student relationships, for example, the personality of the teacher is clearly beyond the control of the teacher and therefore, has to be taken as 'given' when interactions occur.

One factor, however, that does lie within the teacher's power to manipulate is what has been termed as 'non-verbal immediacy behaviors.' This implies that the initiator, namely the teacher, is approachable and available for communication. They can thus, communicate interpersonal closeness and warmth, they can also contribute positively to relationships. Indeed, research on immediacy constructs suggest that there can be positive force in the classroom, particularly in bringing about better teacher-pupil relationships.

The following suggestions should help a teacher treat all the children equally:

- **Ensuring equality in a classroom:** It is the responsibility of a teacher to ensure that he or she treats all the children equally and give them time to learn things at their own pace. The teacher must respect their opinions irrespective of their backgrounds.
- **Formation of groups:** It is essential that a teacher must create groups in a classroom. Groups help students to interact with other children. It gives a chance to analyse how students interact in a social environment and if necessary, provide them guidance to work in a group. It is also necessary that a teacher must not form groups according to gender.
- **Pronouncing the names correctly:** It is important that a teacher must know the names of their children and should also pronounce them correctly. It encourages a healthy environment in the classroom and a student feels happy about it. It increases their level of confidence as they

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believe that a teacher knows them. If in case, a teacher has any problem regarding the pronunciation, a teacher must ask the students whether they have got their name correctly or not.

- **Designing class exercises:** In case of designing class exercises, case studies or scenarios, a teacher must ensure that he or she has not type cast their roles according to race, gender, sexuality, age or disability. It is also recommended that the task should not be divided according to the generalized views of the society, for instance, even boys can do chores related to cleaning of the desk or the girls can help in moving objects.
- **Helping colleagues:** It is necessary that a teacher must also help other teachers realise the importance of equality in a classroom. If in case, a teacher observes any instance where a teacher has violated any such rules of equality, it is the responsibility of the teacher to make them realise their mistake. He or she should explain the importance of equality among the children.
- **Ensuring equality among students:** It is also important that a child should not be biased towards other children whether it is based on gender or economical backgrounds. If a teacher observes any such behaviour, he or she must help them understand the importance of equality and inculcate values of equality in them.
- **Reflect quality in work:** A teacher must work collaboratively with colleagues of different race, gender, sexuality, age, whenever the opportunity arises. It promotes a healthy and sound environment and teachers can learn one thing or the other from each other which will benefit the students.

Check Your Progress

5. State the two main components of teacher behaviour.
6. What are some of the important teaching skills?

2.5 ANSWERS TO CHECK YOUR PROGRESS QUESTIONS

1. Ralph Linton, an American anthropologist has defined culture as the configuration of learned behaviour, and the result of behaviour whose component elements are shared and transmitted by the members of a particular society.

2. Enculturation is a process by which people become part of the native culture. It is done through the internalization of the morals, laws and folkways of such culture to become a part and parcel of it.
3. The following are the characteristics of culture:
 - (a) Culture is man-made
 - (b) Culture is learned
 - (c) Culture is transmitted
 - (d) Every society has its own culture
 - (e) Culture is social, not individualistic
 - (f) Culture is ideal for a group
 - (g) Culture satisfies human need
 - (h) Culture has adaptability
 - (i) Culture has integrative quality
4. Education is a part of cultural pattern and its nature is determined by the culture in which it is organized. In fact, its very existence is determined by the culture of the people.
5. The two main components of teacher behaviour are verbal and non-verbal components.
6. Some of the important teaching skills are as follows:
 - (a) Stimulus variation
 - (b) Set induction
 - (c) Skill of reinforcement
 - (d) Fluency in questioning
 - (e) Probing question
 - (f) Recognizing and attention behaviour
 - (g) Skill of increasing pupil participation
 - (h) Skill of using blackboard
 - (i) Skill of using audio-visual aids
 - (j) Skill of pacing lesson

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2.6 SUMMARY

- Culture has been defined in a variety of ways in the field of social sciences, especially by sociologists.
- Ralph Linton, an American anthropologist has defined culture as the configuration of learned behaviour, and the result of behaviour whose

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- component elements are shared and transmitted by the members of a particular society.
- Diffusion is defined as the process of adopting the characteristics of culture from other societies, irrespective of their means of emergence in the source society.
 - According to sociologists, Robert MacIever and Charles Page, custom sets of its own kind of social order which curbs the disagreements that arise between custom and law.
 - Cultural norm is an established standard of a group that expects in terms of thought and conduct.
 - Ideal culture consists of officially approved behaviour patterns while real culture consists of what people actually do in their day-to-day practices without due consideration to their official status like cheating, lying, fighting and so forth.
 - A subculture is a group, smaller than a society, it is related to the larger culture in the sense that it accepts many of its norms but the subculture is also distinguishable because it has some norms of its own.
 - It is impossible to understand the behavioral patterns of other groups, if we analyse them only in terms of our motives and values.
 - Cultural change occurs whenever new traits and trait complexes like traditional values, customs emerge to replace the old ones in content and structure.
 - When the non-material element of the culture like norms values and beliefs attempt to keep pace with changes in the material element of the culture like technology then cultural lag takes place.
 - The context between one culture and another to change the existing traits is referred to as acculturation.
 - Enculturation is a process by which people become part of the native culture. It is done through the internalization of the morals loss and folkways of such culture to become a part and parcel of it.
 - Cultural traits are basically the smallest units of culture, for instance, shaking hands, offering prayers and saluting a flag and so on.
 - The concept of culture can be visualized as an ongoing repository which keeps on adding material and non-material elements that have been socially inherited by future generations from past generations.
 - Schools make the students efficient and productive members of the society. Thus, schools work as miniature societies.
 - School is an institution established by the society for the purpose of preparing the young to participate in that society.

- Culture is a collective term for socially transmitted behaviour patterns. In ordinary language, culture means good manners and good taste.
- Education is a part of cultural pattern and its nature is determined by the culture in which it is organized.
- In describing the relationship between culture and education, emphasis has been laid on the transmission of culture through education.
- One can define a social leader's personality as the collection of habits, mindsets, behaviour and qualities of a person.
- The relationship between the culture and social leadership belongs to one side, whereas the total social heritage available to the individual and to which he or she consciously and unconsciously responds belongs to the other side, the integral character of the individual being.
- The behaviour of teacher, in the classroom in particular, has a great bearing on the development and shaping of the behaviour of the students and in their participation in the teaching-learning process.

NOTES

2.7 KEY WORDS

- **Acculturation:** It refers to the context between one culture and another to change the existing traits.
- **Cultural lag:** It refers to the lag which takes place when the non-material element of the culture like norms values and beliefs attempt to keep pace with changes in the material element of the culture like technology.
- **Cultural norm:** It refers to an established standard of a group that expects in terms of thought and conduct.
- **Diffusion:** It refers to the process of adopting the characteristics of culture from other societies, irrespective of their means of emergence in the source society.

2.8 SELF ASSESSMENT QUESTIONS AND EXERCISES

Short-Answer Questions

1. What are the characteristics of education?
2. List the steps taken by a teacher to treat children equally in a class.
3. Write a short note on the characteristics of school.
4. Why is it important to have a healthy relation between a teacher and student?
5. What are the characteristics of a social leader's personality?

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Long-Answer Questions

1. 'Invention and diffusion both have contributed to the development of culture'. Elucidate the statement.
2. Analyse the relation between education and culture.
3. Discuss the importance of culture in a society.
4. Interpret the role of a teacher.
5. 'Culture is the hallmark and a distinguishing mark of human society'. Discuss the statement.

2.9 FURTHER READINGS

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UNIT 3 INNOVATIONS FROM EDUCATIONAL EXPERIMENTS

NOTES

Structure

- 3.0 Introduction
- 3.1 Objectives
- 3.2 Educational Experiments of Rabindranath Tagore
- 3.3 Froebel's Kindergarten
- 3.4 Basic Education and Gandhi
 - 3.4.1 Bertrand Russell
- 3.5 Principles Underlying Self-Learning Devices
 - 3.5.1 Child Development Theory
- 3.6 Answers to Check Your Progress Questions
- 3.7 Summary
- 3.8 Key Words
- 3.9 Self Assessment Questions and Exercises
- 3.10 Further Readings

3.0 INTRODUCTION

The philosophy of education aims at examining the goals, methods and forms of the education. It aims at examining the pedagogical approaches of the teaching methods and suggests the reforms which should be taken.

The programmes related to educational reform aims at reforming the curriculum, assessment and professional development of the students. There are certain principles related to the concept of self-learning programmes. The child development theory focuses on the development of a child's capabilities. The stages in this process are broadly classified into three different categories, namely, cognitive, psychosocial and moral development have been analysed.

In this unit, the educational philosophy of Rabindranath Tagore, Mahatma Gandhi, and Bertrand Russell has been discussed. The unit will also discuss the principles related to various educational programmes and the concept of child development theory.

3.1 OBJECTIVES

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

- Discuss Rabindranath Tagore's educational philosophy
- Explain the aims of education as propounded by Froebel

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- Analyse the educational philosophy of Mahatma Gandhi
- Discuss the teaching methodology of Bertrand Russell
- Interpret the principles related to educational programmes
- Discuss the concept of child development theory

3.2 EDUCATIONAL EXPERIMENTS OF RABINDRANATH TAGORE

Tagore's idealism is a true child of India's own past and his philosophy in Indian both in origin and development.

Dr S Radhakrishnan

Rabindranath Tagore, the great poet, dramatist, novelist, actor, composer, educator, philosopher, painter, and prophet was born in Calcutta on May 6th, 1861 in a highly educated family.

Tagore's philosophies of life are more idealistic in nature. He successfully incorporated idealism into naturalism. He believed in the absolute and immortal existence of god and in the philosophy of liberation. He was the Apostle of truth and had a firm belief in the Vedas. He believed in the Supreme Being and regarded it as omnipotent, omnipresent and omniscient. He professed that in the Supreme Being, we find unity between man and man, and men and nature.

Educational Philosophy of Rabindranath Tagore

The main objectives of Rabindranath Tagore's philosophy are as follows:

- The medium of instruction must be in the language which is familiar to the child.
- For developing creative faculties, the child should be provided opportunities for self-expression.
- The child should be educated in the laps of nature, thus, far away from the busy life of towns and cities.
- The concept of national education should be closely connected with national life.
- Children should be given education which is rooted in their culture.
- Children should be provided freedom to live in a natural environment and learn from their own experiences.
- Children should not be forced to receive knowledge through books. Instead, they should be encouraged to learn from original sources.
- Schools should be reformed.
- Education should not train children to be effective farmers, clerks or craftsmen but develop them to become good human beings.

Concept of Education

Rabindranath Tagore's concept of education believed that God reveals himself through nature more effectively as compared to the education taught in institutions. Therefore, education of the child should be under natural surroundings so that he or she develops love for all things around him.

- **Meaning of Education:** Tagore says, 'Education is highest which not only impart information and knowledge to us, but also promotes love and fellow-feeling between us and the living beings of the world'.

Curriculum

Curriculum should be made in such a way that it develops an individual physically, mentally, morally, socially and spiritually to the utmost limits. For this curriculum based on activities and broad experiences in real life situation is necessary. It will help in improving the overall personality of the child. He also believed that along with various subjects, different types of co-curricular activities should also be made an essential part of the curriculum.

Methods of Teaching

Rabindranath Tagore believed in the following teaching methods:

- **Teaching while walking:** Tagore believed that education which is imparted in the classroom does not influence the mind and body of the child. If education is restricted only till the classroom, the child will remain inactive and passive. However, if teachers and students walk while learning, the mind remains active and he or she can easily grasp the things.
- **Teaching through tours and trips:** Tagore believes history, geography, economics and other subjects of social sciences can be effectively taught to the students through tours and excursions. According to him, a child learns maximum when he or she is allowed to be a part of nature.
- **Learning through activities:** For the complete development of the child, it is essential that a child must learn the concepts through some kind of activity. Therefore, he included the activities such as climbing tree, jumping, plucking flowers and dancing in his educational curriculum
- **Narration-cum-discussion and debate method:** Narration-cum-discussion and debating activities were organized in Tagore's education centre to develop oratory abilities of the students. He said that real education is not about learning things by books. It must be based upon real life problems. Students were encouraged to solve problems of various areas through rational debate and discussion so that the students will be able to think logically and argue.
- **Heuristic Method:** Rabindranath Tagore introduced heuristic method as an important method of teaching in his educational institution. In this method

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first, the students are asked to question and clarify their doubts. It is the responsibility of the teacher to clear their doubts and the teacher then asks the questions to the students, to evaluate how far the students are able to comprehend the topic which is discussed in the class.

Discipline

Rabindranath Tagore was a lover of children and an advocate of free discipline. He wanted to provide the child an opportunity for the discovery of his or her innate potentialities in liberty. The education of the child should be carried on naturally and in a natural environment.

The teacher should behave with the child with great love, affection, sympathy. It is the responsibility of the teacher to provide a conducive environment so that a child in engage himself or herself in constructive activities. Such method will help them to understand the concepts in a better way.

The teacher should create engaging activities which will help the child to enhance their creative capabilities. He believed in dynamic methods of teaching. Teaching methods should be based on the interests, ability and experience of the child. The best method of teaching is teaching while walking. The static education which is carried in the environment of the classroom results in boredom and does not facilitate any creative faculty in children. Lectures should be avoided and a democratic atmosphere should be adopted in the classroom and school as well. It was also emphasized by him that learning should be a joyous adventure for children. Poetry should also be taught from the emotional stand-point. Thus, the main aim of Tagore's method of education was to make the child learn through the concept of self-learning and provide him or her situations so that they can have a real life experience.

Rabindranath Tagore believed in education which is rooted in experience. Education should be connected with our complete life experiences whether it is economical, intellectual and aesthetical aspects.

Check Your Progress

1. What is the main aim of Rabindranath Tagore's method of education?
2. How is curriculum designed in Tagore's method of education?

3.3 FROEBEL'S KINDERGARTEN

Friedrich William A Froebel (1782-1852), the German pedagogue laid the foundation for the modern education system. It is based on the concept that children have unique needs and capabilities. He is known as 'the father of kindergarten' because of his contribution to the field of early childhood educationn. As a keen observer of nature as well as humanity, Froebel approached education from both

the biological as well as the spiritual perspective. According to Froebel, ‘mind unfolds from within according to a predetermined pattern. The development and formation of the whole future life of each being is continued in the beginning of its existence’.

He also believed that, all the things are developing according to the specific divine laws and so there should be no external interference in the process of development. He also believed that all the things of the universe have different entities yet they all have originated from one and only God. He opined that all the objects are of different shapes and sizes, yet they are essentially similar to each other. This philosophy of life influenced his educational thoughts and practices.

Froebel’s was influenced by various philosophers such as Jean Rousseau’s works and was inspired towards the concept of nature, goodness and maturity of the child. He was also influenced from Johann Basedow and his natural methods of teaching; and his own tutor Pestalozzi, who developed the natural model of education and Elementary School practices.

Aims of education

Froebel’s goal of education is stated in terms of relationship to nature and God. Education consists in ‘leading man as thinking, intelligent beings, growing into self-consciousness, to a pure and unsullied, conscious and free representation of the in a law of divine unity, and in teaching him ways and means thereto’.

According to Froebel, education is the means to awaken the spiritual nature of man and to identify him or her with nature. It also enables the students to realize the fundamental unity of all living beings with the God.

School curriculum

On the basis of his observation of nature and the stages of Human Development, Froebel’s curriculum incorporated the principles of self-development activity and the process of socialization. The content of the curriculum was made up of all types of self-expression activities. It was so because it will help the child to gain an understanding about the knowledge of self, human relations, nature, and the external world and to understand the concept of god as the divine source and cause of all existence. Play Way method was at the core of the curriculum and was considered as the most valuable form of self-expression. It was believed that this method stimulated motor expression, skill and developed the child’s symbolic, constructive and aesthetic power. Subjects like modeling, drawing, ceiling, painting, gardening, and nature study are taught along with formal subjects like religion philosophy natural sciences, mathematics, and languages. All these subjects should possess internal unity and a high degree of correlation.

Kindergarten

The school opened by Froebel in 1840 at Blankenburg to educate the children is known as ‘kindergarten’ which means garden of the small kids. His educational

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thoughts were applied in this school. Children were educated and guided on the principles of self-experience, observation, and socialization. In this school, the child expressed his or her ideas through various activities and plays.

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Gift and occupation

The gifts and occupation was a series of twenty devices and activities, essentially a hand on curricular system intended to introduce the children about physical forms and relationships found in nature. These tangible objects and activities assume that there was a mathematical and natural logic underlying all things in nature. The gifts literally functioned as a tool which was used to awaken and develop a child's recognition of the common, considered to be as God-given elements found in nature. Froebel was concerned regarding the interrelationship between living and inanimate things. His idea of gifts helped him do so by instilling in children, the idea of appreciation for natural forms and harmony.

In fact, even in the existing times, most of Froebel's ideas and materials are used without acknowledging their source. For instance, the concept of playing with blocks is a part of Froebel's method.

Teaching methods

There were three types of teaching methods in Froebel's method of education which are as follows:

- Use of gifts
- Singing of songs
- The games

The gifts which consisted of geometrical patterns were used to awaken in the child, a power to conceptualize and help him or her to reach the recognition of ultimate truth. *Nursery rhyme* is a small book which consisted of fifty pages. The songs mentioned in the book, established an affectionate bond between the sense organs of the child and helped in improving the physical, mental and spiritual development. The games helped in developing a sense of community as well as an opportunity to share things. Cooperative activities helped in improving socialization and motor competencies. Games also helped to build relationships and provided a group of ideas among the children

Evaluation

Froebel was against memorization and rote method of learning. He was concerned about the traditional method of education which only emphasized on memorization. His idea of education focused on learning which will develop a child's creativity and perception. Froebel stands as a pioneer of modern educational theory, especially in his recognition that a child should not be pushed beyond his ability and readiness and in his sensitivity to the child's natural inclinations.

Check Your Progress

3. What are the three main types of teaching methods in Froebel's method of education?
4. How has Froebel defined education?

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3.4 BASIC EDUCATION AND GANDHI

Mahatma Gandhi was born on October 2, 1869 at Porbandar, Gujarat. He believed in a classless society by decentralizing powers to village panchayat and Parishad and by raising the economic standard of lower sections of the society. His socialism is different from that of Marx in the sense that Marx believed in supremacy.

Gandhi's philosophy of life can be described as follows:

- **Truth and Ahimsa (Non-Violence):** According to Gandhi, 'Truth and Ahimsa are the two sides of the coin. They inter-twined and it is practically impossible to separate both of them'.
- **Satyagraha:** It implies holding of truth through love and purity.
- **Supreme God:** According to Gandhi, God is 'indefinable, by extraneous evidence but in the transformed conduct and character of those who have felt the real presence of god within'.
- **Righteousness and Truth as the Highest Religion:** Gandhi had a firm view that, 'true religion and true morality are inseparably bound up with each other'.
- **Service of Humanity:** The immediate service of all human beings becomes a necessary part of the society because it is the only way to see him in his creation.

Fundamental Principles of Education Proposed by Mahatma Gandhi

The following are the fundamental principles of national education:

- **Fostering of Patriotism:** Education should not cultivate loyalty to British rule. It should instead promote an idea of national consciousness and a love for the mother country.
- **No Servile Imitation of the West:** Although, there were various ways which had to be adopted from the Western civilization. Yet, Indian education must be based on Indian cultural and intellectual traditions.
- **Domination of English Language:** The use of English as a medium of language was considered as a serious defect of the official system. It was opined that the media of instruction should be in the modern vernaculars.

- **Vocational Education to be emphasized:** National education should have a vocational emphasis and focus on the economic development of the country.

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Basic Education

The origin of Basic Education System must be traced back to July, 1937. When Mahatma Gandhi wrote in *Harijan*, 'By education I mean all round development drawing out of the best in child and man-body, mind and spirit. Literacy itself is no education. He believed in beginning of the child's education by teaching useful handicraft and enabling it to produce from the moment it begins its training. Thus, every school can be made self-supporting, the condition being that the state takes over the manufacture of these schools'. In October 1937, a Conference of National Workers was held at Wardha under the chairmanship of Mahatma Gandhi.

The basic school is a special type of school for children aged between seven and fourteen. The following were the characteristics of basic school:

- Life centered activities through crafts.
- Correlation with the central craft.
- Freedom for the Teachers for experimentation and innovation.

It emphasized more on philosophy and ideology rather than the method of instruction. This scheme has five limbs:

1. Free basics for children between five and seven
2. Basic school for children between seven and fourteen
3. Post basic school for pupils from fourteen and seventeen
4. Adult education
5. Education for social workers and teachers in the villages

All these must be well organized for a well-balanced society with well-balanced individuals. The Sarvodaya ideal is the main ideal of a self-sufficient co-operative community.

The chief tenets of Gandhian Education were as follows:

- There should be free and compulsory primary education.
- The education should be craft-centered.
- It should be self-supporting.
- It should be given in mother tongue.
- It should be based on non-violence.

Free and Compulsory Education

According to Gandhi, within the age of seven and fourteen, free and compulsory elementary education should be provided to the students.

Craft Centered Education

Mahatma Gandhi believed that the highest development of the mind and soul was possible only through handicraft. He did not want to teach handicraft side by side with the liberal education. He wanted to start the complete process of education with handicraft only.

Self-Supporting Element

By advocating the self-supporting aspect, he believed that the right kind of teachers should teach the students, the dignity of labour and the children who regard craft as an integral part and means of their intellectual growth.

Flexible Curriculum

Teachers and students are free to work according to their interest and local needs. Necessary changes may be introduced by the teacher, if any need arises. Basic education curriculum is designed for children from seven to fourteen years of age. The structure of the curriculum is given as follows:

- General science for boys and home science for girls
- Co-education up to class fifth only
- Important crafts included in the curriculum are spinning and weaving, carpentry, agriculture, fruits and flowers cultivation, book craft, leather work, pisciculture, or any craft needed locally.
- Mother tongue as the medium of instruction
- Mathematics as a subject to be incorporated to develop calculation ability
- History geography and civics to be taught in all classes
- Painting and music to be included in the curriculum since the beginning of teaching process
- PT, drill and sports to be a part of children's curriculum
- Hindi as a subject had to be introduced if it is not the mother tongue of the people.
- English has not been given any place in the curriculum.
- Religious education also does not occupy any place in the curriculum. Self-realization is the greatest religion according to Gandhi.

3.4.1 Bertrand Russell

Bertrand Russell was born in 1872 in Trelleck, Wales. Among many titles, he is known as philosopher logician, essayist, and mathematician.

Theory of learning

According to Russell, skills and knowledge should be acquired in schools which are designed for the purpose of training children. Parents cannot be expected to

NOTES

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possess the skill or the ledger required for the new and difficult art of dealing with young children. The schools should provide what the parents cannot and the environment in which all the children should be treated equally and learn the art of socialization.

Russell negated idealistic philosophical theories and finally propounded the existence of matter and was therefore, known as neorealist. With time, he propounded his thought on the basis of mathematical logic. It came to be known as logical atomism. He has worked the most on sense data (an immediate object of perception, which is not a material object; a sense impression), and he has done it on the basis of logic and therefore, some scholars also recognize him as a logical positivist.

Aims of education

Russell had an outline of the world in his mind, a world in which truth persists and will replace the place of true concepts, love will rule in place of hatred; creative task will be done in place of destructive ones, freedom in place of repression, and peace will prevail in place of War. According to him, this task must be performed by education only and education can perform this task when it is planned for the attainment of the following aims:

- **Character building:** A man's character should have four attributes of vitality (good health), courage, sensitiveness, and intellect.
- **Intellectual development:** By intellectual development, he meant the development of seven qualities in a man such as curiosity, freedom from prejudices, patience, attention, perseverance, reality, and possibility of knowledge.
- **Development of scientific attitude:** According to Russell, three things are necessary for the development of scientific attitude. First, a person should control his feelings, desires, and excitement, second, he should have faith in the truth and third, he should be free from prejudices.
- **Development of individuality and citizenship:** Russell was a staunch supporter of democracy. According to him, democracy respects the individuality of the individuals. He emphasized on the need of making an individual a good person from the social viewpoint and a good citizen from the state viewpoint.
- **Development of internationalism:** Russell wanted to root out the basic causes of war which he thought are the reason for fear, enmity, false prestige, narrow nationalism and he wanted to establish peace in place of war in the world. According to him, education should be such that it should inculcate a sense of understanding between individuals belonging to different regions. He considered the development of internationalism by education as the foremost need of the world. Thus, he believed this should be the supreme aim of education.

Teaching methodology

Russell laid special emphasis on the following factors regarding teaching methodology:

- Teaching learning environment should be free from fear.
- Learners should have curiosity for learning.
- Learners should have opportunities to learn by doing.
- Learners should proceed from simple to complex.
- The most suitable method should be used for teaching a subject at any level.
- Teaching aids should be used to make teaching learning process effective.
- Individual difficulties of the learners should be removed in the process.

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Discipline

Russell emphasized on self-discipline. According to him, excessive punishment or freedom both of them do not establish any discipline in the student. He opposed the process of making the student discipline by the teacher or any other individual. He also believed that punishment should be given to the child but in a limited way. He believed that, discipline can never be imparted to the student; the child learns discipline by himself and through the environment in which he or she resides.

Teacher

According to Russell, a teacher should be competent in all respects. They should possess general knowledge besides the knowledge of the teaching subjects and should be trained and skilled in the art of teaching and they should be loyal to the students as well the nation. The teacher should possess more love towards his or her pupils as compared to the nation. A teacher should be given freedom to express their opinions and the people should have the freedom to accept or reject them.

Check Your Progress

5. What are the basic characteristics of a school?
6. What are the chief tenets of Gandhian Education?

3.5 PRINCIPLES UNDERLYING SELF-LEARNING DEVICES

The design for the principle of curriculum, instruction, assessment and professional development, provide one of the organizing frameworks of the committees analysis of educational programmes. During the last four decades, scientist have engaged in research that has not only improved our understanding of the basics concept of

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human cognition, providing greater insight into how knowledge is organized how experience can shape the understanding, how learners differ from one another, and how people acquire expertise. Thus, scientist and others have been able to synthesize a large number of principles for human learning. This growth in understanding of basic concept on how people learn has the potential to influence significantly the nature of education and its outcomes. The following are the basic principles which have been developed to assess the programmes of advanced study and can also serve as a guide or framework for those involved in developing, implementing or evaluating new educational programmes.

1. Learner motivation

What motivates the learner? Why do people sometimes put so much effort and energy into learning another language? In trying to understand the motivation that drives language learning, major studies have been done in the past. The studies have divided motivation into two broad categories instrumental and integrative.

Broadly, instrumental motivation refers to a type of motivation in which learners learn a language as it will help in achieving instrumental and practical goals, such as getting a job, reading foreign newspapers or obtaining a promotion. This category also includes more negative factors such as failure. Integrative motivation, on the other hand, refers to a type of motivation in which learners learn a language for reasons of understanding, relating to or communicating with the people of the culture.

2. The teacher's metalanguage

The term metalanguage is used to mean different things. Here, it is used to mean teacher talk and which is not related to the language being presented: the language a teacher uses to allow the various classroom processes to happen, that is, the language of organizing the classroom. This includes the teacher's explanation response to questions, instructions and giving praise correction collection of homework.

While the general name of the classroom is to minimize teacher talking time, so as to encourage student talking time, better language itself is an important source of learning because it is genuinely communicative. For example, when a teacher praises a student or ask another one to be quiet, or sets up a task, the language used is genuinely contextualized, purposeful and communicative, and therefore, a potentially rich source of input.

3. The learning environment

It is generally observed that people learn best when they are relaxed, comfortable, unstressed, interested and involved in what is going on, and motivated to continue. However, there is no such criterion which explains the right kind of environment which will be conducive to the learning process. We cannot, for example, say that 'the more a teacher smiles, the more relaxed the students are' as this is absurdly simplistic. Nonetheless, there may be a lot to be gained from developing an awareness of the effective factors that influence learning.

4. The language of feedback to error

The language of feedback refers to the responses given by the teacher to what learners produce in the classroom. In its most narrow definition, this refers to teacher response to an error. Most teachers are aware of feedback in terms of its motivational value- the value of positive feedback and disincentive that negative reinforcement can produce. However, apart from the motivational aspects of producing feedback, there are linguistic and cognitive reasons for teachers to consider closely how they respond. The exact content of the teacher's response as it relates to the learner's production may well have an important influence on the learning process.

5. Checking learning

If all students learn what they were taught at the time at which it was first taught, and if all of them grasped it equally well and quickly, teaching would be much less complex than it is. In fact, of course, learners do not always learn what the teacher sets out to teach-sometimes they learn less, and sometimes other valuable things. Nor do they all learn in the same way or at the same rate. It is for this reason that teachers develop strategies for checking that learning is taking place or has taken place and it is a necessary principle for learning.

6. Learning and teaching compared

It has long been known that teaching does not equal learning-that what a teacher goes into a classroom to teach may not match what the learner perceives the lesson to be about or what learning is achieved on the part of the learner. This is because the construction of meaning is an essentially personal experience for each individual.

This principle is primarily concerned with how each lesson is a different lesson for every learner. It also helps in examining how a teaching plan appears to be realized in learning terms in the mind of learners. The difficulty in this type of task, as in many aspects of observing learning, is that learning itself is not directly visible. Teaching aims, for example, should not be confused with the learning outcomes, as these will vary according to how the learner acts on the input. We, therefore, must guard against making simple stick equations or drawing conclusions about learning based only on observable data. Keeping these considerations in mind, we must consider how learning appears to be happening for some learners.

7. Using teaching and learning resources well

The resources used for a teaching are a crucial element in influencing the quality of our teaching. Outstandingly good teaching materials are not only the guarantee for good teaching, but they do tend to improve the teacher's confidence and they tend to be an area of work that pupil's comment on, whether adversely or with praise. Most teachers also recognize that the ways in which resources are used make all the difference and that planning of activities is crucial to the success.

NOTES

NOTES

3.5.1 Child Development Theory

Developmental theories are quite useful in understanding how the children learn and grow. Most of the biologists believe that both biology and experience are the major factors that help in shaping the developmental outcomes. Risk as well as the protective factors are also said to contribute towards the development and growth of the child and are often modified through intervention efforts. In fact, theories of development often provide a framework for thinking about human growth, development and the learning process if one has ever wondered about what motivates human thought and behavior or how the personality is formed, understanding these theories can provide useful insight into both individual as well as societal influences on early child development.

Development

Development means the emerging and expanding capacities of the individual to provide a greater facility in functioning such as the development of motor ability from certain manipulation to proficiency in games. It is achieved through the process of growth.

Development refers to interaction of a person with his environment surrounding whose after product is to increase. The outcomes of the development process can be categorized into the following categories:

- The strength
- The degree of differentiation
- The organization of personality

Let us now the stages related to the development process.

1. Stages in Cognitive Development

According to Jean Piaget, a Swiss psychologist, cognitive development in human beings takes place through four important stages in cognitive development of the child:

- (a) Period of sensory-motor adaptation (0 to 2 years of age):** The Infant starts this age by his reflex activities and then he or she reaches to the states of sensorimotor schemes by practice and accommodation. Infant differentiates himself or herself from objects; gradually becomes aware of the relationship between his or her action and their effects on the environment so that he or she contact intentionally and make interesting events last longer (if he or she shakes a rattle it will make a noise); learns that object continues to exist even that they are no longer visible (object permanence).
- (b) Preoperational stage (2 to 7 years of age):** Child uses language and can represent object by images and words; is still egocentric; the world revolves around him and he has difficulty taking the viewpoints of others;

classifies object by single salient features: if A is like B in one respect, must be like B in other respects; towards the end of the stage begins to use numbers and develop conservative concepts.

- (c) **Concrete operational stage (7 to 12 years of age):** The child becomes capable of logical thought; achieves conservation concepts on this order; can classify objects on the basis of numbers order them in series along a dimension and understand relational terms.
- (d) **Formal operational stage (12 years and above):** The child can think and abstract terms, follow logical propositions, and reason by hypothesis; isolates the elements of a problem and systematically explores all possible solutions; becomes concerned with the hypothetical, the future, and the ideological problems.

NOTES

2. Stages in Psychosocial Development

Stages (Ages are approximate)	Psychosocial Crises	Radius of significant relations	Psychosocial Modalities	Favorable outcome
1. Birth-first year	Trust vs. Mistrust	Mother or Mothers substitute	To get To give in return	Drive and hope
2. Second year	Autonomy vs. Shame or Doubt	Parents	To hold (on) To let (go)	Self-control and willpower
3. Third year to Fifth year	Initiative vs. Guilt	Basic Family	To make (going after) To 'make like' (playing)	Direction and purpose
4. Sixth year to onset of puberty	Industry vs. Inferiority	Neighborhood; school	To make things (competing) To make things together	Method and competence
5. Adolescence	Identity and reputation vs. Identity diffusion	To be oneself (or not to be)	To be oneself (or not to be)	Devotion and fidelity
6. Early Adulthood	Intimacy and solidarity vs. isolation	Partners in friendship, sex, competition, cooperation	To lose and find oneself in another	Affiliation and love
7. Young and middle adulthood	Generativity vs. self-absorption	Divided labor and shared household	To make be To take care of	Production and care
8. Later Adulthood	Integrity vs. Despair	'Mankind' 'My kind'	To be, through having been To face not being	Renunciation and wisdom

3. Stages in Moral Development

Levels and Stages	Illustrative Behavior
Level I Premoral 1. Punishment and obedience orientation. 2. Naive instrumental hedonism	Obeys rules in order to avoid punishment. Conforms to obtain rewards, to have favors returned.
Level II Morality of conventional role conformity 3. 'Good-boy' morality of maintain good relations, approval of others. 4. Authority making morality	Conforms to avoid disapproval, dislike by others. Conforms to avoid censure by legitimate authorities, with resultant guilt.
Level III Morality of self-accepted moral principles 5. Morality of contract, of individual rights, and of democratically accepted law. 6. Morality of individual principles of conscience	Conforms to maintain respect of the impartial spectator judging in terms of community welfare. Conforms to avoid self-condemnation

NOTES

Check Your Progress

7. What are the main outcomes of the development process?
8. What do you understand by the term 'metalanguage'?

**3.6 ANSWERS TO CHECK YOUR PROGRESS
QUESTIONS**

1. The main aim of Tagore's method of education was to make the child learn through the concept of self-learning and provide him or her situations so that they can have a real life experience.
2. Curriculum is designed in such a way that it develops an individual physically, mentally, morally, socially and spiritually to the utmost limits. For this curriculum based on activities and broad experiences in real life situation is necessary.
3. The three main types of teaching methods in Froebel's method of education are as follows:
 - (a) Use of gifts
 - (b) Singing of songs
 - (c) The games
4. According to Froebel, education is the means to awaken the spiritual nature of man and to identify him or her with nature. It also enables the students to realize the fundamental unity of all living beings with the God.
5. The basic characteristics of a school are as follows:
 - (a) Life centered activities through crafts.
 - (b) Correlation with the central craft.
 - (c) Freedom for the Teachers for experimentation and innovation.
6. The chief tenets of Gandhian Education are as follows:
 - (a) There should be free and compulsory primary education.
 - (b) The education should be craft-centered.
 - (c) It should be self-supporting.
 - (d) It should be given in mother tongue.
 - (e) It should be based on non-violence.
7. The main outcomes of the development process are as follows:
 - (a) The strength
 - (b) The degree of differentiation
 - (c) The organization of personality

8. The term ‘metalanguage’ is used to mean different things. Here, it is used to mean teacher talk and which is not related to the language being presented: the language a teacher uses to allow the various classroom processes to happen, that is, the language of organizing the classroom.

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3.7 SUMMARY

- Tagore’s philosophies of life are more idealistic in nature. He successfully incorporated idealism into naturalism.
- Rabindranath Tagore’s concept of education believed that God reveals himself through nature more effectively as compared to the education taught in institutions.
- Curriculum should be made in such a way that it develops an individual physically, mentally, morally, socially and spiritually to the utmost limits.
- Tagore believed that education which is imparted in the classroom does not influence the mind and body of the child.
- Tagore believes history, geography, economics and other subjects of social sciences can be effectively taught to the students through tours and excursions.
- For the complete development of the child, it is essential that a child must learn the concepts through some kind of activity.
- Narration-cum-discussion and debating activities were organized in Tagore’s education centre to develop oratory abilities of the students.
- Rabindranath Tagore introduced heuristic method as an important method of teaching in his educational institution.
- Education should be connected with our complete life experiences whether it is economical, intellectual and aesthetical aspects.
- Friedrich William A Froebel (1782-1852), the German pedagogue laid the foundation for the modern education system. It is based on the concept that children have unique needs and capabilities.
- According to Froebel, education is the means to awaken the spiritual nature of man and to identify him or her with nature.
- On the basis of his observation of nature and the stages of Human Development, Froebel’s curriculum incorporated the principles of self-development activity and the process of socialization.
- The gifts and occupation was a series of twenty devices and activities, essentially a hand on curricular system intended to introduce the children about physical forms and relationships found in nature.

NOTES

- Froebel was against memorization and rote method of learning. He was concerned about the traditional method of education which only emphasized on memorization.
- Froebel stands as a pioneer of modern educational theory, especially in his recognition that a child should not be pushed beyond his ability and readiness and in his sensitivity to the child's natural inclinations.
- Education should not cultivate loyalty to British rule. It should instead promote an idea of national consciousness and a love for the mother country.
- According to Gandhi, within the age of seven and fourteen, free and compulsory elementary education should be provided to the students.
- By advocating the self-supporting aspect, Gandhi believed that the right kind of teachers should teach the students, the dignity of labour and the children who regard craft as an integral part and means of their intellectual growth.
- Teachers and students are free to work according to their interest and local needs. Necessary changes may be introduced by the teacher, if any need arises.
- According to Russell, skills and knowledge should be acquired in schools which are designed for the purpose of training children.
- Russell negated idealistic philosophical theories and finally propounded the existence of matter and was therefore, known as neorealist.
- Russell emphasized on self-discipline. According to him, excessive punishment or freedom both of them do not establish any discipline in the student.
- The design for the principle of curriculum, instruction, assessment and professional development, provide one of the organizing frameworks of the committees analysis of educational programmes.
- The language of feedback refers to the responses given by the teacher to what learners produce in the classroom.
- Developmental theories are quite useful in understanding how the children learn and grow. Most of the biologists believe that both biology and experience are the major factors that help in shaping the developmental outcomes.
- Development means the emerging and expanding capacities of the individual to provide a greater facility in functioning such as the development of motor ability from certain manipulation to proficiency in games.

3.8 KEY WORDS

- **Development:** It refers to the process of emerging and expanding capacities of the individual to provide a greater facility in functioning such as the development of motor ability from certain manipulation to proficiency in games.
- **Instrumental motivation:** It refers to a type of motivation in which learners learn a language as it will help in achieving instrumental and practical goals, such as getting a job, reading foreign newspapers or obtaining a promotion.
- **Integrative motivation:** It refers to a type of motivation in which learners learn a language for reasons of understanding, relating to or communicating with the people of the culture.
- **Language of feedback:** It refers to the responses given by the teacher to what learners produce in the classroom.

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3.9 SELF ASSESSMENT QUESTIONS AND EXERCISES

Short-Answer Questions

1. How is curriculum designed in Froebel's method of education?
2. Write a short note on Rabindranath Tagore's educational philosophy.
3. What is the main aim of Froebel's method of education?
4. List the fundamental principles of Gandhi's national education.
5. What is the role of teacher in Russell's method of education?

Long-Answer Questions

1. Explain the various teaching methods of Tagore's educational philosophy.
2. Discuss Gandhi's philosophy of education.
3. Analyse the aims of education as propounded by Russell.
4. Explain the principles related to self-learning devices.
5. Interpret the stages of development. Discuss in detail.

3.10 FURTHER READINGS

Linton, Ralph. 1998. *The Cultural Background of Personality, Volume 1*. United Kingdom: Routledge.

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S.S., Chauhan. 2009. *Innovations in Teaching Learning Process*. Noida: Vikas Publishing House Pvt. Ltd.

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UNIT 4 FACTORS OF INNOVATIONS

NOTES

Structure

- 4.0 Introduction
- 4.1 Objectives
- 4.2 Growth of Culture and Civilization
 - 4.2.1 Factors Responsible for the Resistance to the Growth of Culture
- 4.3 Social Effects of Innovation
 - 4.3.1 Inventions
 - 4.3.2 Principle of Equality
- 4.4 Innovation and Educational Goals
- 4.5 Answers to Check Your Progress Questions
- 4.6 Summary
- 4.7 Key Words
- 4.8 Self Assessment Questions and Exercises
- 4.9 Further Readings

4.0 INTRODUCTION

Culture is defined as a system of learned behaviour which is shared by the members of a group. On the other hand, civilization is defined as the manners and thoughts which are inherited in a person. Education is acquired by learning and is also a result of good upbringing. Thus, civilization and culture are closely interrelated. Education explains the way in which one should live his or her life and this way of living is a part of an individual's culture and civilization.

Innovations and inventions are also an important part of the teaching process. The developments and new methods have paved the way for a better future. It is important that education should be given to everyone and thus, there are various articles in our constitution which provides equal education.

There are three main types of innovative practices which are team teaching, personalized system of instruction and educational games. The main characteristics of each of these practices have been explained in the unit.

In this unit, the concept of growth of culture and civilization has been explained. The articles related to the principle of equal education and importance of invention in teaching process has been analysed. The social effects of innovation have also been highlighted in the unit.

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4.1 OBJECTIVES

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

- Discuss the concept of growth of culture and civilization
- Analyse the social effects of innovation
- Discuss the importance of inventions in teaching and principle of equal education
- Explain the three main types of innovation practices of teaching

4.2 GROWTH OF CULTURE AND CIVILIZATION

We will discuss the concept of growth of culture and civilization in this section.

Growth of Culture

The word culture is derived from the Latin term ‘cult’ or ‘cultus’ which means tilling or cultivation or refining. Culture is a means in which cultivation and refining takes place to such an extent its end product brings admiration and respect. Culture is something more than the material wealth of a society. It refers to the capabilities acquired by men.

According to author and anthropologist, Bantock, ‘the word culture is normally used in two broad senses. It is used by the anthropologists to refer to the total pattern of a society’s life. The other typical use of the word culture, however, involves a high degree of selectivity’.

A country in order to achieve the status for true development should not only focus on scientific tools and economic growth but should also focus to sustain its traditional heritage and cultural civilization. The very notion of Human Development Index (HDI) devised by United Nations Development Programme (UNDP) is that progress and development is no longer to be measured just in terms of Gross Domestic Product (GDP) or per capita income but also in terms of human well-being which includes number of factors such as cultural identity, sense of security of both one’s personal safety, as well as safety of one’s culture and ones, place in this world. Keeping this view in mind, Bhutan has very high indicators of human happiness. It is so because of Bhutan’s flourishing craft activities, linking craft to Bhutan sense of Identity (Chatterjee and Ashoke 2005). So traditional cultural ethos and values are a major part of a country’s development. In India, it is a traditional skill (local knowledge) of the handicrafts artisans that is a major

basis of their identity and in post-liberalization India that identity is either getting vanished or getting diluted and the skill/local knowledge is very much influenced by the market forces (Jena 2008,22). Sustaining one's own cultural heritage of any form in modern globalized times is one of the greatest challenges for any country. Without this, true development of nation and humanity is impossible.

Growth of Civilization

According to sociologists, MacIver and Page, the two great areas of human experience and human activity are 'culture' and 'civilization'. All that man does, all that he or she creates, all his or her artifacts fall permanently into one order or the other. It would include not only our systems of social organization but also our techniques and material instruments. It would include the ballot box and the telephone alike, our laws as well as our schools and our banking system as well as our banks. They both argued that technology is a part of civilization.

Within the order of civilization, they distinguished between basic technology and social technology. The basic technology is directed towards man's control over natural phenomena. It is the area of the engineer and the mechanic. It applies the laws of physics, chemistry, and biology to the service of human objectives. It rules the process of production in industry, agriculture and extractive industries. It constructs ships, planes, ornaments, tractors and elevators and an endless variety of artifacts. It shapes and assembles the objects of every scale. It plans the modernize city and its parkways and also the newest design of women's hats. Social technology, on the other hand, is a collection of techniques that are directed towards the regulation of the behavior of human beings. It has two essential divisions, economic technology, and political technology. Economic technology is concerned with the economic processes and immediate relationship between men, for the pursuit of economic means. Political technology regulates a wide range of human relationships.

MacIver and Page describe culture; they believe that, just as the typewriter belongs to one great order, similarly the book that has been typed on it belongs to another great order. All material things that we bring into existence give something that we crave for all we need. All of them are expressions of us. They have been created to satisfy the need within us. This need is not an outer necessity. They belong to the realm of culture. This is the kingdom of principles, styles, emotional strings and intellectual ventures. They argue that culture is then the antithesis of civilization. It is the expression of our nature in our modes of living and thinking, in our everyday intercourse, in art and literature, in religion, in recreation, and in enjoyment.

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4.2.1 Factors Responsible for the Resistance to the Growth of Culture

The factors which provide resistance to growth/challenged area of culture and their routed solutions are as follows:

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Factors resistance to the growth of Culture	Culture Routed Solutions
1. Accessibility: Schools physically, socially, psychologically, economically inaccessible to the children.	Strong community involvement, relying on culture accepted structures. Use of traditional structure (homesteads, playgrounds, etc) for schooling.
2. Gender Equity: Poor attendance and girls participation (their entry in the school, retention, progression and completion of education)	Adapting schooling to local realities. Using culturally acceptable mobilization strategies. Attending to the special needs of girls.
3. Relevance: Improper alignment of educational processes to the perceived need of the community and learners.	Use of local culture/local activities as the substance of Education Use of methods, materials and content appropriate to the environment. Community language for laying the foundation for learning.
4. Quality of Education: The improper curriculum construction, assessment and regulation impact on the learner.	Learning based activities and socially acceptable skills and competencies (instead of Rote learning or memorizing) Use of learners language for deep understanding
5. Efficiency: Elimination of wastage through judicious mix and use of resources	Community involvement in school management Active and culturally imbibed teaching learning activities that make teaching and learning interesting Activities that enhance relevance and quality

Check Your Progress

1. What are the two essential divisions of social technology?
2. Why is it considered that culture is the antithesis of civilization?

4.3 SOCIAL EFFECTS OF INNOVATION

Innovations have become an essential part of everyday life. Our day-to-day tasks are completely technology driven. We cannot imagine our life without technology. Science is moving a step ahead every day. Thus, the effects of Innovation on the society cannot be neglected. The following are the social effects of Innovation:

- Bring changes in the society.
- Improvement in the level of education in the youth.

- They help in building the economy of the nation.
- Results in rise in the IQ level of the students.
- Improvement in the research quality.
- Development of better society and culture.
- Improvement in social, religious and emotional development.
- Improvement in the social structure.
- Enhancement of social status.
- Better living standards and improvement in medical facilities.
- Technological improvement in the society.
- Beneficial for people of all age groups.

Thus, innovation aims at enhancing the status of the society, thereby bringing a positive change in the structure of society. Like every coin has two sides, similarly innovations also have negative side. Some of the negative effects of innovation include negative effects of experimentation, students might feel overloaded with the innovation sometimes and students may underestimate the capabilities of the teacher.

4.3.1 Inventions

With the introduction of educational technology, numerous changes have resulted in the advancement of the society. Inventions have revolutionized the world, not only in the society but also the teaching methodologies. The origin, purpose and scope of innovative practices are numerous. Inventions in the teaching learning systems resulted in the development of personalized system of instruction, team teaching, educational games and changes in the educational system.

Inventions are considered as an important ingredient of teaching, they are essential for the designing and selection of teaching devices, educational measurement, programmed learning, feedback devices, development of action research as supporting device, development of multi-media devices and development of evaluation techniques.

4.3.2 Principle of Equality

It is essential to provide equal education to all the individuals and every individual must be treated equally in the eyes of law. Articles 14 to 18 provides for right to equality which aims to secure all citizens their civic equality. Articles 325 and 326 secure all citizens political equality. Articles 39 under the Directive Principles secure all citizens economic equality. Law of Equality not only means to provide equal education, rather it means to provide equal opportunities to the individuals along with the equal education. Principle of equality plays a prime role in the development of the child. If the child is not treated equally like other children, he/she may develop

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negative attitude towards certain group of individuals and may develop unwanted feelings towards educational system. There are times when children are not given equal rights and opportunities, they do not want to study more, they stop their education, they drop-out, and the cases of stagnation are not less in the country.

There may be many reasons for a girl child to move out of the education system, but the major reason is unequal treatment of girl child. There are many times, when the people who are physically or mentally disabled are not considered suitable for a certain post. A lot of time, student suffers because of biasness in the education system which is done by the teachers. These cases are to be sorted out, and it is the responsibility of all of us to take care of the educational system in such a way that all the teachers, students and stakeholders of the education system including the parents and the society must take the education of the child seriously.

Check Your Progress

- 3. State the premises of the Law of Equality.
- 4. What are some of the negative effects of innovation?

4.4 INNOVATION AND EDUCATIONAL GOALS

With the introduction of educational technology in the discipline of education, great changes have taken place in the process of teaching learning and training of teachers. In the last 25 years, classroom teaching has been changed considerably with the application of technology of teaching. The emphasis is being given to evolve new practices in teaching in order to raise the academic performance, and individual differences of the students to be properly considered in the teaching learning situations. As a result, various innovative practices have been involved in this area. The three most important innovative practices of teaching are as follows:

- 1. Team teaching
- 2. Personalized system of instruction
- 3. Educational games

These practices have been discussed in the following section.

1. Team Teaching

Present system of education demands too much from a teacher by curtailing his or her freedom. The teacher has to teach same subject matter every year and to teach the same content to two or three sections of the same class. It is very boring for them and ceases their interest in the subject. Sometimes he or she is assigned to teach the subject in which one has no interest to teach but is forced to do so. This may be an important reason that present structure of education has failed to

cater to the needs of the students. More over the present-day classroom are appropriate only for the average student.

In these circumstances, when teachers and students have to work, under so many constraints, we feel an urge to use ‘Team teaching’. The innovation of team teaching is widely spreading to improve the teaching learning process in the classroom.

Team teaching is a form of organization in which an individual teacher decides to pool resources, interest and expertise in order to device and implement a scheme of work suitable for the needs of the people and the facilities of the school. The following are the characteristics of team teaching:

- It involves two or more teachers to teach a class.
- It is an instructional strategy rather than training strategy.
- A team or group of the same teachers of the same subject work together to deal a significant content to same group of students jointly.
- It can be termed as ‘cooperative teaching’, in which individual teachers plans to pool resources, interest and their expertise for teaching a content for the same group or class of students.
- Every individual teacher gets an appropriate instructions space and length of time so as to use special competencies of teaching content to a group of students.
- In team teaching, the group of teachers has to consider the needs of their pupils and they should teach jointly to satisfy their needs and remove the difficulties of their students.

Types of team teaching

There are various ways to classify the team teaching but a better way to classify it on the basis of its organization. Team teaching may be organized mainly in three types:

1. Teachers from the same department
2. A team of teachers from inter department but from the same institution
3. Teachers from inter-institution

Objectives of team teaching

The teaching strategies have been designed to achieve certain objectives. The team teaching has been evolved to achieve the following objective:

- To make the best use of expertise of teachers under team teaching.
- To improve the quality of teaching. It involves two or more experts of the subject to teach same group simultaneously.
- To develop the feelings of cooperation or group work in teaching learning situation.

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- To help the students, to satisfy the needs and difficulties relating to the special content.
- To develop the sense of shared Responsibility in teaching and evaluation of students learning outcome.
- To minimize the scope of teaching wrong things to the students.

Procedure of organizing team teaching

The team teaching serves several purposes of teaching and it has different forms or types. Therefore, it is difficult to provide a general procedure for organizing team teaching, but it involves the following steps:

- Formulating the objectives of team teaching.
- Writing these objectives in behavioral terms.
- Identify the entering or initial behaviour of the learners of the group.
- Deciding the topic to be taught.
- Preparing a tentative schedule of teaching.
- Assigning duties to teachers, considering their interest and competencies.
- Fixing up the level of instruction.
- Selecting appropriate teaching aids and teaching equipment's for generating learning environment.
- Deciding ways and means for evaluating the students' performance-oral and written questions for practical work.

2. Personalized System of Instruction

The personalized system of instruction gets its name from the fact that each student is served as an individual by another student, face to face and one inspect of the fact that the class size is large. It is necessary that the student is expected to acquire a well-defined body of knowledge or skill the majority of college course. The personalized system of instruction designer experts makes sure that almost all his or her students learn material well and in the class itself. This system has been designed to reduce the needs of the individual learner. It is a means of instruction which is person oriented. It emphasizes on the individualized instruction as compared to the other methods of higher education. The main characteristics of a good personalized system of instruction are as follows:

- It lays more emphasis on personal-social relationship in the educational process. Teaching and learning problems are solved on personal basis.
- The personal system of instruction emphasize on the importance of written work. The teacher provides the situations to the learners to practice on well-designed assignments. It provides an opportunity for assimilating the content.

- It provides opportunities to remove the learning difficulties of each student of the system.
- It provides appropriate motivation and frequent reinforcement to the learners.
- It facilitates the student learning using multimedia approach because different students learn better through different devices. Some students learn better by listening, or some other by reading or writing the content. Thus, in the personal system of instruction, the subject matter is presented in written form through film, through tape and by computer.

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3. Educational Games

Educational games are recent innovation in instructional technique to provide appropriate learning experiences. The pragmatic philosophy makes educational system experience centered and intends to prepare students for life situations. This type of education can be best imparted by using gaming technique.

An educational game is defined as an activity among two or more independent decisions that are seeking to achieve their objectives in some limiting content. Educational games usually stimulate or at least approximate real-life situations for helping students more to understand real life situations and human behavior. Educational games usually lay less stress on corporation, bargaining and adjustment or compromise the main characteristics of human instruction in the society. As in real life, winning is often related and some groups may win more as compared to the others, but these groups do not require one against one's competition. The main characteristic features of the educational games are as follows:

- Role play games require participants to assume realistic social roles and to interact with one another in terms of common social situation.
- These games are designed to teach dynamics of human behavior in response to a specific social problem situation.
- Role profile is prepared which describe the social situation in terms of which the roles are to be performed.

Check Your Progress

5. How is team teaching organized?
6. What are the characteristics of educational games?

4.5 ANSWERS TO CHECK YOUR PROGRESS QUESTIONS

1. The two essential divisions of social technology are economic technology and political technology.

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2. Culture is considered as the antithesis of civilization because it is the expression of our nature in our modes of living and thinking, in our everyday intercourse, in art and literature, in religion, in recreation, and in enjoyment.
3. Law of Equality not only means to provide equal education, rather it means to provide equal opportunities to the individuals along with the equal education.
4. Some of the negative effects of innovation include negative effects of experimentation, students might feel overloaded with the innovation sometimes and students may underestimate the capabilities of the teacher.
5. Team teaching may be organized into three main categories namely, teachers from the same department, a team of teachers from inter department but from the same institution and teachers from inter-institution.
6. The following are the characteristics of educational games:
 - (a) Role play games require participants to assume realistic social roles and to interact with one another in terms of common social situation.
 - (b) These games are designed to teach dynamics of human behavior in response to a specific social problem situation.
 - (c) Role profile is prepared which describe the social situation in terms of which the roles are to be performed.

4.6 SUMMARY

- The word culture is derived from the Latin term ‘cult’ or ‘cultus’ which means tilling or cultivation or refining.
- Culture is a means in which cultivation and refining takes place to such an extent its end product brings admiration and respect.
- A country in order to achieve the status for true development should not only focus on scientific tools and economic growth but should also focus to sustain its traditional heritage and cultural civilization.
- According to sociologists, MacIver and Page, the two great areas of human experience and human activity are ‘culture’ and ‘civilization’.
- The basic technology is directed towards man’s control over natural phenomena. It is the area of the engineer and the mechanic. It applies the laws of physics, chemistry, and biology to the service of human objectives.
- Social technology, on the other hand, is a collection of techniques that are directed towards the regulation of the behavior of human beings.
- Economic technology is concerned with the economic processes and immediate relationship between men, for the pursuit of economic means. On the other hand, political technology regulates a wide range of human relationships.

- Innovations have become an essential part of everyday life. Our day to day tasks are completely technology driven.
- Innovation aims at enhancing the status of the society, thereby bringing a positive change in the structure of society.
- Inventions have revolutionized the world, not only in the society but also the teaching methodologies.
- Inventions in the teaching learning systems resulted in the development of personalized system of instruction, team teaching, educational games and changes in the educational system.
- It is essential to provide equal education to all the individuals and every individual must be treated equally in the eyes of law.
- Law of Equality not only means to provide equal education, rather it means to provide equal opportunities to the individuals along with the equal education.
- With the introduction of educational technology in the discipline of education, great changes have taken place in the process of teaching learning and training of teachers.
- The emphasis is being given to evolve new practices in teaching in order to raise the academic performance, and individual differences of the students to be properly considered in the teaching learning situations.
- Team teaching is a form of organization in which an individual teacher decides to pool resources, interest and expertise in order to devise and implement a scheme of work suitable for the needs of the people and the facilities of the school.
- In team teaching, the group of teachers has to consider the needs of their pupils and they should teach jointly to satisfy their needs and remove the difficulties of their students.
- The personalized system of instruction gets its name from the fact that each student is served as an individual by another student, face to face and one inspect of the fact that the class size is large.
- The personalized system of instruction is a means of instruction which is person oriented. It emphasizes on the individualized instruction as compared to the other methods of higher education.
- Educational games are recent innovation in instructional technique to provide appropriate learning experiences.
- An educational game is defined as an activity among two or more independent decisions that are seeking to achieve their objectives in some limiting content.
- Educational games usually lay less stress on corporation, bargaining and adjustment or compromise the main characteristics of human instruction in the society.

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4.7 KEY WORDS

- **Educational game:** It refers to an activity among two or more independent decisions that are seeking to achieve their objectives in some limiting content.
- **Personalized system of instruction:** It refers to a means of instruction which is individual oriented. It emphasizes on the individualized instruction as compared to the other methods of higher education.
- **Social technology:** It refers to a collection of techniques that are directed towards the regulation of the behavior of human beings.
- **Team teaching:** It refers to a form of organization in which an individual teacher decides to pool resources, interest and expertise in order to device and implement a scheme of work suitable for the needs of the people and the facilities of the school.

4.8 SELF ASSESSMENT QUESTIONS AND EXERCISES

Short-Answer Questions

1. How is social technology different from basic technology?
2. What is economic technology?
3. List the social effects of innovation.
4. Write a short note on principle of equal education.
5. What are the main characteristics of personalized system of instruction?

Long-Answer Questions

1. Discuss the concept of growth of culture and civilization.
2. 'Inventions are considered as an important ingredient of teaching'. Elucidate the statement.
3. Explain the objectives of team teaching.
4. Discuss the factors of resistance to the growth of culture.
5. What are the innovative practices of teaching? Discuss any one practice in detail.

4.9 FURTHER READINGS

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Factors of Innovations

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BLOCK - II
NATIONAL TRENDS AND EDUCATIONAL
TECHNOLOGY

UNIT 5 NATIONAL TRENDS
IN EDUCATIONAL
INNOVATIONS

Structure

- 5.0 Introduction
- 5.1 Objectives
- 5.2 Science Education in Developed and Underdeveloped Countries
- 5.3 Role of Science and Culture in the Future
 - 5.3.1 Role of Education and the Need for Improvement in Science Education
- 5.4 UNESCO: The Modification of Educational System
- 5.5 Answers to Check Your Progress Questions
- 5.6 Summary
- 5.7 Key Words
- 5.8 Self Assessment Questions and Exercises
- 5.9 Further Readings

5.0 INTRODUCTION

Science is a universal subject which examines the physical and natural aspects of the world through observation. This branch of knowledge can also be understood through experiments. Science is divided into three main fields namely, biology, chemistry and physics. However, there are many other branches of science. Science as a subject helps to analyse the importance of scientific problems which are related to change and its causes. The importance of science as a subject was soon realized and efforts were made by developed and underdeveloped countries to include it as a part of curriculum.

Science is acquired through knowledge and its role is classified into facts, concepts, theories and generalizations. It is important that science must be taught in every school so that pupils can learn the value of leading a good life. It is imperative that students should be taught in such a manner that what is taught in the school must also be practiced in the real life. However, there were several challenges which were propounded by UNESCO and have to be addressed so that education serves its purpose well.

In this unit, the development of science as a subject in developed and underdeveloped countries, the role of science at present and in the future has been

analysed. The importance of facts, laws, theories and generalizations have been explained with examples. The unit will also highlight the challenges which one will face while teaching various subjects.

5.1 OBJECTIVES

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

- Discuss the development of science as a subject
- Explain the role of science for future purposes
- Interpret the steps taken to improve the role of science education
- Discuss the challenges faced in the field of education as propounded by UNESCO

5.2 SCIENCE EDUCATION IN DEVELOPED AND UNDERDEVELOPED COUNTRIES

The development in teaching methods related to science can be traced back from the works of various philosophers, namely, John Amos Comenius who emphasized that science instruction must move from words to things and the teaching of useful knowledge. Johann Heinrich Pestalozzi, a Swiss educator, advocated learning by doing and argued that teaching and learning must be largely analytical.

Over the years, methods of teaching science and the curriculums of science have undergone significant changes. Instruction in science has profited from innovative programs such as BSCS, PSSC, ISCS, ESCS, and many other projects with acronyms that are readily recognized. More recently, programs such as the BioQuest Curriculum Consortium, Project Wild, and case-based learning approach to biological concepts have made problem-solving and decision-making inseparable from the content of the discipline. These programs individually and collectively have enlightened science teachers as well as the students at all the levels of instruction.

India made a pioneer headway in the field of medicine and agriculture till about 600 A.D. The oldest Indian scripture, *Rig Veda* which was written about 4000 years ago, refers to physicians and speaks about the healing power of medicinal herbs. The concept of atom and the formation of the world as discussed in *The Vaisesika*, one of the Upanishads, approach the modern western thought. The Sankhya philosophy by Kapila is very much like Darwinism. The *Upa- Vedas* or secondary Vedas discuss various sciences. One of these *Upa-vedas* is 'Ayur Veda' which consists of six books on surgery, nosology, anatomy, therapeutics, toxicology and supplementary section dealing with various local diseases. However, most importantly attention was given to diet. In surgery, they attained great proficiency. The *material medica* of the Hindus embraced a vast collection of drugs which belongs to the mineral, vegetable and animal kingdoms many of which

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have been adopted by western physicians. These were colleges and universities of international repute.

From the point of view of methods and technique of acquiring scientific knowledge, there was considerable development in the refinement of observation. Logical analysis as a tool for refinement of ideas and to arrive at generalizations was also considerably developed. From the point of view of the institutions for acquiring knowledge and continuing the tradition, it may be noticed that they were centered on individuals, who passed on the knowledge and skills to their best disciples only. The result was that most of the scientific knowledge and traditions were lost with time. The early universities of Takshila and Nalanda could be taken as a first step towards institutionalization of teaching and acquiring knowledge, but their character must be fully studied, and also the reasons for their disappearance.

In a normal course, the scientific knowledge and the methods and techniques of acquiring it should have led to the next stage of development; however, it did not happen. The philosophy of Buddhism (Between 750 A.D. to 1000A.D) discouraged further development of life sciences. Rules of caste became stricter and Brahmins forbade contaminating with blood and withdrew from all the practice of medicine. They even shrank from touching dead bodies and as a result of decreasing number of good physician's public hospitals had to be closed. Later, on the gradual conquest of the country by invaders from West Asia and Central Asia brought an element of discontinuity of ancient Indian tradition. The people brought with them different languages i.e. Arabic, Turkish and Persian, and also scientific knowledge, methods, techniques and concepts. There is however, some evidence to suggest that many of the scientific ideas brought to India by foreigners during the medieval period had the Indian origin. A large number of scholars went out of India and were patronized at the courts of various feudal kings in West Asia and Central Asia. The information, methods, techniques and concepts which they took with them were synthesized and incorporated in the medieval Arabic and Persian scientific traditions of West Asia and Central Asia. This was further developed as a part of the scientific and intellectual developments of these civilizations, the form in which they came to India. There is, however, still a controversy on the origin of many scientific ideas, concepts, methodology and techniques and further studies need to be made before one can fully understand the evolution of scientific thought in medieval India.

The modern period brings another sharp break in the scientific thought and tradition of India with the conquest of the country by the British. Modern science was introduced in India along with the British, in opposition to the earlier two traditions and again in a foreign language i.e. English. Modern science came to India at a stage of development which marks a radical change from the medieval and ancient sciences, newer branches of sciences had been developed, experimentation developed as a full-fledged technique of acquiring information. Language of science had taken a definite shape; scientific institutions had been developed and technology made a decisive breakthrough.

Modern science did not make a significance highway in India during the British period for various reasons. Its character was not radically different from the earlier scientific tradition in the country, but the new language made the process of its assimilation in Indian culture difficult. Secondly, it either aroused awe or hostility as a 'British thing' alien and hostile to the Indian tradition. The effort, therefore, became once again, one of choice rather than of a synthesis to evolve a scientific tradition in the Indian context.

In order to study the development of science education in India during the modern period we have to look at the history of the science in the West because whatever happened there was followed in India through a slower pace.

At the end of eighteenth century, the Universities, however, neglected the teaching of science and it had no place in the school curriculum. Chief scientific discoveries were made by amateur scientists such as Cavendish, Priestly, James Watt and Hershel. A number of philosophical societies were started to fill the gap between the educational provision and the social need, such as Societies of Arts, London, Literary and Philosophical Society of Manchester founded in 1781 and Lunar Society of Birmingham (1766). In 1799, Count Rumford was influential in founding the *Royal Institute* of Great Britain. It was intended for teaching young men in the mechanical profession by courses of philosophical lectures and experiments on the application of science to common purpose of life. But later its policy was altogether changed by the influence of Sir Humphry Davy and of Faraday and it became the center of research.

The Royal Education Commission reported that in none of the schools, science was taught as an independent subject though at Rugby, natural science was taught to boys who elected to study it instead of languages. They described it as 'a plain defect and a great practical evil'. They therefore, suggested that natural science should be taught and should include two main branches, one comprising physics and chemistry and other comparative physiology and natural history. As a result of this, physics was introduced in 1837 at Rugby under Dr Arnold. Dr Trait, his successor, introduced subjects such as botany, chemistry and geology in the curriculum in 1859 and a science lecture room and laboratory were built for the first time at the cost of over £1,000.

The great exhibition of 1851 gave further impetus for teaching science in schools, as a result, Department of Science and Art was established in 1853. In 1854, three eminent scientists urged the claims of science as an essential part of general education. An English biologist, T H Huxley delivered an important address on the Educational value of the Natural History of Sciences. In 1861, an English sociologist, Herbert Spencer believed that 'Knowledge of life was the important knowledge for all Moral and Physical.' The staunchest advocate of teaching science in the 'sixties' and 'seventies' was Huxley. The establishment of natural science course in the Universities of Oxford and Cambridge further paved the way for the inclusion of science in the curriculum of the secondary schools. A full survey of the position of science teaching in secondary schools is contained in the Devonshire

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Commission Report which was published in 1895. The report begins with the discussion on the difficulties attending the introduction of science teaching in the schools and recommended that (i) In all public and endower schools, a substantial portion of the time allotted to-study must be devoted to natural science, and not less than six hours a week on the average should be assigned for this purpose (ii) school laboratories should be constructed to supply accommodation for practical work in physics as well as chemistry in the curriculum of boys schools and of botany into that of girls school.

Public examinations of science and of other science subjects are of very recent origin. Societies of Arts of London held science examination in 1852, designed to qualify for membership. During few years the system became established and papers were set in botany, chemistry, physiology, mathematics and mechanics.

Since the beginning of twentieth century, there has been an adequate increase in the equipment and facilities for teaching of science in schools. The Great World War of 1914-18 opened the eyes of public to the importance of general science in the modern world. Sir J J Thompson appointed a committee, in 1916, to inquire into the position of natural science in the educational system and as a result so named 'Thompson Report' was published under the title 'Natural Science in Education'. Consequently, many advanced courses in science were added to many schools. The Science Masters association and the association of women's science teachers were formed in the early century. School Science Review, the S.M.A. periodical, created a good influence on the teacher as well as public.

In India, the pattern of education was influenced by what happened in England; the only difference is that things moved at a slower pace. The reviews issued by Government of India in the years 1877-92 gave an insight into the story state of science teaching. Even in the beginning of this century, science was not a school subject in our country and it was only a name in the universities. Indian science congress was formed a few decades back but it also did not do any notable work towards the teaching of science in schools. The Report of the Secondary Education Commission, 1953, recommended the teaching of general science as a compulsory subject in the high and higher secondary schools.

Let us now discuss about the various steps which were taken to promote science in the country.

1. All India Seminar on Teaching of Science

The All India Seminar on the teaching of science in secondary schools held at Tara Devi (Shimla Hills) in 1956, dealt with almost all the problems facing the inclusion of general science as a core subject for higher secondary classes. It was the first of its kind which touched almost all the aspects concerning the teaching of science in schools viz. syllabus, equipment and apparatus, method of examination, teaching

aids in science and other allied topics like textbooks, Science clubs and museums. It had suggested a unique and uniform system of science teaching for the entire country, suited to its needs and resources.

2. Indian Education Commission (1964-66)

The progress, welfare and security of the nation depend critically on rapid planning and sustainable growth in the quality and extent of education and research in science and technology. Science is universal and so can be its benefits. Science represents a cumulative and cooperative activity of mankind and its rate of growth is extremely rapid. The knowledge of science is doubling in the period of ten to fifteen years.

The commission had pointed out that science education is in bad shape and it becomes worse, if one fail to reckon with the explosion of knowledge. To meet this immediate threat, the commission recommended upgrading school curricula by 'research in curriculum development, the revision of the textbooks and teaching learning material.' The commission recommended that:

- Science and mathematics should be taught on compulsory basis to all the pupils as a part of general education during the first ten years of schooling.
- In the lower primary classes, teaching should be related to the child environment. The roman alphabets should be taught in class IV to facilitate child's understanding of internationally accepted symbols of scientific measurement and use of maps, charts and statistical tests.
- At the lower secondary stage, science should be developed as a discipline of mind. The newer concept of physics, chemistry and biology and the experimental approach to the learning of science should be stressed.
- Science teaching should be linked to agriculture in rural areas and to technology in urban areas.
- Science course as an advanced level may be provided for talented secondary students in selected lower secondary school with facilities of staff and laboratory.
- The method of teaching science should be modernized, stressing the investigatory approach and understanding of the basic principles. Guide materials should be made available to help teachers adopt the approach. Laboratory work will need considerable improvement. There should be flexibility in the curriculum to cater to the special needs of the gifted.
- The development of science must derive its nourishment from our cultural and spiritual heritage and not bypass it.
- At the university level, better conditions for research should be provided.

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3. National Policy on Education (1968)

The National Policy of Education (1968) marked a significant step in the history of education in post- independence India. It aimed to promote national progress, a sense of common citizenship and culture, and to strengthen national integration. It laid stress on the need for the radical reconstruction of the education system, to improve its quality at all stages, and gave much greater attention to science and technology, the cultivation of moral values and a closer relation between education and the life of the people.

Since the adoption of 1968 policy, there has been considerable expansion in educational facilities all over the country at all the levels. More than 90 per cent of the country's rural habitations now have schooling facilities within a radius of one kilometer.

One of the most significant developments has been the acceptance of a common structure of education throughout the country and the introduction of the 10+2+3 system by most states. In the school curricula, in addition to laying down a common scheme of studies for both boys and girls, science and mathematics were incorporated as compulsory subjects.

4. National Council of Educational Research and Training (NCERT)

The NCERT was established on September 01, 1961 as an autonomous organization with its headquarters in New Delhi. At the headquarters it has National Institute of Education (NIE) which is concerned with research, instruction and evaluation. The NIE functions through its various departments like the department of education in Science and Mathematics, Department of Education in Social Science and Humanities, Department of Educational Psychology, Department of Teacher Education, Department of Textbooks, Department of Teaching Aids National Science Talent Search, Survey and Data Processing and Examination Reform.

A Central Science Workshop was also established under the NCERT to produce prototypes of school equipment and to develop low cost kits for the primary and middle school stages through the various departments of NIE and the Regional Institute of Education, the NCERT discharges functions relating to the improvement of education at all levels of school education and teacher training in India. It also maintains a close liaison with the Education departments and the schools in the different states and the Union territories of India.

5. State Councils of Educational Research and Training (SCERT) and State Institutes of Science Education (SISE)

Some states have now established State Council of Educational Research and Training (SCERT) on the pattern of NCERT. In these states SCERT incorporates the functions of the States Institutes of Education.

SISEs have been set up in all the states with a view to improve the quality of science education in the schools. The main function of these institutes is to provide in-service training to science teachers in the new developments in the field of science education; prepare instructional material in the science; conduct research studies in science education of their respective states; provide guidance service in science to school; take up innovative programs in science education; and participate in the national science programs.

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6. National Policy on Education (NPE) 1986

In January 1985, the Government of India announced that a new education policy would be formulated for the country. A comprehensive appraisal of the existing educational scene was made followed by a countrywide debate. The views and the suggestions received from different quarters were carefully studied. As a result, a new educational policy was established in 1986.

The NPE has reiterated the importance of Mathematics and Science Education as well as inculcation of scientific temper. The committee set up under the chairmanship of Prof. Yash Pal, former Chairman, UGC for implementation of programs for the improvement of the science education has stressed need of proper motivation of teachers in order to enable them to play their role effectively and provision of suitable training to them. To implement this program a detailed scheme for improvement of science education in schools was prepared. The scheme was approved for implementation in 1987-1988. The salient features of the scheme are:

- Provision of science kits to 90,000 upper primary schools.
- Assistance to 22,500 Secondary and Higher Secondary Schools having laboratory rooms and science teachers, to acquire science equipment.
- A one-time assistance of 15,000 per Secondary Higher Secondary School each to procure about 500 books relating to Science and Mathematics;
- Identification of an educational institution or voluntary agency in each district to act as resource center to help science teachers. Each resource center should be given equipment worth of 1 lakh.
- Conducting in-service training in the form of summer institutes in institutions of Higher Education courses in Secondary Teacher Training (College courses in DIETS and through voluntary organizations having expertise.
- Assistance on 100 per cent basis to voluntary organizations having expertise to promote scientific temper and science education.

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Check Your Progress

1. What were the recommendations made by the Devonshire Commission Report?
2. State the aim of The National Policy of Education.
3. What is the main function of SISEs?

5.3 ROLE OF SCIENCE AND CULTURE IN THE FUTURE

We will discuss about the role of science and culture in the future in this section.

The nature of science can be identified as:

- An accumulated and systematized body of knowledge
- The scientific method of inquiry, and
- The scientific attitudes.

The first point indicated the PRODUCT of science, while second and third points indicate the PROCESS of science. In other words, science is both a product and a body of knowledge that has been accumulated by scientists, and the process in which they acquire this knowledge. We will discuss about this concept in detail in the following section.

(a) The body of scientific knowledge: The body of scientific knowledge can be classified into facts, concepts and generalizations, theories and laws. These form the structure of science.

(b) The process of science: The second dimension of science is the process by which the knowledge is acquired. To define processes of science, the American Association for the Advancement of Science (AAAS) asked scientists to say what they actually do. The following list of thirteen processes came from this enquiry.

1. Observation
2. Classification
3. Number relations
4. Measurement
5. Space/time relations
6. Communication
7. Prediction
8. Inference
9. Making operational definitions

10. Formulating hypothesis
11. Interpreting data
12. Identifying and controlling variables
13. Experimenting

The structure of science can be compared to the framework of a building under construction. A framework of building consists of foundation, vertical pillars and horizontal beams to the methods are process of science. The facts are comparable to the building materials i.e. stone, bricks and concrete. In this analogy, the vertical pillars and the horizontal beams of science is subject to alteration based on empirical tests.

It may be worthwhile to know the role of science for future purposes:

1. **Facts:** Facts are all the basis of all knowledge. They are said to be grassroots for any theory or law. Since science is the human enterprise, it has its limitations, because science does not merely involve recording and classifying facts, but also involves speculation, intuition, and imagination. This quality of science makes it subject to errors. Scientists not only make mistakes in their observation but also make errors in formulating models or theories. The facts, models, or theories which are proved wrong during the course of time are discarded and replaced by new ones. The whole process of the scientific enterprise is continuously replenished by new facts and discoveries. The process of acquiring scientific information can be compared to a building.
2. **Concepts:** A concept is a generalized idea suggested to the individual by object, symbol or situation, it is not synonym for principle. It is rather an understanding of almost indefinable something. For instance, the concept of dog for a three-year-old child is different from a ten year or twelve year old child. So, the concepts about different objectives and phenomena are different for different people according to their age and experience. For instance,
 - **Development** is the product of 'Heredity and Environment'.
 - The **mass** of a body is equal to the product of its density and volume.
 - **All living things** are composed of cells.
 - **Metals** are good conductors of heat and electricity.
 - All **living** things show characteristics of life.
 - All **gases** are made up of molecules moving randomly in all directions.
3. **Generalization:** Generalizations are very helpful in deriving useful conclusions regarding the 'scientific facts'. The facts, concepts and generalizations are inter-related and inter-dependent. The facts give rise to concepts and when the facts and concepts are properly classified based on various scientific process, they give rise to generalizations. It is not essential that only direct experiences should be used in generalizing.

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Many times, our generalizations are based on indirect experiences such as listening the same thing from several sources. However, in the field of sciences, we usually take help of direct experiences in the form of self-observation and experimentation for deriving valid generalizations.

For instance, let us take another case of generalization 'All bodies are attracted by earth'. When a child throws a piece of chalk upwards, it falls on earth. When he or she tries the similar experiment with the help of piece of stone, the child observes the same phenomenon. After that, the child performs similar activity with the help of a glass ball, a pencil, a book and finds the same results. Hence, he or she draws the conclusion that all substances when thrown upwards, fall on the earth. Therefore, the child generalizes that all bodies are attracted by earth.

4. **Theory:** Theory is a tool of science in many ways. Some definitions of scientific theory given by various scientists are given below:

- A theory is a set of interrelated concepts, definitions and presents a systematic view of phenomena by specifying relations among variables with the purpose of explaining and predicting the phenomena.

–Kerlinger

- Theory refers to the relationship between facts or to the ordering of them in some meaningful way.

–Good and Hatt

- A theory specifies the relationship between events for explaining the occurrence of the events and predicting future events.

–Matheson

Author, George J. Mouley has given the following list of characteristics of a good theory:

- Theory is based on facts.
- Theory should be precise and clear.
- Theory must be grounded in empirical data.
- Theory is open to interpretation and verification.
- Theory follows the law of parsimony (that theory is best which explains in simplest forms).
- Theory has a meaningful structure.
- Theory has applicability.

5. **Law:** Oxford Learner's Dictionary has defined scientific law as 'a factual statement of what always happens in certain circumstances'. For instance, 'Newton's Law of Motion' is statements of principles i.e. generalized statements through which unrelated data is systematized. So, the law is broad generalization which means the same for all people irrespective of their age and experience and holds good in different situation.

5.3.1 Role of Education and the Need for Improvement in Science Education

Since the time India got its freedom, India has achieved milestones in the field of science and economics. It has achieved the levels of self-sufficiency in many areas. The development goes on to say our education system is strong and healthy plus it is quite viable in the face of global competition. If the nation has progressed in such an enormous way, it seems that, our country have the best of educators and best of the education available.

If one talks about the teaching of science, India has addressed to number of problems facing human life through science. It focusses on the heredity and hereditary material. It also focusses on the issues of socioeconomic concerns such as population control, environment preservation, conservation of natural resources, animal breeding, plant breeding and economic importance of sericulture and apiculture. Looking at the content of science and its being taught over a period of fifty-six years one thing can be said. The school going population have acquired all this knowledge, values and skills necessary and are ready to combat any of the problem pertaining to the content are of science. They may also be able to lend their voice to solve many of the environmental problems facing human generation. They would have also better understanding of the processes and the products of science. They may be aware about the flora and fauna on the planet earth. Perhaps they may be even aware about the life processes and their interdependence.

If we have been able to achieve our objectives of teaching science as a school subject, mentioned set of behaviors are expected from the clientele of education today. Schools are the place that satisfy the curiosity of students and answer the questions raised by students. The following objectives have been achieved to an extent:

- A well-developed garbage management system.
- Smaller queues at the hospital and doctor clinics.
- Air free pollution, water pure and portable.
- Fruits and vegetable without pesticides.
- More use of natural things, i.e. biodegradable things.
- Use of recycled products, rather than increasing the garbage pile.
- A more rational lifestyle with lesser stress and burden.
- A better water harvest system and conservation of natural resources.
- A strong knowledge of fundamentals.

If one observes the current scenario, one finds the opposite, people do have awareness of the various problems, but do not have action programmers, it seems that one just teach them and do nothing about it. However, one advocates that students should know the structure, function, relationship but teaching according to teleological approach is seldom done. Topics pertaining to environmental

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conservation a mere lip say. A research conducted in this area revealed though student prefer walking for short distance in the written questionnaire but in practice used mopeds and other two wheelers for short distances. Students memorize such recommendations and write in examination, however, do not feel necessary to implement in their real life perhaps they feel the content taught in school is far from reality and is meant to just pass examination.

Similarly, the concept of balanced diet, the student may score ten on ten in the written examination but can be very fussy about their food habits and may prefer food which has low nutrition value. As far as skill development in science is concerned, it is an important part in science learning.

Instructional objectives: Instructional objectives are the statements written in the future tenses the instructional objectives are stated in terms of student's performance i.e., the student will be able to do the instructional objective are of the two types which are as follows:

- **General objectives:** They are long term; they need longer time in accomplishment. They do not indicate the action verb. The general objectives are broad and based on the subject objective. For example, students will be able to know the effect of population explosion on environment.
- **Specific objectives:** The specific objectives are stated in the behavioural terms of the students, which are evaluated thereafter. For an objective to be specific one must specify the condition in which the objective will be achieved the minimum expectation from the students is stated in explicit terms.

Check Your Progress

4. What are the characteristics of a good theory?
5. What are the types of instructional objectives?

5.4 UNESCO: THE MODIFICATION OF EDUCATIONAL SYSTEM

The report of UNESCO of International commission on education for twenty first century has identified several challenges which education has to address. These challenges have to be reflected in the aims and objectives and the curricular and co-curricular programmes of different subjects. These challenges are discussed as follows:

- The challenge between the global and the local. It is necessary that people must become global citizens without losing their roots and continuing to play an active part in the life of their nation and their local community.
- The challenge between the universal and the individual. Culture is steadily being globalized. We cannot ignore the promises of globalization nor its risks. The individuals must choose their future and achieve their full potential within their traditions and cultures.
- The challenge between traditional and modernity. This is the spirit in which the challenges of the new information technology have to be met.
- The challenge between extraordinary expansion of knowledge and human beings capacity to assimilate it.
- The challenge between the spiritual and the material. It is education's noble task to strike a balance between the two.
- The challenge between on the one hand the need for competition and on the other, the concern for quality of opportunity. This is really a classic issue which has been making both economic and social policy makers. Education policy must reconcile three forces viz., competition which improves incentives, co-operation which gives strength and solidarity, which unites.

The objectives of teaching science have undergone major changes during the last few decades. These unexpected developments in the field of science in twentieth century have only made position for itself in the school curriculum but have affected the ultimate objectives of education also.

According to B.S. Bloom, 'Educational objectives are not only the goal towards which curriculum is shaped and towards which instruction is guided, but they are also the goals that provide detailed specification for the construction and use of educational techniques'.

The National Science Teaching Association, Washington presented the following objectives in 1961:

- A basic knowledge of the nature of the scientific enterprise.
- An increase in the mathematical observational and experimental skills.
- Understanding related to the interrelations of science and society.
- Increased understanding of the concepts and theories which describe and unify the fields of science.

Check Your Progress

6. What are the objectives of National Science Teaching Association?
7. State the three main forces of education policy.

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5.5 ANSWERS TO CHECK YOUR PROGRESS QUESTIONS

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1. The recommendations made by the Devonshire Commission Report were as follows:
 - (a) In all public and endower schools, a substantial portion of the time allotted to-study must be devoted to natural science, and not less than six hours a week on the average should be assigned for this purpose.
 - (b) School laboratories should be constructed to supply accommodation for practical work in physics as well as chemistry in the curriculum of boy's schools and of botany into that of girl's school.
2. The National Policy of Education aimed to promote national progress, a sense of common citizenship and culture, and to strengthen national integration.
3. The main function of SISEs is to provide in-service training to science teachers in the new developments in the field of science education; prepare instructional material in the science; conduct research studies in science education of their respective states; provide guidance service in science to school; take up innovative programs in science education; and participate in the national science programs.
4. The following are the characteristics of a good theory:
 - (a) Theory is based on facts.
 - (b) Theory should be precise and clear.
 - (c) Theory must be grounded in empirical data.
 - (d) Theory is open to interpretation and verification.
5. There are two types of instructional objectives, namely, general objectives and specific objectives.
6. The objectives of National Science Teaching Association are as follows:
 - (a) A basic knowledge of the nature of the scientific enterprise.
 - (b) An increase in the mathematical observational and experimental skills.
 - (c) Understanding related to the interrelations of science and society.
7. The three main forces of education policy are competition which improves incentives, co-operation which gives strength and solidarity, which unites.

5.6 SUMMARY

- The development in teaching methods related to science can be traced back from the works of various philosophers, namely, John Amos Comenius who emphasized that science instruction must move from words to things and the teaching of useful knowledge.

- Over the years, methods of teaching science and the curriculums of science have undergone significant changes.
- Logical analysis as a tool for refinement of ideas and to arrive at generalizations was also considerably developed.
- In a normal course, the scientific knowledge and the methods and techniques of acquiring it should have led to the next stage of development; however, it did not happen.
- The modern period brings another sharp break in the scientific thought and tradition of India with the conquest of the country by the British.
- Modern science was introduced in India along with the British, in opposition to the earlier two traditions and again in a foreign language i.e. English.
- Modern science came to India at a stage of development which marks a radical change from the medieval and ancient sciences, newer branches of sciences had been developed, experimentation developed as a full-fledged technique of acquiring information.
- Modern science did not make a significance highway in India during the British period for various reasons.
- The Royal Education Commission reported that in none of the schools, science was taught as an independent subject though at Rugby, natural science was taught to boys who elected to study it instead of languages.
- The establishment of natural science course in the Universities of Oxford and Cambridge further paved the way for the inclusion of science in the curriculum of the secondary schools.
- Since the beginning of twentieth century, there has been an adequate increase in the equipment and facilities for teaching of science in schools.
- In India, the pattern of education was influenced by what happened in England; the only difference is that things moved at a slower pace.
- The All India Seminar on the teaching of science in secondary schools held at Tara Devi (Shimla Hills) in 1956, dealt with almost all the problems facing the inclusion of general science as a core subject for higher secondary classes.
- The progress, welfare and security of the nation depend critically on rapid planning and sustainable growth in the quality and extent of education and research in science and technology.
- Science represents a cumulative and cooperative activity of mankind and its rate of growth is extremely rapid.
- The National Policy of Education (1968) marked a significant step in the history of education in post- independence India. It aimed to promote national progress, a sense of common citizenship and culture, and to strengthen national integration.

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- The NCERT was established on September 01, 1961 as an autonomous organization with its headquarters in New Delhi.
- Some states have now established State Council of Educational Research and Training (SCERT) on the pattern of NCERT.
- SISEs have been set up in all the states with a view to improve the quality of science education in the schools.
- In January 1985, the Government of India announced that a new education policy would be formulated for the country.
- The NPE has reiterated the importance of Mathematics and Science Education as well as inculcation of scientific temper.
- Science is both a product and a body of knowledge that has been accumulated by scientists, and the process in which they acquire this knowledge.
- Facts are all the basis of all knowledge. They are said to be grassroots for any theory or law.
- A concept is a generalized idea suggested to the individual by object, symbol or situation.
- Generalizations are very helpful in deriving useful conclusions regarding the 'scientific facts'.
- A theory specifies the relationship between events for explaining the occurrence of the events and predicting future events.
- Oxford Learner's Dictionary has defined scientific law as 'a factual statement of what always happens in certain circumstances'.
- Instructional objectives are the statements written in the future tenses the instructional objectives are stated in terms of student's performance.
- The report of UNESCO of International commission on education for twenty first century has identified several challenges which education has to address.
- The unexpected developments in the field of science in twentieth century have only made position for itself in the school curriculum but have affected the ultimate objectives of education also.

5.7 KEY WORDS

- **Concepts:** It refers to a generalized idea suggested to the individual by object, symbol or situation.
- **General objectives:** It refers to objectives which are long term and need longer time in accomplishment. The general objectives are broad and based on the subject objective.

- **Theory:** It refers to an idea which specifies the relationship between events for explaining the occurrence of the events and predicting future events.

5.8 SELF ASSESSMENT QUESTIONS AND EXERCISES

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Short-Answer Questions

1. What was the aim of the All India Seminar on the teaching of science?
2. What are the recommendations made by the Indian Education Commission?
3. How is the nature of science identified?
4. Write a short note on the role of education.
5. What are the functions of National Institute of Education?

Long-Answer Questions

1. Explain the emergence of science as a subject of study in India.
2. Analyse the features of National Policy on Education.
3. Discuss in detail the structure of science.
4. Explain in detail the challenges of the education system.
5. Why did modern science fail to succeed in India? Discuss in detail.

5.9 FURTHER READINGS

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UNIT 6 EDUCATIONAL TECHNOLOGY

NOTES

Structure

- 6.0 Introduction
- 6.1 Objectives
- 6.2 Educational Technology: Meaning
- 6.3 Characteristics of Teaching Devices
 - 6.3.1 Media and Learning
- 6.4 Types of Machines
 - 6.4.1 Computer Assisted Instruction and its Uses
 - 6.4.2 Innovation and Educational Goals
- 6.5 Answers to Check Your Progress Questions
- 6.6 Summary
- 6.7 Key Words
- 6.8 Self Assessment Questions and Exercises
- 6.9 Further Readings

6.0 INTRODUCTION

Educational technology is defined as the study which facilitates learning and improves performance by creation and managing technological processes. It includes various domains such as online learning, computer-based training and learning theories. Teaching aims at developing the personality of the students and aims at achieving learning objectives.

Instructional media plays an important role in teaching. It makes the process of teaching effective and interesting. Print instructional media and non-print instructional media are the two main types of instructional media. Teaching machine is a device which is designed to be operated by an individual student. On the other hand, a computer-assisted instruction (CAI) is a programme which is related to instructional material and is presented by means of computer systems.

In this unit, the concept of educational technology, its characteristics and objectives have been described. The steps involved in the process of educational technology and the characteristics of teaching learning devices have been discussed. The role of media in teaching and the concept of teaching devices have been highlighted. The characteristics of innovation and programmed learning have also been dealt in the unit.

6.1 OBJECTIVES

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

- Discuss the meaning and characteristics of educational technology
- Interpret the characteristics of teaching devices
- Analyse the types of media
- Explain the types of teaching machines
- Analyse the concept and uses of computer-assisted instruction
- Discuss the characteristics of innovation and programmed learning

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6.2 EDUCATIONAL TECHNOLOGY: MEANING

The word technology has been derived from the Greek word ‘technik’, which means an art. H.J. Leving defines technology as a problem-solving invention. The development of technology is essentially related to attempt to be rationale and provide greater efficiency.

McGrath has expanded the definition to include the methods and strategies of teaching, tools, mechanical and electronic devices and instruments, media equipment’s, library inventories and even text books.

Technology is a means of component. It is possible to classify technology for education into two categories

- Systematic programme
- Support/Transport items

A systematic programme is conceived as a complete package or programme structured towards an end (a single textbook or CAI Programme). Support/transport items consists of technology of support such as projectors, transparencies, or film and transport including CCTV (Closed Circuit Television), IT (Instructional television) and language laboratory. The computer alone is an example of support/transport item. Further, this computer can be used as a tool to generate an evaluation of the mentioned systemic programme.

Education Technology can be conceived as a science of techniques and methods by which educational goals can be achieved. Although, it does not specifies the goals or translates them into behavioural terms. It is the other hand of science on the basis of which various strategies and tactics could be designed for the realization of specified goals.

The educational technology comes to see whether by a given process or situation the specified goals can be achieved and if so to what extent and if not what changes should be made in the process in order to achieve the specified

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goals. Keeping this view in mind, the process of educational technology involves four steps which are as follows:

- The first step is to make the functional analysis of the teaching and learning process to identify the various components which operate at the stage of input to that of output.
- The second step is to explore the various functions of these components which are performed separately or in connection with other components.
- The third step is to observe the effect of manipulation of the various components and their functions in various fields.
- The final step is to translate all these research findings into some kind of useful guidelines for the practitioners.

Educational Technology and its Characteristics

It may be noted that by considering the mentioned meaning and definitions of educational technology, the characteristics of educational technology are as follows:

- It involves input, output and process aspects of education.
- It stresses upon development of methods and techniques for effective learning.
- It is an application of scientific knowledge and principles to education.
- It includes organizations of learning conditions for realizing goals of education.
- It emphasizes upon designing and measuring instruments for testing learning outcome.
- It facilitates learning by control environment, media and methods.

On the basis of above meaning and definitions of Educational Technology the term may be stated as: 'Education Technology implies a behavioral science approach to testing and learning, by making pertinent use of scientific and technological methods and concepts developed in psychology, sociology, communications, linguistics and other related fields. It also attempts to incorporate the management principles of cost effectiveness and the efficient development and use of available resources in man and materials. It involves media, methods, equipment's and resources'.

General Characteristics of Educational Technology

The following are some of the other general characteristics of educational technology.

- It is an application of scientific process to man's learning.
- A systematic and scientific principle applied to teaching, training and instructions for achieving desired objectives.
- It makes teaching learning process effective as well as more efficient which means that it is an economical method of teaching.

- It is an application condition of learning for child's development.
- It is a branch of educational theory and practice which concerns the use of media to control learning process.
- It is an art of teaching and science of learning.
- It makes use of feedback devices for regulating and controlling environment for effective learning.

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Objectives of Educational Technology

The following are the objectives of educational technology which are realized in all teaching learning situations.

- To determine the goals and formulate the objectives in behavioral terms.
- To analyse the characteristics of the learner.
- To organize the content in the logical or psychological sequence.
- To mediate between content and resource presentation.
- To evaluate the learner's performance in terms of achieving educational objectives.
- To provide the feedback of other components for the modifications of learners.
- To make teaching, training and instruction effective and efficient.
- To use media and methods in education.

Process of Educational Technology

The following explains the process of educational technology.

1. In the first step, the teaching learning process is analysed in behavioural terms and all the relevant elements are identified which are necessary for initiating the teaching to achieve the goals of education.
2. In the second step, those activities and elements are determined which are helpful in relating other relevant elements and reduce the probability of repetition of some elements in teaching.
3. In the third step, the effects of teaching are evaluated. It examines the appropriateness of different activities and elements of teaching in terms of achieving teaching and learning objectives.
4. In the fourth step, the main function is to provide feedback for improving learning activities. The result of evaluation guides the teacher to modify his or her teaching activities for optimal utilization of objectives.

Education Technology: Basic Principles

Educational technology is one of the most significant forces, influencing change in the educational structure. It is highly advanced communication and information

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technology. The computer is an important technological media used to enhance the educational means. The basic principles of educational technology are as follows:

- **Principle of Active Involvement:** The principle of active involvement makes sure that the student has to be focused or engage directly with the activity or task where he or she may draw knowledge, concepts, principles, attitudes, skills or habits. The student should take an active role in the search for knowledge. According to a German pedagogue, Froebel ‘learning is the result of the activity of the child himself’. With educational technology, student can be given various materials from regalia to contrived experiences.
- **Principle of Connectivity:** The principle of connectivity involves the building of relationships or linkages between and among experiences. The process of connectivity facilitates remembering of names, dates, events, issues, processes including spelling, number combinations, grammatical relationships and formula in mathematics.
- **Principles of Integration:** The principle of integration refers to the organization or putting together diverse elements to form a unified and harmonious whole. The students should be able to combine his or her previous experiences together in meaningful patterns of understanding and application.
- **Principle of Active Learning:** The principle of active learning aims to provide the learners in understanding the concept in a quick and easier way. The students would be able to create software, learn on their own and actively participate in the online on-going seminar and conferences thereby providing them rich experiences. They should be able to learn the new concepts on their own in a much simpler manner.
- **Principle of Feedback:** The principle of feedback makes sure that the instructor must provide the feedback to the students’ performance for online tests. Immediate feedback about the marks or grades of the students can be provided to the students. They can also be provided the suggestions for further improvement and the details regarding their weaknesses and strengths.

Check Your Progress

1. What are the two main forms of educational technology?
2. What are the objectives of educational technology?

6.3 CHARACTERISTICS OF TEACHING DEVICES

Teaching is a social and professional activity. It is a process of development of a teacher through a system of action which induces learning through interpersonal

relationship. It is an application of philosophical, sociological and scientific knowledge to teaching for achieving some specific learning objectives.

Teaching is a purposeful activity. The goal of teaching is to bring all around development of the child. The knowledge and practice help in realizing the goals, is the content matter of teaching technology.

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Characteristics of Teaching Technology/Teaching Learning Devices

The following are the main features of teaching technology:

- All the three types of objectives: cognitive, affective and psychomotor can be achieved by this technology.
- The content structure can be related to the communication structure for achieving the learning objectives.
- The philosophical, sociological and scientific knowledge can be applied to teaching process.
- The teaching theory can be formulated by the use of teaching technology.
- The pupil teacher and in-service teacher can improve their teaching methodology using teaching technologies.
- Teaching technology implies the input, process and output aspects side by side.
- The teaching can be organized from memory level to reflective level.
- It helps the teacher and learner by providing them varied experiences in the teaching-learning process.
- It is an application of the laws, principles as well as recent discoveries of science and technology in the process of education.
- It can be conceived as a science of techniques methods and media by which educational process is made efficient.
- It is a systematic approach by organization of available resources for effective learning

6.3.1 Media and Learning

The use of instructional media is an essential component of teaching learning process to realize various socio-economic, cultural and national goals. The media contributes towards the efficient and effective progress of teaching and learning process so as to meet the teaching-learning objectives efficiently. If the use of media is done in an appropriate manner and is made to utilize in the field of education in a proper way, it will undoubtedly prove to be highly useful in making the students efficient and enhance the student's ability as it provides the totality of experiences to the learners.

Media is not only helpful in making the teaching and learning process flexible rather it also helps the learner to learn anytime and anywhere. Through the use of instructional media, the students can take the help of the teacher at any time by

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connecting with the teacher through video-conferencing, online system, sending e-mail, or electronic messages.

Instructional technology has been therefore, a boon for the teaching learning institutions. A student may attend the seminar or a conference while sitting in the drawing. He or she can easily understand the concept as well as record and replay the theoretical lesson as many as times he/she wants. Thus, technology has paved a way for the students by creation of online learning systems, digital libraries, open universities, and many more. There are many open learning education systems as well as universities that help the students in preparation and completion of their studies while doing a part-time job. The student gets the assignments and notes through online learning systems. Any information can be easily transmitted from one place to another with the use of online resources.

The following are the types of media generally used in the education system as follows:

1. **Print Instructional Media:** The Print Instructional Media is used in distance education, correspondence education or postal education. With the help of print media, the students get the information in the form of notes, learning material, lessons and assignments in the printed form. As some students find it easy to understand the concepts through print media therefore, the lessons/assignments are sent to the students by postal services or in-hand. Print Instructional Media helps the students in preparation of their notes, helps in understanding the concepts in a better form, makes the student aware about the learning material, and provides flexibility of the students to learn the material by sitting at home through a book or learning material. It also helps the students during the preparation of exams. It also helps the learners in understanding them about their weakness and strengths. Students would be able to read the concept and know the pattern of writing the concept through print media.
2. **Non-Print Instructional Media:** Non-Print Instructional Media is used in the process of distance teaching through radio, television, computer, teleconferencing and video-disc. The teacher/trainer provides the learning material through online resources. The students connect with the teacher through digital means and technology. It provides the flexibility to the learners as well as to the teachers as they can communicate with each other according to their own time. It is a cost-efficient and time saving method of teaching and learning. It also helps the student to learn a subject in variety of ways. A student may ask the difficulties related to the subject through electronic means. It enables the learners to become more efficient with the means of technology. Different subject teachers may connect with the student at the same time enabling the learners to solve their problems. The students get the entire learning material through e-mail or digital means.

Check Your Progress

3. What is the premise of principle of integration?
4. State any one use of print instructional media.

NOTES**6.4 TYPES OF MACHINES**

A renowned author, Kenneth Austwick (1986) observed, 'Pressing demands for more teaching in schools and for more training in the industry are leading to a greater study of teaching and learning procedures to seek for greater efficiency, and these have led to what appear to be two contradictory developments in the schools and colleges. One is the development of mass media, like TV and Films, in conjunction with other forms of large instruction like lectures. The other development is that of individualized self-instruction, like language laboratories and teaching machines'.

Meaning of Teaching Machine

A teaching machine is a device designed to be operated by an individual student. There is an interaction between the machine and the student. Psychologists have found that important principles of affective learning can be mastered by the use of machines with special instructional material prepared for use. The (tutorial type) Socratic method of teaching is the basis of all programmes for the teaching machines. It is usually accepted that teaching machines provide not only better instruction and learning at lower costs which saves time but also ensures maximum student achievement.

Working of Teaching Machine

The machine works as follows:

- There is a device that displays a question or problem on the machine.
- In response, the student must do something overtly about the problem, such as writing his or her answer or pushing the button to indicate an answer.
- The student is informed by the machine, through some device, whether his or her answer is correct and sometimes even why he or she is right or wrong.
- Every response is generally recorded in the machine.

Basic Principles of Teaching Machines

The following are the basic principles of teaching machines:

- Instruction is individualized.
- The content to be learnt is presented in small doses.

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- The likelihood of error is reduced to the minimum.
- There is logical ordering of the subject matter.
- The learner is allowed to learn at his or her own pace.
- The device instantaneously checks the answer, and thereafter the desired reinforcement takes place.
- The machine demands the active participation of the students.
- The device may be operated electrically or manually.

Value of Teaching Machine

The following are the points which will help one to analyse the importance of teaching machine:

- Teaching machines provide a technological solution to the problem of individual differences.
- Teaching machines, if programmed intelligently and used wisely, provide individual experience to the students.
- Auto instruction can be almost as good as personalized tutor instruction.
- Every student can proceed at his own rate of learning.

Types of Teaching Machines

Auto instructional devices have reached a higher level of technological sophistication. The stages involved in their evolution include: a set of cards in a cardboard or plastic case, or simply cyclostyled sheet; a write-in machine; a film machine, a machine using combination of microfilm and motion pictures; and finally hi-tech machines electronically synchronized with a television broadcast.

Broadly speaking, teaching machines can be classified into two categories:

1. **Constructed Response Devices:** These are based on an American psychologist, B F Skinner's principle, viz., emission of a response considered more effective in learning than simple recognition. These machines are of the following types:

- The slider machine
- The disc-type machine
- The type-writer input computing machine
- Audio-visual combination television

However, audio-visual combination television is perhaps the most common example of this combined approach to teaching machines

2. **Multiple-choice Machines:** In multiple choice machines, it is possible to prepare branches for every reply to a given question. These machines are of following types:

- Sidney L Pressy, a professor of psychologist developed a machine, consisting of revolving drum and the programme printed upon the face of the drum
- Audio-Visual Machine
- Electronic computer and multiple type programmes
- Non-mechanical multiple choice devices and punch cards consisting of small cards that contain multiple choice items

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Courseware Development

Courseware development aims at designing and developing the appropriate e-learning materials for teaching and learning. It includes use of authoring tools and languages to develop multimedia educational tools.

6.4.1 Computer Assisted Instruction and its Uses

A computer-assisted instruction (CAI) is a programme related to instructional material which is presented by means of computer systems. The use of computers has become widespread from primary education to the university level. These programmes provide a presentation of data in a systematic and friendly manner. They can also provide a tutorial role in which the student is tested based on what is taught to them. CAI is an interesting instructional technique in which computers monitor the learning which takes place.

Uses of CAI

The following are the main uses of CAI:

- It provides one to one interaction with a student and a student can learn at their own pace. There is no competition as compared to studying in a class.
- It provides a new learning environment where a student is not confined to the four walls of a classroom.
- A computer programme helps to identify the problem and once the problem has been identified, it then focuses on the problem area. Thus, helping the students to understand the problem and a solution is also given to them.
- Computers are useful especially in those subjects which involves practical rather than just memorizing things.

6.4.2 Innovation and Educational Goals

Programmed Instruction or programmed learning is one of the important innovations in the teaching-learning process. Programmed instruction or programmed learning is carefully specified, systematically, planned, empirically established, skillfully arranged and effectively controlled self-instructional technique for providing individualized instruction or learning experiences to the learner. The subject matter or the learning experience is logically sequenced into small segments. The learning

experience is self-corrected. It is the application of principles of behavioral sciences and technology in the field of education.

Characteristics of Innovation and Programmed Learning

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The characteristics of innovation and programmed learning are as follows:

- The objectives underlying the programme is defined in explicit and operational terms. This makes the terminal behavior desired to be built up through the programme measurable and observable.
- The subject matter of the programme is presented by breaking it into simple steps in a logical sequence. The small steps stress the gradual nature of the increase in complexity and the smoothness of the transition from one item to the next. Information grows in depth and changes occur in quality and quantity.
- Programmed Instruction is a process of constructing sequences of instructional material in a way that the rate and depth of learning are maximized, understanding is fostered and the motivation of the student is enhanced.
- Assumption about the learner are clearly stated and put in definite terms in a programmed learning type of situation. These assumptions may relate to the particular level of reading competence of the learner, the extent of his vocabulary and his background in the subject matter.
- It emphasizes the logical phased interaction between the learner and the programme.

Effects of Innovations and Educational Goals

The effects of innovation and educational goals are as follows:

- Tutorial experiences are provided for individual learners on a large scale, wherein the learner may proceed at its own rate.
- The help in exercise control on homework and individual study.
- It enables the learner to catch up if he has fallen behind in his learning schedule due to absence from school.
- It provides a technological solution for the problem of the individual differences. The lack of innovations would compel the teacher to design his presentation to cater to what he senses is the student of average ability but such a presentation is bound to be too slow for the bright students and too fast for the slow ones.
- It helps the teachers to be much more professional in their approach to teaching than they are now.

Check Your Progress

5. What are the uses of computer-assisted instruction (CAI)?
6. State the aim of courseware development.

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6.5 ANSWERS TO CHECK YOUR PROGRESS QUESTIONS

1. The two main forms of educational technology are systematic programme and support or transport items.
2. The following are the objectives of educational technology:
 - (a) To determine the goals and formulate the objectives in behavioural terms.
 - (b) To analyse the characteristics of the learner.
 - (c) To organize the content in the logical or psychological sequence.
 - (d) To mediate between content and resource presentation.
3. The principle of integration refers to the organization or putting together diverse elements to form a unified and harmonious whole.
4. Print Instructional Media helps the students in preparation of their notes, helps in understanding the concepts in a better form, makes the student aware about the learning material, and provides flexibility of the students to learn the material by sitting at home through a book or learning material.
5. The following are the uses of computer-assisted instruction (CAI):
 - (a) It provides one to one interaction with a student and a student can learn at their own pace. There is no competition as compared to studying in a class.
 - (b) It provides a new learning environment where a student is not confined to the four walls of a classroom.
 - (c) Computers are useful especially in those subjects which involves practical rather than just memorizing things.
6. Courseware development aims at designing and developing the appropriate e-learning materials for teaching and learning. It includes use of authoring tools and languages to develop multimedia educational tools.

6.6 SUMMARY

- The word technology has been derived from the Greek word 'technik', which means an art. H J Leaving defines technology as a problem-solving invention.

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- A systematic programme is conceived as a complete package or programme structured towards an end (a single textbook or CAI Programme).
- Support/transport items consists of technology of support such as projectors, transparencies, or film and transport including CCTV (Closed Circuit Television), IT (Instructional television) and language laboratory.
- Education Technology can be conceived as a science of techniques and methods by which educational goals can be achieved.
- The educational technology comes to see whether by a given process or situation the specified goals can be achieved and if so to what extent and if not what changes should be made in the process in order to achieve the specified goals.
- Educational technology is one of the most significant forces, influencing change in the educational structure.
- The principle of active involvement makes sure that the student has to be focused or engage directly with the activity or task where he or she may draw knowledge, concepts, principles, attitudes, skills or habits.
- The principle of connectivity involves the building of relationships or linkages between and among experiences.
- The principle of integration refers to the organization or putting together diverse elements to form a unified and harmonious whole.
- The principle of active learning aims to provide the learners in understanding the concept in a quick and easier way.
- The principle of feedback makes sure that the instructor must provide the feedback to the students' performance for online tests.
- Teaching is a social and professional activity. It is a process of development of a teacher through a system of action which induces learning through interpersonal relationship.
- Teaching is a purposeful activity. The goal of teaching is to bring all around development of the child.
- The use of instructional media is an essential component of teaching learning process to realize various socio-economic, cultural and national goals.
- Media is not only helpful in making the teaching and learning process flexible rather it also helps the learner to learn anytime and anywhere.
- The Print Instructional Media is used in distance education, correspondence education or postal education.
- Non-Print Instructional Media is used in the process of distance teaching through radio, television, computer, teleconferencing and video-disc.
- A teaching machine is a device designed to be operated by an individual student. There is an interaction between the machine and the student.

- Courseware development aims at designing and developing the appropriate e-learning materials for teaching and learning.
- A computer-assisted instruction (CAI) is a programme related to instructional material which is presented by means of computer systems.
- Programmed Instruction or programmed learning is one of the important innovations in the teaching-learning process.
- Programmed Instruction is a process of constructing sequences of instructional material in a way that the rate and depth of learning are maximized, understanding is fostered and the motivation of the student is enhanced.

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6.7 KEY WORDS

- **Computer-assisted instruction (CAI):** It refers to a programme related to instructional material which is presented by means of computer systems.
- **Education technology:** It refers to a technology which is based on science of techniques and methods by which educational goals can be achieved.
- **Teaching machine:** It refers to a device designed to be operated by an individual student. There is an interaction between the machine and the student.
- **Principle of active learning:** It refers to a principle which aims to provide the learners in understanding the concept in a quick and easier way.
- **Principle of connectivity:** It refers to a principle which involves the building of relationships or linkages between and among experiences.

6.8 SELF ASSESSMENT QUESTIONS AND EXERCISES

Short-Answer Questions

1. What are the characteristics of innovation and programmed learning?
2. Why is teaching considered as a purposeful activity?
3. What are the steps involved in the process of educational technology?
4. List some of the general characteristics of educational technology.
5. How do media contribute in effective teaching?

Long-Answer Questions

1. Discuss the concept of teaching machines and its types.
2. Explain the principles related to educational technology.

3. Interpret the features of teaching learning devices.
4. Analyse the two types of media.
5. Explain the concept of instructional technology in detail.

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6.9 FURTHER READINGS

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UNIT 7 PROGRAMMED INSTRUCTION

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Structure

- 7.0 Introduction
- 7.1 Objectives
- 7.2 Programmed Instruction: Meaning
 - 7.2.1 Programmed Instruction: Principles
- 7.3 Types of Programmed Instructions
 - 7.3.1 Programmed Learning: Merits and Demerits
- 7.4 Preparing the Learning Material for Programmed Instruction
 - 7.4.1 Role of Computer in Instruction
- 7.5 Teaching Machines
- 7.6 Answers to Check Your Progress Questions
- 7.7 Summary
- 7.8 Key Words
- 7.9 Self Assessment Questions and Exercises
- 7.10 Further Readings

7.0 INTRODUCTION

Programmed instruction is defined as a research based system which helps the learners to work efficiently and successfully. Various researches have been made in this type of instruction. In this type of method, the learning material is provided in the form of textbook or computer or on teaching machines.

There are two main models based on the concept of programmed instruction. One was developed by Norman Crowder and the other by B.F. Skinner. Crowder's system was based in the multiple choice questions and on the other hand, Skinner's method was based on the concept of reinforcement. The teacher had to provide feedback for each of the alternatives which were suggested by the students.

Computer assisted instruction (CAI) is an interactive instructional technique in which computer presents the instructional material and monitors the learning which takes place. It uses a combination of graphics, sound and video. Teaching machines provide instruction to students according to a certain programme and then reacts to their responses.

In this unit, the concept of programmed instruction, its principles and characteristics have been discussed. The main types of programmed instruction and the steps involved in preparing the material of programmed instruction have been explained. The unit will also help one to analyse the characteristics of computer assistance instruction and the role of teaching machines.

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7.1 OBJECTIVES

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

- Discuss the meaning of programmed instruction
- Explain the principles related to programmed instruction
- Analyse the types of programmed instructions
- Discuss the steps related to the preparation of programmed learning
- Interpret the types of computer assisted instruction (CAI)
- Describe the characteristics of teaching machines

7.2 PROGRAMMED INSTRUCTION: MEANING

The instructions provided by a teaching machine or programmed textbook is referred to as programmed instruction or programmed learning. Let us seek some help from the definitions put forward by the various scholars in understanding the meaning of the term programmed learning are programmed instruction.

- Smith and Moore (1962) said ‘Programmed instruction is the process of arranging the material to be learnt into a series of sequential steps, usually it was the student from a familiar background into a complex and new set of concepts, principles and understanding’.
- Jacobs and other (1967) assert that ‘Self-instructional programs are educational materials from which the students learn. These programs can be used with many types, of students and subject matter either by themselves, and the name “self- instruction” or in combination with other instructional techniques’.
- Espich and Williams (1967) said, ‘Programmed instruction is a planned sequence of experiences, leading to proficiency, in terms of stimulus response relationship that have proven to be effective’.
- Susam Markle (1969) says, ‘It is a method of designing a reproducible sequence of instructional events to produce a measurable and consistent effect on the behaviours of each and every acceptable student’.

Characteristics of Programmed Instruction

The following are the characteristics of programmed instruction:

- In this technique, the instructional material is logically sequenced and broken into suitable small steps or segment of the subject matter called frames.
- For sequencing a particular unit of the instructional material, the programmer has to pay consideration for the initial or entry behaviour of the learner with which it begins and the terminal behaviour or the competence with student is required to achieve.

- In actual operation the beginning is made by presenting a frame (a small but meaningful segment of subject matter). The learner is required to read and listen and then respond. Programmed instruction is a method or technique of giving or receiving individualized instruction from a variety of sources like programmed textbook, teaching machine and computers with or without the help of a teacher.
- Programmed instruction system has an adequate provision for immediate feedback which is based on the theory of reinforcement. For instance, while responding to the first frame of the programme material the learner is informed about the correctness of his or her response. In case, he or she is correct, his or her response is reinforced and if he or she is wrong, he or she may correct himself or herself by receiving the correct answer.
- It is the interaction between the learner and the learning material or programme which is emphasized in the programmed instruction. The student is actively motivated to learn and respond.

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7.2.1 Programmed Instruction: Principles

Programmed instruction is a strategy of teaching and learning through a medium which operates through any device like radio, television, tape recorder, language laboratory and a teacher. Programmed learning in this context is only a beginning of the application of the science of behaviour to education.

Principles of linear programming

The principles of programmed learning were identified first about learning programming and were formulated by an American psychologist, B F Skinner. The Principles of programming imply the rules and systems by which a programme instructional material functions and is constructed. These principles have been classified into three categories:

1. Fundamental principles of programmed learning

Good programmed instruction merely incorporates good principles of learning. In programmed learning, the subject matter is broken down into a sequence of steps. The sequence and step must be determined much more carefully and skillfully than it is possible for any ordinary teacher to do. The steps must be small enough for the learner to move from one to next easily with minimum errors. Trial and error learning must be reduced to a minimum. The ideal programme would result in no mistake. Constant success reinforces past learning and motivates further efforts. Programmed learning may take various forms depending upon the subject and desired objectives. One common form in academic subjects is to present certain carefully worded data in a 'frame' or viewing space. Each frame calls for a response. The response may be constructed or selected from multiple choice alternatives.

The basic idea of programmed learning is that most efficient, pleasant and permanent learning takes place. Programmed learning has many features which

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are different from conventional method of learning. The principle on which programmed learning is based was discovered in psychological laboratories:

- Principle of small steps
- Principle of active responding
- Principle of immediate confirmation
- Principle of self-pacing and
- Principle of student testing

The following points will help one to get a better understanding of programmed learning.

- (a) A programme then is made up of a larger number of small, easy to take steps. A student can proceed from knowing very little about a subject to mastery of the subject by going through a program.
- (b) Another finding from psychological laboratories is that the student learns best if he or she is actively responding as he or she is learning. Another way to say that people 'learning by doing' is that they learn by active responding.
- (c) The third principle from the psychological laboratory is that, the students learn best when they can confirm their answer immediately. It is one type of reinforcement to work on the programme or to learn. A student who must wait two weeks for the test probably will not learn as well as student whose test scores immediately.

2. Basic principle of programmed learning

The following principles are the basic ones for programmed learning:

- **Objective specification:** It means identifying the terminal behaviours so that the learners will be able to perform when he or she will complete the programming. These are the intended outcomes rather than the mastery of the content.
- **Small step size:** It involves small information to be imparted into small units. Each requiring activity is sanctioned by reinforcement.
- **Over responding:** It means that students must act on each unit of information by means of exercise and assimilate it.
- **Success or minimum error:** It means that error must be avoided at all costs because they are constructed as obstacle to learning.
- **Immediate feedback:** To ensure success and satisfaction the public must know that his action is correct.
- **Logical graded process:** It implies two things, relevance of content and its graded presentation.

- **Self-Pacing:** Each individual move at his or her own pace thus, allowing for individualization of instruction.
- **Empirical testing:** It is used for programme development and validation. The programme instruction material is prepared, modified and evaluated in terms of learner performances.

These principles are formulated for developing the programmed instructional material and are based on the theory of behaviour discovered by BF Skinner in laboratory experiments.

3. The mandatory and optional principle of programmed learning

The optional and mandatory principles are those which may or may not be present in it. The mandatory principles of programming are those which are critical and essential for distinguishing it from other forms of instruction such as conventional classroom teaching, instruction by the use of textbooks and so on. According to psychologist, Edward (1971) the following three are referred to as mandatory principles:

- (a) Principle of objective specification
- (b) Principle of empirical testing
- (c) Principle of small steps

A programmed learning sequence is discovered by objective defined terminal behaviour. Its effectiveness is evaluated in terms of learner's performance and the learner can proceed at his own pace. These features or principles are different from any conventional method of teaching.

Fundamental principles of branching programme

The branching program is based on the three fundamental principles:

1. **Principle of exposition:** The learner should perceive the whole phenomena which should be exposed to him or her. It means that a student learns better if the whole concept is presented to him or her. The complete information is provided on homepage. It serves two purposes teaching and diagnosis.
2. **Principle of diagnosis:** The principle refers to identify the weakness of a learner. After exposition, it is assessed whether the learner would be able to learn the concept or not and what are the causes for it. Multiple choice format is used to diagnose the weakness of the learner.
3. **Principle of remediation:** The diagnosis provides the basis for remediation. Remedial instructions are provided on the wrong page. For learners chooses wrong alternative, he or she must move to a wrong page, where remedial instruction is provided to him and directed to return to the homepage. He or she is asked to choose the right response. It is known as the principle of remediation.

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Check Your Progress

1. State the basic idea of programmed learning.
2. What is empirical testing?

7.3 TYPES OF PROGRAMMED INSTRUCTIONS

In programmed instruction, the presentation of the instructional material of subject matter to the learner in a suitable form is termed as programming. Various types of programming have emerged on account of researches and experimental studies in the field of programmed instruction. Some of the mentionable researches are discussed in the following section.

Linear or extrinsic programming

The credit for propagating the linear programming style goes to B.F. Skinner (1955). It is directly related with his theory of operant conditioning and is based on the assumption that human behaviour can be shaped or conditioned gradually. In linear programming, instructional material is sequenced into a number of meaningful small steps called frames. These frames are presented to the learner in an arranged sequence one at a time. The learner is required to respond actively at each step. Immediately after responding the learner is given information about the correctness of his response. It reinforces his or her behaviour and he or she may be motivated to learn the next frame in the arranged sequence.

By proceeding from one step to another the learner may then be able to acquire the desired learning experiences. The linear programming lays great emphasis on making the sequence of response error less. For this purpose, the steps are made so small and sequence in such a way that the learner makes only correct responses throughout the instruction process and receives in consequences only positive reinforcement.

Branching or intrinsic programming

The credit for developing the branching program goes to an American psychologist Norman A. Crowder (1954). In Crowders own words branching or instructional programme is one which adapts to the need of the students without a medium of any extrinsic device such as computer. In contrast to linear programming the branching style therefore, provides an intrinsic arrangement in the sense that it is not controlled extrinsically by the programmer. Here, the learner is free to make decisions and can adapt the instruction to his needs. The basic assumptions underlying this style are as follows:

- The learner learns a thing better if it is presented in its totality or in the form of meaningful components or units.

- Learning takes place better if the students are made to learn on the pattern of traditional tutorial methods.
- The basic learning takes place during the student's exposure to the new material.
- Wrong responses do not necessarily hinder the learning of a correct response. In a learning process, errors may occur. If an error occurs, it may be detected and corrected before proceeding further on the learning path.
- Learning takes place better if a learner is allowed sufficient freedom to take decisions for adapting the instruction to his needs.
- Learning takes place better if each response is used to test the success of the latest communication to the student and that testing is followed by remedial instructions.
- Multiple choice items help more in the learning process than the forced choice single response item.

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7.3.1 Programmed Learning: Merits and Demerits

The following are the clarifications regarding various confusions about programmed learning concept:

- It is not audio visual aids of teaching and learning but it is a strategy of teaching on instructional technology as a part of new educational technology in the discipline of education.
- Some people think that it is an objective type test or completion type test, but it is a new strategy of imparting knowledge or developing new behaviour among the learners.
- It is not the solution of educational problems, but it is the strategy of teaching for realizing the specific learning objectives.
- It is not a solution to the shortage of capable or effective teachers or is not an answer to inadequate school budget, but it is a new device of teaching process.
- It is not the form of scientific lesson plan, but it is a model teaching method.
- It is not a teaching machine, but programme material can be displayed by teaching machines.
- It is not a new device of evaluation, but it is a new strategy of teaching and learning.
- Programmed instruction is not educational technology, but it is one of the aspects of instructional technology or software approach.

Merits of linear programming

- A good linear programme is accompanied with the self-explained set of instructions to use it, precisely written statements of entering and terminal behaviour and an assessment test.

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- It provides a clear understanding of the concepts and sufficient practice of the skill.
- It provides the learning by doing situation. The learner can learn without the physical presence of the teacher.
- The feedback is designed to minimize the possibility of errors in responses. The error rate should necessarily be less than ten per cent.
- It controls the individual differences among the learners. It provides the adjustable devices for individual variations.

Demerits of linear programming

It is not a complete strategy of teaching and learning. It has the following limitations:

- In linear programming, every learner has to follow the same linear path. The needs of the learner are not considered adequately.
- It can be used only to achieve the lower cognitive objectives. Psychomotor and affective objective cannot be realized by linear programming.
- It can be used to teach the conceptual and explanatory content, but factual content cannot be taught.
- It does not provide the freedom to the learner for emitting the responses. It generates controlled learning situation.
- The linear programme does not suit to the creative and bright children. Crowder says that linear programming is an insult intelligent student.
- It cannot be used for remedial purpose. It can be used only for teaching purpose.
- It does not provide the social motivation to the learner which is important for human learning.

Norman A Crowder has raised several objections for linear programming. He develops his own strategy as an improvement over Skinnerian programming even then it is not a perfect instructional strategy. It has the following limitations:

- The students take little interest to use scrambled textbooks because they don't follow the sequence of pages in the learning.
- When learner selects wrong response, he moves on the wrong page for remedial instruction then he must repeat the same material of the homepage for choosing the correct response. This reduces the probability of improvement in learning difficulties.
- The learner must select a response from given multiple choice alternatives. He can select his response by guessing without comprehending the concepts. So, it will help in diagnosing the learning difficulties. There is no check for the guessing.

- The wrong responses are generally given on wrong pages. He may not select alternative of the wrong page serial number because remediation of two or three home pages is provided on one wrong page. It helps in selecting the correct response to the learner.
- The scrambled text cannot be displayed through teaching machines and computer. It requires a very complex model for presenting scrambled texts.
- In the branching programming, remediation is provided for two or three types of learning difficulties. Hence, it is not covering the individual variations of the learner.
- The scrambled textbook cannot be used effectively for primary and secondary school students.

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Check Your Progress

3. What is programming?
4. What are the merits of linear programming?

7.4 PREPARING THE LEARNING MATERIAL FOR PROGRAMMED INSTRUCTION

Different programmers have suggested various steps in preparing a programmed material.

Peter Pipe has suggested six steps:

1. Selection of a unit to be programmed
2. Writing assumptions about the learners and entering behaviours of the learners
3. Defining appropriate objectives in behaviour terms
4. Defining pre-requisite knowledge and skill in behavioural terms
5. Preparing criterion test
6. Developing specific outline of the content to be programmed

John P Decceo has suggested five steps for developing programmed material

1. Select unknit or topic to be programmed
2. Prepare a content outline
3. Defining objectives in behavioural terms
4. Construct and administer a test of entering behaviour
5. Construct and administer a test of terminal behaviour

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These steps are not sufficient to develop a programmed material because important steps such as writing frames and validation are not mentioned in the above list. Thus, the following steps are more practical in designing programmed material.

- Specify the goals of learning educational objectives.
- Device a strategy of learning where the student should begin, which sequence of task would lead him or her most effectively towards the goals how much repetition is done.
- Write a series of frame stimulus response 'frames' each frame gives some new information and also ask a question which a student has to answer before it proceeds to another frame.
- Empirical try out, the programme is to be presented section by section first to individual student and then to a group of students. If a student makes much error or become confused at any point in short do not learn-revise the programme.
- Validation and evaluation, after a revision based on tries out, administer the programme to a representative group of students. Programmes are to be evaluated in terms of student's performance.

7.4.1 Role of Computer in Instruction

Computer-assisted instruction (CAI) as the name suggests stands for the type of instruction aided or carried out with the help of a computer as a machine. It is just one step ahead to the use of teaching machine and probably two, to the use of programmed textbooks in making the instructional process as self-directed and individualized as possible. The computer is said to be ahead of the teaching machine because of its unlimited capacity of doing more work and multiple types of works at the same time for an unlimited number of individual learners than the teaching machine.

Computer-assisted instruction, for this reason, is relatively a new and developed concept as compared to the teaching machine and programmed learning oriented instructional technology. As observed by Hilgard and Bover (1977) 'Computer-assisted instruction has now taken as so many dimensions that it can no longer be considered as a simple derivative of the teaching machine or the kind of programmed learning that Skinner introduced', the fact stands clearer before us. The use of Computer has now almost revolutionized the field of instruction in all its dimensions. It cannot be defined now as a teaching machine device, for presenting the programmed instructional material.

Let us examine one other definition of computer assisted instruction stating that, '*CAI is defined as an interaction between a student, a computer-controlled display and a response entry device for the purpose of achieving educational outcomes*'. (Bhatt and Sharma 1992)

The definition brings into lime light the following things:

- In computer assisted instruction, there is an interaction between an individual student and the computer just as happens in tutorial system between the teacher and individual student.
- Computer can display the instructional material to the individual student.
- The individual student takes benefit of the displayed material and responds to it. These responses are attended by the computer for deciding the future course of instruction displayed to the learner.
- The interaction between the individual learner and computer device helps in the realization of the set instruction objectives.

In this way while explaining all about the practical of CAIs, this definition is lacking in respect of providing out the nature and characteristics of the instructions provided by CAI. It can be modified in the following way. Computer assisted instruction may be defined as a method of instruction in which there is a purposeful interaction between a learner and computer device(having useful instructional material as software) for helping the individual learner to achieve the desired instruction objective with his own pace and abilities at his command.

Types or modes of computer assisted instruction (CAI)

CAI can take a variety of forms and providing self-individualized instruction to a learner depending upon the variety of uses to which computers services can be availed. The following are some of its famous types:

- **Informational computer assisted instruction:** This type of computer assisted instruction help the learners to get the desired information needed by him or her. Here, computer can serve the role of an equity officer, to respond to student's enquiry with answers it has stored. It provides minimal interaction between the student and the computer programme. The sole purpose of this type of CAI is to provide essential information for the acquisition of concept and skills. However, individual learner can learn a lot by adopting an enquiry or discovery approach towards learning through such instruction.
- **Drill and practice Programmes:** This type of computer assisted instruction provides the learner different types of drill and practice programmes covering specific topics related with a particular subject. Through such drill and practice programmes of CAI, the services of computers can be properly availed for providing practice in something already learned in some other way.
- **Tutorial type computer assisted instruction:** In such type of computer assisted instruction, the computers are engaged in actual teaching. Here, they can play effectively the role of a tutor by maintaining a perfect interaction and dialogue with the individual students. The tutorial programmes are prepared not only to provide instructions in topics like photosynthesis,

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ecosystem and Eco balances and our body systems. But also, to provide sufficient practice, having proper track of the student's difficulties and performance and move the students on the path of progress according to their pace, ability and interest. In case, the student is able to master a concept, the sea AI programme provides next step of instruction, but if he or she is not able to achieve mastery, the programme provides remedial instruction.

- **Educational games types:** In such type of computer assisted instruction the learners are provided with the variety of well-designed computer games. These games should not be confused with academic type games. The purpose of such type of games is only to provide intellectual challenge, stimulation of curiosity and serve as a source of motivation to the individual learner. During the course of learning, these games can be used as a source of review or as a reward for some accomplishment on the part of the learner.
- **Stimulation type of instruction:** In such type of computer assisted instruction, stimulation is used as a technique for providing training to the students. Such type of instructional activities provides the most powerful learning tools to them. With the carefully prepared programmes, the students are made to face real or idealized situations. They have to play an active role and are required to take decisions that have consequences. For example, a stimulation computer programme may put the participants in the shooting range of the enemies in the battle front or in the role of a hunter in a village full of horror of beasts or in the role of an explorer who is looking for buried treasurer. The stimulation in all such ways proves much less expensive and dangerous to have a trainee below up something on the screen then to face a real danger to make a real mistake while trained in real situations.

Check Your Progress

5. What is the purpose of educational games?
6. What is stimulation type of instruction?

7.5 TEACHING MACHINES

Sydney L Pressey developed and used machines for teaching and testing. In 1926-27, he produced the drum tutor, which underwent successive modification. It was a teaching and testing device that presented a question until the student responded correctly the number of times for which the device was designed. The student selected his or her response from multiple choice alternatives by pressing one of four response keys. Thus, one of the first teaching machines was reported by Sydney L Pressey in 1926.

It was B F Skinner who has introduced teaching machine for presenting the programme instructional material. The teaching machine is essential a technology aid which can provide easily continuous reinforcement for the modification of desirable behaviour. Teaching machine or auto interactional device is a form of apparatus designed to be operated by an individual student. There are many types and varieties of teaching machines, but all of them have the following characteristics:

- The student is presented with a question or problem by some form of display on the machine.
- The student is required to respond by writing or answering or pushing a button to show an answer.
- The student is informed, one way or another, so as to let him or her know whether his or her answer is right or wrong in some cases, why he or she is right or wrong.
- Often an account is kept of the response, to each item not for testing purposes, but for teaching purposes.
- The content to be taught is analysed and developed into a programme. The programme, the series of items which are presented to the student in the form of blanks to be filled in.
- The programme is designed, considering a theory of learning, the nature of the student for which the programme is being designed and the subject matter to be worked on.
- The thoughtful teacher should understand something of the different concepts of programming.

Characteristics of Teaching Machines

The following are the characteristics of teaching machines:

- These are used to present instructional material systematically.
- Teaching machine provides the opportunities to respond or answer overtly.
- It provides the situation to check and confirm the response. There is no scope to copy down the response.
- Teaching machines can provide the continuous reinforcement to the student.
- These machines also prepare the record of the students learning and responses.
- The content can be presented systematically through the teaching machines and feedback is given for the student responses.
- Teaching machines can present the form of programmed instruction in which student cannot copy down the correct response. There is an interaction between the student and the teaching machine that results in the formation of new knowledge.

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Teaching Machines and Teacher

Teaching machines serve different functions which no teacher can accomplish it. Teacher's functions cannot be rendered by any teaching machine. The following points clarify this issue:

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- The instructional material can only be developed by the teacher. No teaching machine can prepare instruction.
- Teacher and student interaction help in developing cognitive, affective and psychomotor aspects of a learner. Not teaching machine can develop affective aspect of the learner.
- The teacher can only provide the social motivation to the learner for developing attitudes and values, but a teaching machine can provide psychological motivation to the learner.
- Teaching machine can create well-defined and well-structured learning situation which cannot be generated by the teacher.
- Teaching machines cannot compensate the individual differences in the learning process which can be compensated by the teacher.
- The continuous reinforcement can be provided by teaching machine but can only be given by a teacher.

Uses of Teaching Machine

Psychologist, Stolurow conducted a study to ascertain the effectiveness of teaching machines and programmed text and scrambled book. He found out that there is no difference in presenting the instructional material through teaching machines and programmed text a scrambled textbook. Even then teaching machines have their importance in education and they have the following advantages:

- Teaching machine orient towards the automation of the teaching-learning process.
- Teaching machines function light tutorial instructions. These machines compensate the individual differences in the process of learning.
- They provide well-defined and well-structured learning situation for desired behaviour change or modification.
- Teaching machines provide the continuous reinforcement to the learner while he or she reads the material.
- They create the situation in which a student learns by doing.
- A learner cannot copy down the correct response while the material is presented through teaching machines.
- Teaching machines assist the teacher and make his or her task simpler.
- Teaching machines are also used for testing the students learning outcomes or their achievement.

Teaching machines are used in conducting the fundamental research in the field of programmed instruction because they provide the real data. The findings based on teaching machines are more authentic and reliable. The various schedules of reinforcement can be employed in presenting the instructional materials through the teaching machines. The experiment studies in area reinforcement and instruction are only possible teaching machines in human learning.

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Check Your Progress

7. State any one use of teaching machine.
8. What are the characteristics of teaching machine?

7.6 ANSWERS TO CHECK YOUR PROGRESS QUESTIONS

1. The basic idea of programmed learning is that most efficient, pleasant and permanent learning takes place.
2. Empirical testing is used for programme development and validation. The programme instruction material is prepared, modified and evaluated in terms of learner performances.
3. In programmed instruction, the presentation of the instructional material of subject matter to the learner in a suitable form is termed as programming.
4. The following are the merits of linear programming:
 - (a) A good linear programme is accompanied with the self-explained set of instructions to use it, precisely written statements of entering and terminal behaviour and an assessment test.
 - (b) It provides a clear understanding of the concepts and sufficient practice of the skill.
 - (c) It provides the learning by doing situation. The learner can learn without the physical presence of the teacher.
5. The purpose of educational games is only to provide intellectual challenge, stimulation of curiosity and serve as a source of motivation to the individual learner.
6. Stimulation type of instruction is used as a technique for providing training to the students. Such type of instructional activities provides the most powerful learning tools to them. With the carefully prepared programmes, the students are made to face real or idealized situations.
7. Teaching machines are used in conducting the fundamental research in the field of programmed instruction because they provide the real data. The findings based on teaching machines are more authentic and reliable.

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8. The characteristics of teaching machine are as follows:
- (a) These are used to present instructional material systematically.
 - (b) Teaching machine provides the opportunities to respond or answer overtly.
 - (c) It provides the situation to check and confirm the response. There is no scope to copy down the response.
 - (d) Teaching machines can provide the continuous reinforcement to the student.

7.7 SUMMARY

- The instructions provided by a teaching machine or programmed textbook is referred to as programmed instruction or programmed learning.
- Programmed instruction is a method or technique of giving or receiving individualized instruction from a variety of sources like programmed textbook, teaching machine and computers with or without the help of a teacher.
- Programmed instruction is a strategy of teaching and learning than a medium which operates through any device like radio, television, tape recorder, language laboratory and a teacher.
- The principles of programmed learning were identified first about learning programming and were formulated by an American psychologist, B F Skinner.
- Good programmed instruction merely incorporates good principles of learning. In programmed learning, the subject matter is broken down into a sequence of steps.
- The basic idea of programmed learning is that most efficient, pleasant and permanent learning takes place.
- The mandatory principles of programming are those which are critical and essential for distinguishing it from other forms of instruction such as conventional classroom teaching, instruction by the use of textbooks and so on.
- A programmed learning sequence is discovered by objective defined terminal behaviour. Its effectiveness is evaluated in terms of learner's performance and the learner can proceed at his own pace.
- In programmed instruction, the presentation of the instructional material of subject matter to the learner in a suitable form is termed as programming.
- The credit for propagating the linear programming style goes to B F Skinner (1955). It is directly related with his theory of operant conditioning and is

based on the assumption that human behaviour can be shaped or conditioned gradually.

- The linear programming lays great emphasis on making the sequence of response error less.
- The credit for developing the branching program goes to an American psychologist Norman A. Crowder (1954).
- Programmed instruction is not educational technology, but it is one of the aspects of instructional technology or software approach.
- A good linear programme is accompanied with the self-explained set of instructions to use it, precisely written statements of entering and terminal behaviour and an assessment test.
- In linear programming, every learner has to follow the same linear path. The needs of the learner are not considered adequately.
- Computer-assisted instruction (CAI) as the name suggests stands for the type of instruction aided or carried out with the help of a computer as a machine.
- Computer-assisted instruction, for this reason, is relatively a new and developed concept as compared to the teaching machine and programmed learning oriented instructional technology.
- Computer assisted instruction may be defined as a method of instruction in which there is a purposeful interaction between a learner and computer device (having useful instructional material as software) for helping the individual learner to achieve the desired instruction objective with his own pace and abilities at his command.
- The teaching machine is essential a technology aid which can provide easily continuous reinforcement for the modification of desirable behaviour.
- Teaching machines serve different functions which no teacher can accomplish it. Teacher's functions cannot be rendered by any teaching machine.
- Teaching machines are used in conducting the fundamental research in the field of programmed instruction because they provide the real data.

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7.8 KEY WORDS

- **Programmed learning:** It refers to the instructions provided by a teaching machine or programmed textbook.
- **Objective specification:** It refers to identifying the terminal behaviours so that the learners will be able to perform when he or she will complete the programming.
- **Teaching machine:** It refers to a form of apparatus designed to be operated by an individual student.

- **Programmed learning sequence:** It refers to a method of effectiveness and is evaluated in terms of learner's performance and the learner can proceed at his or her own pace.

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7.9 SELF ASSESSMENT QUESTIONS AND EXERCISES

Short-Answer Questions

1. What are the main characteristics of programmed instruction?
2. What are the principles based on programmed learning?
3. List the principles of branching programme.
4. Write a short note on computer-assisted instruction (CAI).
5. What are the characteristics of teaching machines?

Long-Answer Questions

1. Discuss the principles related to programmed instruction.
2. Analyse the types of programmed instructions.
3. Compare the merits and demerits of linear programming.
4. Discuss the steps related to the designing of programmed material.
5. Interpret the types of computer assisted instruction.

7.10 FURTHER READINGS

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UNIT 8 MODERNIZATION

Structure

- 8.0 Introduction
- 8.1 Objectives
- 8.2 Meaning and Concept of Modernization
 - 8.2.1 Innovation and Educational Goals
- 8.3 Education and Modernization
 - 8.3.1 Difference between Modernity and Modernization
- 8.4 Answers to Check Your Progress Questions
- 8.5 Summary
- 8.6 Key Words
- 8.7 Self Assessment Questions and Exercises
- 8.8 Further Readings

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8.0 INTRODUCTION

Education plays the most important role in the society as it fosters knowledge among the students and promotes innovation through new ideas and concepts. Modernization can be defined as a process of socio-cultural transformation which involves changes in values, norms and structures.

In a changing society, it becomes important for education to transmit knowledge in such a way that the traditional and cultural heritage must be kept intact and at the same time, prepare the students to adjust to changes which may take place in the future. Modernization plays an important role with respect to this point and it thus, becomes necessary that importance must be given to the concept of modernization.

In this unit, the concept of modernization and the importance of innovation in educational system has been discussed. The relation between education and modernization and the difference between modernity and modernization has been dealt in the unit.

8.1 OBJECTIVES

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

- Discuss the concept of modernization
- Explain the importance of innovation in education
- Interpret the role of education and its main principles
- Analyse the relationship between education and modernization
- Explain the difference between modernity and modernization

8.2 MEANING AND CONCEPT OF MODERNIZATION

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In the words of sociologist, S N Eisenstadt, 'Historically, modernization is the process of change towards those special types of social, economic and political systems that have developed in western Europe and North America from the seventeenth century to the nineteenth and twentieth centuries to the American, Asian, and African continents'. Modernization is the characteristic feature of modern society.

The most important function of education is modernization. Modernization according to some sociologists is based upon European and American models. As compared to urbanization, industrialization and westernization, modernization provides a more complex process and a more complex result. In the intellectual sphere, it is awareness that it is possible to see a rational explanation of a physical and social phenomenon.

Thus, it is presented by positivism, empiricism and rationalism. In the field of religion, it is expressed in secularism. Thus, its approach is this worldly. In the field of philosophy, it is expressed in humanistic thought. It includes social mobilizations and differentiation and specialization in individual and institutional activities. In political field, it stands for democratization in ecology it is characterized by advancing degree of urbanization. However, the most important feature of modernization as related to education is cultural.

Role of Education in Modernisation

Education is the most important instrument of modernization since modernization includes:

- Directed change in the system of attitudes, beliefs and values, and also in the institutional complex, to enhance acceptability of modern technology and its organization and operational framework.
- Growth of the infrastructure essential to the adaptation to technology of foreign origin to specific national needs.
- Laying the foundation of institutions and organizations which could, in time, assume responsibility for independent innovation and technological growth to the country's needs and problems.

Modernization is a comprehensive concept aimed at capturing, describing the transition of a society from medieval to modern culture. It stands for progress beyond tradition.

Modernization through Education

Education is the most important instrument of modernization since modernization includes the following:

- Directed change in the system of attitudes, beliefs and values and also in the institutional complex, to enhance the acceptability of modern technology and its organizational and operational framework.

- Growth of the infrastructure essential to the adaptation to technology of foreign origin to specific needs.

8.2.1 Innovation and Educational Goals

A renowned philosopher, Eric Hoffer believed that in a time of drastic change, it is the learners who inherit the future. The learned find themselves equipped to live in a world that no longer exists.

Innovation is a broad concept, addressed by many definitions depending on the specific area of application. According to sociologists, Kirkland and Such (2009), ‘Innovation is the application of new resource or approach that changes social practice, creating some value’.

According to sociologist and educational reformer, Fullan (2007), significant educational innovation must include the following three elements:

- Use of new revised materials (curriculum materials or technologies)
- Use of new teaching approaches (teaching strategies or activities)
- Alteration of beliefs (pedagogical assumptions)

Fullan says that, developing innovation as a process requires the necessary skills, the approach which aims at empowerment, a climate of faith and a bond of trust, and a lot of energy to implement new ways of organizing and structuring the things in the desired order, rewarding people and communicating.

Sociologist Kozma (2003), said ‘ICT supported innovation in education is defined as the pedagogical situations and means of supporting a shift from traditional paradigms towards emerging pedagogical approaches based on our current understanding of learning, such as fostering learner centered and constructivist approaches, and the acquisition of life-long learning skills’.

Innovation is a major driving force for economic and social progress. If absent, innovation growth stalls, economies, and communities stagnate. Innovation in education is always seeking knowledge that would support new and unique ideas in the instructional techniques and will reach the students in a more effective and exciting ways. However, it is important to note the fact that innovation does not happen in a vacuum. Bringing about change, requires team, goals, and an examination of the methodologies used and values at play along with the commitment from all the aspects. Innovative ideas often meet resistance always from the fear of failure or a push to not to rock the boat, but there can be new processes, models, or ways to create and manage knowledge and new cultures. Innovation requires conversation with yourself and surroundings around you.

Innovation has been a topic of considerable interest in the education sector. For innovation to be successful, human creativity, knowledge, skills, and talents are to be nurtured in a large part through the system of education.

When most people think innovation as a new product of the world. However, much innovation is a fact at the product level, and some of the most important level

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of innovation starts right from the platform level. We must understand that we are not concerned with innovation merely for the sake of novelty. Innovation is the successful ingredient for creating and prospering the culture of performance in the field of education, one that is based on the kind of continuous improvement that is necessary to resolve the challenges and issues that we are facing in the present world, to increase the student achievement results.

Recent Innovations: Technological change, Industrialisation and Modernisation

Some of the recent innovations in the education system include the introduction of computers in the classrooms, which is often referred to as the most significant innovation. However, the physical structure of the classroom has not changed much since chalkboards were introduced in the late 18th century, the arrival of computers, tablets, internet, e-learning, project-based learning, learning in groups has led to re-orientation of many traditional teaching practices and is generally seen as an opportunity for improvement (The Economist, 2013).

The Organization for Economic Co-operation and Development (OECD) (2007) has defined major principles, to be looked at interactively, as building blocks in educational innovation design are as follows:

- Learning environment should make learning and engagement central
- Innovation must be a social process
- Innovation must be highly attuned to learner's emotions
- Innovation must reflect individual differences
- Innovation must be demanding for all while avoiding overload
- Use of broad assessments and feedback
- Promote horizontal connectedness

Some of the Guiding Principles of Innovation in Education as defined by Michigan, Department of Education are as follows:

- Innovation in education must use outcome-based strategies and practices that are new, unique or creative and that have the likelihood of having significant impact on the student(s).
- Innovation in education must involve risk, creativity, and challenge our basic assumptions and beliefs underlying traditional education system.
- Innovation in education must engage students to use novel ideas, products, or processes.
- Innovation in education must prepare the students globally to be competitive, to think out of the box, solve problems, and to assimilate and apply the knowledge learnt.
- Innovation in education must be focused on individual student and student competency and should have data-proven relevance.

- Innovation in education must reduce barriers to student success and must include instruction presented and delivered in a form that is different from traditional classroom setting.
- Innovation in education must include the mechanisms through which schools can be creative in developing new and unique products with both student and fiscal accountability as included in parameters.

Innovation is thus, creation of new, improved products and new methodologies of production that increase efficiency and are the driving force for the economic growth. Therefore, the education system should be capable of producing students who are capable of being innovative at the workplace. Since, innovation is often related to new, improved and quality-oriented products; therefore, high-quality engineers, scientists, and doctors are often regarded to be crucial. Therefore, school must be a place where knowledge and values are translated into action.

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8.3 EDUCATION AND MODERNIZATION

In view of the mentioned changes required by the modernization the functions of education in this direction may be achieved by the following:

1. By enlarging the cognitive map of those getting exposed to it, education suggests alternative to tradition, brings into focus the rewards, implicit in them, and indicates-roughly at least the paths through which the new goals with their attendant regards can be achieved. It broadens mental horizons, raises expectations and predisposes people to make experiments.
2. As an instrument of socialization, it can project new images and values. Purposively used, it can help in obliterating attitudes and behaviour patterns that are dysfunctional to programmes of modernization.
3. By providing ideological articulations, it can promote the development of national consciousness and can help people see their needs and their problems from a national perspective. It can stimulate the creation of a national consensus at least on major issues.
4. Education provides a highway to the elite status of the educand. They provide a reference model to the masses, who in imitation of the former, take the first steps away from tradition. Modernization elites are almost always the products of modern or semi-modern school or university systems.
5. Education is mobility multiplier. Although its impact is on the immobility of thought-ways, in the long run, it does alter the rigid forms of social stratification. Modernization requires both types of mobility.

The latest study in this connection was however made by Dr S N Sharma published by ICSSR (1979) under the title 'Modernizing Effects of University

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Education' on the basis of study; he reached the following important conclusion concerning the relationship of modernization and education:

- The level of higher education is of no consequence as an explanatory variable of student modernity.
- The lowest percentage of moderns is in the field of humanities, followed by Social Sciences and professionals with the highest percentage in science faculty.
- Males are more modern as compared to females.
- High-status students are more modern as compared to students belonging to the lower strata of the society.
- There is a significant and positive correspondence between the level of student modernity and that of reference teachers, provided the latter preferred character building role over other roles favored no social distance in their relationship with the students and reported greater interpersonal introduction with students.
- Family type has no association with modernity.
- Caste has no bearing on modernity.
- The initial exposure to cosmopolitan city like Chandigarh makes not much difference in modernity.
- There is no relationship between parental modernity and student modernity.
- Duration of urban exposure is positively associated with modernity.
- There is a positive significant relationship between modernity and media exposure.
- There is a strong positive relationship between extent of exposure to the other cultures and the level of modernity.
- The type of schooling is the best predictor of modernity and the students who are taught in convent or public school are modern.
- Early socialization variable account for greater variance in student modernity as compared to the later socialization variables.
- An education variable, particularly student background in schooling, tops the list of explanatory variables.

In sum, with proper planning and under efficient direction, education can make a meaningful contribution to the attainment of modernization. It can be harnessed to defuse attitude and ideologies required for the adoption of modern technology and its associated values and organization premises, to provide personnel to operate and sustain the programs of modernization and to create capabilities for adaptation and origination of new technology.

8.3.1 Difference between Modernity and Modernization

Modernization

Modernity has indeed expanded to most of the world and has given rise to civilization patterns which share some central core characteristics, but which unfold differently even if with cognate ideological and institutional dynamics. Moreover, far-reaching changes, beyond the original premises of modernity, have also been taking place in Western societies.

At its most general, modernity may serve as a broad synonym for capitalism, or industrialization, or whatever institutional and ideological features are held to mark off the modern West from other, traditional societies. With the political demise of Marxism in Eastern Europe in the late 1980s, and the academic ascendancy of postmodernism, ‘modernity’ has become an increasingly fashionable term in revisionist social theory.

Paradoxically, because most theorizing about modernity and the modern has been conducted at a lofty level of generalization, the possibilities for an anthropological approach to modernity are extremely rich. Since the late 1970s there has been a growing number of ethnographic studies of quintessentially modern institutions and practices, scientific laboratories, capitalist corporations, consumer cultures, as well as the studies of architecture and planning already mentioned – both within and outside the ‘West’. Empirical scrutiny reveals that supposedly modern institutions fail to live up to Weberian expectations of impersonality and rationality, and the anthropology of modernity might go no further than repetitive, if amusing, empirical challenge to Western self-images of modern life. As such it would remain parasitic on those self-images, rather as much other anthropology has remained dependent on Occidentalism stereotypes of ‘the West’, ‘Western thought’ and ‘Western institutions’.

There is, however, another more radical possibility. Developing his own empirical research in the history and ethnography of science, Bruno Latour (1991) has argued that the very idea of the modern world is based on a set of impossible intellectual distinctions – between the objective knowledge of nature and the subjective world of culture, between science and politics, between the modern and the traditional.

Empirical research swiftly shows these distinctions to be untenable: science and politics are connected in complex social networks, while our public life is increasingly concerned with hybrids, objects and problems which are at once social and natural. An anthropology of modernity would employ ethnographic holism to dissolve the illusions that convince us that ‘we’ are modern, unprecedented but objective observers of other people’s cultural worlds. As yet such an anthropology hardly exists, and it is difficult to imagine quite what an ‘a modern’ (rather than postmodern) intellectual landscape would look like, except to say that it would be far more empirically challenging and far more genuinely ‘decentred’ than any of the oddly Eurocentric products of scholastic postmodernism.

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Check Your Progress

1. State any one important function of innovation in education.
2. State the main aim of modernization.
3. What is the most important function of education?
4. How does innovation act as an instrument of socialization?

8.4 ANSWERS TO CHECK YOUR PROGRESS QUESTIONS

1. The most important function of innovation in education is to reduce barriers to student success and must include instruction presented and delivered in a form that is different from traditional classroom setting.
2. Modernization is a comprehensive concept aimed at capturing, describing the transition of a society from medieval to modern culture. It stands for progress beyond tradition.
3. The most important function of education is modernization. It is awareness that it is possible to see a rational explanation of a physical and social phenomenon.
4. Innovation acts as an instrument of socialization as it can project new images and values. Purposively used, it can help in obliterating attitudes and behaviour patterns that are dysfunctional to programmes of modernization.

8.5 SUMMARY

- The most important function of education is modernization. Modernization according to some sociologists is based upon European and American models.
- As compared to urbanization, industrialization and westernization, modernization provides a more complex process and a more complex result.
- Modernization is a comprehensive concept aimed at capturing, describing the transition of a society from medieval to modern culture.
- A renowned philosopher, Eric Hoffer believed that in a time of drastic change, it is the learners who inherit the future.
- Innovation is a broad concept, addressed by many definitions depending on the specific area of application.
- Innovation is a major driving force for economic and social progress. If absent, innovation growth stalls, economies, and communities stagnate.

- Innovation in education is always seeking knowledge that would support new and unique ideas in the instructional techniques and will reach the students in a more effective and exciting ways.
- Innovative ideas often meet resistance always from the fear of failure or a push to not to rock the boat, but there can be new processes, models, or ways to create and manage knowledge and new cultures.
- For innovation to be successful, human creativity, knowledge, skills, and talents are to be nurtured in a large part through the system of education.
- Innovation is the successful ingredient for creating and prospering the culture of performance in the field of education, one that is based on the kind of continuous improvement that is necessary to resolve the challenges and issues that we are facing in the present world, to increase the student achievement results.
- Some of the recent innovations in the education system include the introduction of computers in the classrooms, which is often referred to as the most significant innovation.
- The Organization for Economic Co-operation and Development (OECD) (2007) has defined major principles, to be looked at interactively, as building blocks in educational innovation design.
- Innovation in education must use outcome-based strategies and practices that are new, unique or creative and that have the likelihood of having significant impact on the student(s).
- Innovation in education must involve risk, creativity, and challenge our basic assumptions and beliefs underlying traditional education system.
- Innovation in education must prepare the students globally to be competitive, to think out of the box, solve problems, and to assimilate and apply the knowledge learnt.
- Innovation in education must reduce barriers to student success and must include instruction presented and delivered in a form that is different from traditional classroom setting.
- Innovation is thus, creation of new, improved products and new methodologies of production that increase efficiency and are the driving force for the economic growth.
- By enlarging the cognitive map of those getting exposed to it, education suggests alternative to tradition, brings into focus the rewards, implicit in them, and indicates-roughly at least the paths through which the new goals with their attendant regards can be achieved.
- In sum, with proper planning and under efficient direction, education can make a meaningful contribution to the attainment of modernization.

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- Modernity has indeed expanded to most of the world and has given rise to civilization patterns which share some central core characteristics, but which unfold differently even if with cognate ideological and institutional dynamics.

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8.6 KEY WORDS

- **Empiricism:** It refers to a theory which states that all knowledge is based on experience and is derived from senses.
 - **Modernization:** It refers to a comprehensive concept which aims at capturing and describing the transition of a society from medieval to modern culture.
 - **Positivism:** It refers to a theory which states that a specific knowledge is based on natural phenomena and their relations.
 - **Rationalism:** It refers to a theory which bases its opinions on reason and knowledge rather than basing opinions on religious beliefs.
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8.7 SELF ASSESSMENT QUESTIONS AND EXERCISES

Short-Answer Questions

1. How is modernization represented in the various fields of knowledge?
2. What are the three main elements of innovation?
3. Why is education considered as the most important instrument in modernization?
4. What are the main constituents of modernization?
5. List the principles related to educational innovation design.

Long-Answer Questions

1. Discuss the concept of modernization in the field of education.
2. Analyse the role of innovation in education.
3. Differentiate between modernity and modernization in detail.
4. 'Innovation is a major driving force for economic and social progress'. Elucidate the statement.
5. Interpret the main functions of education.

8.8 FURTHER READINGS

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BLOCK - III
FREEDOM, ALTERNATIVE SCHOOLS
AND DISTANCE EDUCATION

UNIT 9 FREEDOM FOR
INNOVATION

Structure

- 9.0 Introduction
- 9.1 Objectives
- 9.2 Autonomy in Institutional Structure
 - 9.2.1 Individual/Student Autonomy
- 9.3 Teacher Autonomy
- 9.4 Answers to Check Your Progress Questions
- 9.5 Summary
- 9.6 Key Words
- 9.7 Self Assessment Questions and Exercises
- 9.8 Further Readings

9.0 INTRODUCTION

In the field of education, the concept of autonomy is the most common and important topic of discussion as it deals with the freedom of professional independence in schools and universities. Autonomy can be defined as a situation in which the student is responsible for all the decision he or she makes and the implementation of the decisions made by them.

Teacher autonomy on the other hand refers to the professional independence which is given to the teachers and it is primarily concerned with what they teach and how they teach it. It is important to give teacher autonomy as they play a major role in developing the personality of his or her students.

In this unit, the concept of autonomy in education has been highlighted. The meaning of student and teacher autonomy has been discussed in detail. The function of student autonomy bodies and the importance of teacher autonomy have also been explained.

9.1 OBJECTIVES

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

- Discuss the meaning of autonomy in institutional structure
- Explain the concept of student autonomy

- Interpret the function of students self-government bodies
- Analyse the importance of teacher autonomy

9.2 AUTONOMY IN INSTITUTIONAL STRUCTURE

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Autonomy means self-norms; it is the condition or quality of being autonomous; independence, self-government or the right of self-government and self-determination. Autonomy is supposed to provide a better de-centralized system of management. Therefore, it is necessary to delegate authority for the academic as well as management purposes so as to get a better autonomous structure.

Academic autonomy provides freedom to the teachers in deciding the curriculum, formulation of objectives, selection of teaching-learning resources and evaluation of the student learning outcomes.

Autonomy means the right to regulate institutions in all areas of its management, under the status set by the government, Indian University Board and University Grant Commission. There are two observations regarding granting autonomy to universities. In the first case, universities are denied autonomy and are made to function under official control. Political pressure politicizes all the matters of academics and administration from admission of students to the appointment of teachers leading to sustained pandemonium and total turmoil in the institutions.

Institutional autonomy: Freedom in learning situations

Institutional autonomy provides freedom to the administration as well as the teachers to govern the system of any institution in an organized manner. The institution gets complete right to undertake the work expected by community and they support only if freedom of choice and action is provided. However, this does not exempt the public interest, nor does it mean that policies should not be under review by themselves and by others.

Purpose and Need of Institutional Autonomy

The purpose of institutional autonomy is the selection of staff and teachers based upon their academic credentials, prior knowledge and experiences in their subject and pedagogy. The pay scales and the environmental conditions of employment requires government approval and the individuals posted to a higher level of authority they may even require government approval.

The students are admitted on the basis of advice of UGC but the decision of acceptance and rejection of candidates based upon the entrance test or their course content knowledge that is to be done by the institution only.

Red tapism in the organization and Institutions hampers the pace of decision making execution of decision and planning of further growth. Universities apply all their efforts just to fulfill the official formalities and in teaching the tendency of innovations and experiments is curbed. Curriculum becomes a limitation and very

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often it remains to be useless, outdated and impractical. It is hardly rationalized and restructured as per the need of the hour. There remains no inspiration, facilities and yearn for good, hard and commendable work. All benefits are time based and not performance based.

On the other hand, if universities are granted autonomy and are allowed to manage their matters independently, there remains no uniformity in any of the academic or administrative matters of Universities. Selfish motives bring baseless norms in institutional administration. Curriculum is either changed frequently or remains static for years. Examination and evaluation loses consistency and reliability, hence the standard of studies deteriorates. No proper use of allotted money is seen or funds may not be used in desired manner or for the intended purposes.

Looking at the causes of problem it may be noted that due to misuse of power due to non-sincerity and lack of honesty is the foremost reason of the crisis. On the other hand, the politics of the vote, Anarchy and mess in the campuses due to political motives, frequent changes in government and subsequently in the administration also make the situation bad to worse. Fanatic and groundless ambitions of high placed officers and politicians also add manual to the problem.

To find a workable solution to the problem status of autonomy may be provided along with the set of accountability. Freedom to administer internal affairs should have checks and balances from the concerned authorities. UGC should ensure that the curriculum and research work in university should be of high or International standard. The jurisdiction of UGC in fixing the minimum qualification should be maintained along with the universities, as far as the rights of selection and promotion of teachers is concerned. Examination and evaluation should have more precision, transparency and objectivity; and lastly the academic and administrative bodies should work independently in close cooperation with each other.

9.2.1 Individual/Student Autonomy

Autonomy is the inner enforcement of one's actions that are derived from oneself and are one's own. When autonomous, student's goals and action flow out of an internal stimulus a sense of volition and an experience of choice.

Student Autonomy

Student autonomy is a form of management in which students have the right to decide the internal control. The main objective of the autonomy is primarily to create conditions of young people in self-interest of the individual, society and the state in protecting the rights of students.

The Sheffield Hallam provides a definition of learner autonomy that starts with the premise that an autonomous learner takes responsibility of his or her own learning. It can be achieved through:

- Identification of learning goals and the processes to evaluate the learning level of the students.

- Development of concepts of learning for enhancement of their knowledge.
- Provides wide variety and scope for the development of learning approaches and skills.
- Organization of better learning objectives for their overall development of personality.
- Organization of learning strategy.
- Enhancement of information processing skills by conducting brain storming sessions and analytical skills.
- Development of inquiry based approach and motivational skills in the students.

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How to Enhance Autonomous Learning Environment?

The following steps can help to enhance the autonomous learning environment.

- Protect the rights and legitimate interests of students, both inside the school and outside.
- Provide the execution of student's obligations and promoting harmonious development of personalities of students, forming the organizational and leadership skills of students.
- The activities of the bodies of students self-administration is focused on the improvement of the educational process, quality of education, forming of students' culture, increasing of the social activity and the responsibilities for assigned tasks of student youth.
- Within its powers to encourage the students in the practical realization of human rights and freedoms.
- Students are full and equal members of the School .The members of the student self- government shall plan its activities and bring them to life taking into account the fundamental role of student clubs The priority of the student self-government is to expand students' participation in activities, create independent student councils, student exchange and projects on partnership with teachers and students of other schools.

The main functions of the bodies of student's self-government are:

- To provide and to protect the rights and interests of students, in particular towards the organization of the educational process.
- To provide execution students obligations.
- To promote educational, scientific and creative activities of students.
- To assist creation of the proper conditions of living and rest of students.
- To assist the activities of the different types of student's associations.
- To organize cooperation with students of the other schools and youth organizations.

- To take part in the realization of the mission and vision of the school.
- To involve students into amateur performances.

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In order to prepare the students, so that they can operate autonomously, it is important for them to develop an approach so as to manage their learning procedure as well as themselves and their relationships in different ways so that they can maximize their ability to succeed in their academic life. This can be encapsulated intuitively in the notions of personal effectiveness; reflections on the nature and degree of personal autonomy; and informed agency in the context of a complex academic environment. For many students, this can be seen as and involving capability in relation to different demand and challenges presented by different learning experiences and goals.

Specifically, this will involve the student to develop effective study planning problem-solving time and project management skills demonstrating focus and resilience being able to balance social work and learning needs thereby enhancing the self-enhancement and evaluation of learning procedure.

Example of Student Autonomy

Indian Springs School, Alabama, United States

The mission of Indian Springs School is to develop in students a love of learning, a sense of integrity and moral courage, and an ethic of participatory citizenship. Inspired by the motto Learning Through Living, the school is a community of talented boarding and day students and dedicated faculty committed to the belief that in learning to balance individual achievement with the values and principles of democracy, the student can develop to his or her full stature.

Indian Springs is very unique in that we run the school as a small town with a student government that reflects our belief that student involvement is critical to the running of the school. In accordance with the school's Constitution, students have real authority to effect change through the Student Government.

The student government is headed by the Mayor, who along with six Commissioners and the Judiciary, meet weekly to tackle issues, embracing our motto of "Learning Through Living". Student self-governance is at the heart of Indian Springs School and its traditions. Elections for student government are held in the middle and at the end of each year, following speeches given at a Town Meeting. Our student government consists of several offices:

Mayor: The duty of the mayor is to provide leadership for the community 'in building a greater understanding of the aims and purposes of the community'. He or she is also responsible for running student government meetings, making sure that the commissioners are doing their jobs, leading Town Meetings, and dealing with problems within the community.

Commissioners of Protection: The Commissioners of Protection ensure everyone's safety while at school. In addition to enforcing the rules in the Read

and Heed, they serve, along with the proctors, as the student leaders in the dormitories.

Commissioners of Recreation: The Commissioners of Recreation provide entertainment on campus, including after-school and weekend activities. They also organize Student Concerts, and recreational activities on D-Day, the school's semi-annual day of service.

Commissioners of Services: The Commissioners of Services's main responsibility is to run the Student Store throughout the day. They also put up the flag every morning.

Commissioners of Citizenship: The Commissioners of Citizenship find speakers and organize projects for D-Day (the school's semiannual day of service), and they keep the students informed of any service projects around the school and community. They also organize orientation at the beginning of the year and are involved with Washington Day Camp.

Commissioners of Education: The Commissioners of Education run the tutoring system, as well as the book sale. They also sit in on Academic Committee meetings and help students with any problems they might have in the classroom.

Class Representatives: Class representatives or the monitors in the school premises; represent their class and sections in which they are studying. They are the individuals who represent their grades in student government meetings, organize class activities and class trips, and help their classmates with any problems they might have.

Judiciary: With self-government comes responsibility for self-discipline. The Judiciary is a group of students that hear the cases of students who have received 'records' and decide what punishment or discipline the student should receive. Only extreme violations of school policy are dealt with by the administration without the judiciary.

The student self-government, an organization that is by definition representative of the entire student community, should be playing a key role in promoting the Bologna Process, both in the student community and in organs of the higher education institution. However, we must not overlook other organizations, such as scientific, artistic, tourist, sports and other associations created by students at the various higher education institutions. Many of these associations find partners abroad, thus, developing the cultural infrastructure of mutual contacts, exchange and cooperation among European higher education institutions. The Bologna spirit goes a long way towards encouraging initiatives of this kind. The effectiveness of efforts of student's organizations will be much enhanced if they are properly planned and consistent, if they work together with the rector and deans on institutional level, and with the conference of rectors on the national level. In Poland, one can see this kind of partnership between students and rectors as the most important element of Bologna implementation efforts.

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Check Your Progress

1. What do you understand by the term ‘autonomy in education’?
2. State the main objective of student autonomy.

9.3 TEACHER AUTONOMY

Teacher autonomy means providing freedom to the study to teach, study and learn. The teacher is considered as the controlling figure in the educational system. He or she plays a critical role in the process of accommodating social change in the curriculum development process. According to the National Policy of Education, 1986, a teacher must have freedom of innovation, development of teaching-learning material, device appropriate methods of communication, activities and governing the teaching-learning process in the classroom. If a teacher has good ability and quality, they can transmit the same to the students and help them in the creation of the nation.

Education is the only process to achieve the desired goals. It is a tripolar process that includes the teacher, curriculum and learning material. According to the Secondary Education Commission or Mudaliar Commission in 1984, the most important factor in the contemplative educational reconstruction is the teacher, his personal qualities, educational qualification and his professional training and place that he occupies in the school as well as the in the process of communication. The reputation of the school and its influence on the life of community invariably depends upon the kind of teacher working in it.

The socio-cultural ethos of the society is reflected in the National policy of Education, 1986. It is said that no one can rise above the level of the teachers. For that, the government and the community play a very important role in the overall development of the child’s personality. Teacher autonomy is therefore, essential to ensure better teaching and learning environment and addresses individual differences. As much as the learner requires space, freedom, flexibility and learning environment the teacher also requires the same.

It is essential to encourage an atmosphere that facilitates collaborative efforts of the teachers. Teacher autonomy is essential for personal and professional growth and development and improvement, so that autonomous teacher seek out opportunities over the course of his career for developing further. Teacher’s autonomy and professional independence is a process of social construction, wherein the teachers support and develop groups that act as teacher-learner pools of diverse knowledge, experience, equal power, and autonomous learning. When the teachers are provided autonomy in their profession it enhances the status of the teacher as well.

Meaning and Definition of Teacher Autonomy

Teacher autonomy is defined by the ability to control one's own teaching. Teacher autonomy means providing freedom to study, learn and teach without any kind of interference from higher authority so that the teacher can perform his or her role and duty without any fear.

According to Smith (2001), six very comprehensive characteristics of teacher's autonomy are as follows:

- Self-directed professional individual with professional competence and skills
- Capacity for self-directed professional action and development
- Freedom from control over professional actions and directive activities
- Self-directed professional development and teaching strategies
- Capacity for self-directed professional development

Need of Teacher Autonomy

The concept of teacher autonomy is essential because of the following reasons:

- Teacher autonomy is essential to ensure a learning environment that should address children's diverse needs.
- Teacher autonomy is driven by a need for personal and professional improvement; so that an autonomous teacher may seek out opportunities over the course of his/her career to develop further.
- An autonomous teacher feels personal responsibilities, attends workshops & come up with new classroom ideas.
- Teacher autonomy refers to the ability to develop appropriate skills, knowledge & attitude for oneself as a teacher, in cooperation with other.
- The teacher should have the freedom to innovate, to devise appropriate methods of communication & activities relevant to the need & capabilities of the concerns of the community.
- Autonomous teacher feel more confident with virtual learning environment.
- Teacher autonomy is necessary in order to be able to respond to student needs, interests and motivation and individualize our approach.

Teacher's role in promotion of own autonomy

The teacher can promote his or her autonomy himself or herself. Some suggestions to promote the autonomy of teacher are as follows:

- Teacher should read a lot to be familiar with current subjects.
- Teacher should be able to observe themselves and their methods of teaching.
- They must co-operate with others.

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- Teachers must be open to criticism.
- Teacher should make notes at the end of lesson and evaluate them.
- Feedback by students may be given to the teacher.
- They should be given the opportunity to develop his own autonomy.
- Teacher should observe each other to give feedback (peer observation).
- A very careful lesson plan is required.
- One should be aware of his good and bad points or qualities.

Thus, teacher autonomy plays a major role in the development of the country. It is necessary to provide autonomy to the students as well as the teachers to innovate and devise new learning methodologies so as to serve the diverse needs of the learners according to the different environmental conditions.

Check Your Progress

3. Why is education considered as a tripolar process?
4. What are the six main characteristics of teacher autonomy?

9.4 ANSWERS TO CHECK YOUR PROGRESS QUESTIONS

1. Autonomy in education means the right to regulate institutions in all areas of its management, under the status set by the government, Indian University Board and University Grant Commission.
2. The main objective of the student autonomy is primarily to create conditions of young people in self-interest of the individual, society and the state in protecting the rights of students.
3. Education is considered as a tripolar process because it includes the teacher, curriculum and learning material. Education is the only process which can be used to achieve the desired goals.
4. The six main characteristics of teachers autonomy are as follows:
 - (a) Self-directed professional individual with professional competence and skills
 - (b) Capacity for self-directed professional action and development
 - (c) Freedom from control over professional actions and directive activities
 - (d) Self-directed professional development and teaching strategies
 - (e) Capacity for self-directed professional development

9.5 SUMMARY

- Autonomy means self-norms; it is the condition or quality of being autonomous; independence, self-government or the right of self-government and self-determination.
- Academic autonomy provides freedom to the teachers in deciding the curriculum, formulation of objectives, selection of teaching-learning resources and evaluation of the student learning outcomes.
- Autonomy means the right to regulate institutions in all areas of its management, under the status set by the government, Indian University Board and University Grant Commission.
- Political pressure politicizes all the matters of academics and administration from admission of students to the appointment of teachers leading to sustained pandemonium and total turmoil in the institutions.
- Institutional autonomy provides freedom to the administration as well as the teachers to govern the system of any institution in an organized manner.
- The students are admitted on the basis of advice of UGC but the decision of acceptance and rejection of candidates based upon the entrance test or their course content knowledge that is to be done by the institution only.
- The institution gets complete right to undertake the work expected by community and they support only if freedom of choice and action is provided.
- The purpose of institutional autonomy is the selection of staff and teachers based upon their academic credentials, prior knowledge and experiences in their subject and pedagogy.
- On the other hand, if universities are granted autonomy and are allowed to manage their matters independently, there remains no uniformity in any of the academic or administrative matters of Universities.
- Autonomy is the inner enforcement of one's actions that are derived from oneself and are one's own.
- The student self-government, an organization that is by definition representative of the entire student community, should be playing a key role in promoting the Bologna Process, both in the student community and in organs of the higher education institution.
- Student's autonomy is a form of management in which students have the right to decide the internal control.
- The main objective of the student autonomy is primarily to create conditions of young people in self-interest of the individual, society and the state in protecting the rights of students.

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- Teacher autonomy means providing freedom to the study to teach, study and learn. The teacher is considered as the controlling figure in the educational system.
- Education is the only process to achieve the desired goals. It is a tripolar process that includes the teacher, curriculum and learning material.
- Teacher's autonomy is therefore, essential to ensure better teaching and learning environment and addresses individual differences.
- Teacher's autonomy is essential for personal and professional growth and development and improvement, so that autonomous teacher seek out opportunities over the course of his career for developing further.
- Teacher autonomy means providing freedom to study, learn and teach without any kind of interference from higher authority so that the teacher can perform his or her role and duty without any fear.
- It is necessary to provide autonomy to the students as well as the teachers to innovate and devise new learning methodologies so as to serve the diverse needs of the learners according to the different environmental conditions.

9.6 KEY WORDS

- **Academic autonomy:** It refers to an autonomy which provides freedom to the teachers in deciding the curriculum, formulation of objectives, selection of teaching-learning resources and evaluation of the student learning outcomes.
- **Institutional autonomy:** It refers to an autonomy which provides freedom to the administration as well as the teachers to govern the system of any institution in an organized manner.
- **Student autonomy:** It refers to a form of management in which students have the right to decide the internal control.
- **Teacher autonomy:** It refers to a form of autonomy which provides freedom to study, learn and teach without any kind of interference from higher authority so that the teacher can perform his or her role and duty without any fear.

9.7 SELF ASSESSMENT QUESTIONS AND EXERCISES

Short-Answer Questions

1. What do you understand by the term 'student autonomy'?
2. Write a short note on institutional autonomy.

3. Why are universities not given the status of autonomy?
4. What is the main purpose of institutional autonomy?
5. What are the main functions of bodies of student's self-government?

Freedom for Innovation

Long Answer Questions

1. Discuss the importance of autonomy in education.
2. Analyse the steps which can be taken to achieve the status of learner autonomy.
3. Interpret the importance of teacher autonomy in educational institutions.
4. How can autonomous learner's environment be improved? Discuss in detail.
5. Explain the concept of teacher autonomy.

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9.8 FURTHER READINGS

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UNIT 10 ALTERNATIVE SCHOOLS

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Structure

- 10.0 Introduction
- 10.1 Objectives
- 10.2 Alternative Schools: An Introduction and Dalton Plan
 - 10.2.1 Dalton Plan
 - 10.2.2 Winnetka Plan
 - 10.2.3 Howard Plan
 - 10.2.4 Plantoan Plan
- 10.3 De-Schooling and Ivan Illich: Important Ideas
 - 10.3.1 Learning Resources and Non-Classroom Learning
- 10.4 Answers to Check Your Progress Questions
- 10.5 Summary
- 10.6 Key Words
- 10.7 Self Assessment Questions and Exercises
- 10.8 Further Readings

10.0 INTRODUCTION

Alternative schools are designed with a curriculum and methods of education which are informal and are set up in a non-traditional manner. The American educator, Helen Parkhurst introduced the concept of Dalton Plan which aimed at reforming the manner of usual classroom management. It is a method of education in which pupils work at their own pace and receive individual help from the teachers.

The Winnetka Plan was developed as an educational experiment which aimed at expanding the educational focus to creative and emotional and social development of the children. The plan divided the subjects into 'common essentials' and 'creative group activities'. De-schooling refers to a method of education in which children are taught outside the formal environment of the schools.

In this unit you will learn about the concept of alternative schools. The Howard programme and Daltons Plan have been explained in detail. The unit will also discuss the vision of the Winnetka Plan and the concept of de-school. The importance of learning resources has also been analysed in the unit.

10.1 OBJECTIVES

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

- Discuss the concept of alternative schools
- Explain the benefits of Dalton Plan
- Analyse the aims of Winnetka Plan and Howard Plan

- Discuss the concept of de-schooling
- Interpret the importance of learning resources

10.2 ALTERNATIVE SCHOOLS: AN INTRODUCTION AND DALTON PLAN

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We will in this section discuss about the concept of alternative school and Dalton Plan.

The alternative schools are majorly designed to incorporate educational, behavioural, or medical needs of children and adolescents which are difficult to address in traditional school environment.

Alternative education has long been an option for students who would be better served in a non-traditional academic setting, from the founding of schools by leaders in the Transcendentalist movement up to the arrival of Montessori schools in 1907 and the development of magnet schools in the 1960s.

Today, the concept of alternative education has become broader. In fact, forty-three different state school systems have their own formal definition of alternative education, though these programmes are typically for middle and high school students who need additional services outside of what can be provided in a traditional school setting or would benefit from different scheduling or instructional formats than what's found in your typical school day.

The needs served by alternative schools are as diverse as their student bodies. There are alternative schools and educational programs for:

- Students with behavioural or emotional difficulties and problems.
- Students with specialized academic interests or talents.
- Students with certain disabilities, medical needs or learning disorders.
- Students who are at risk for dropping out or have dropped out.
- Students who have been suspended or expelled or incarcerated student parents.

10.2.1 Dalton Plan

The Dalton Plan is an educational concept created by an American educator, *Helen Parkhurst*. The Dalton Plan was created to solve didactic organizational problems in the classroom of different ages of pupils and therefore, Parkhurst wanted to create a new system that would allow each pupil to have an educational program adapted to his needs, interests, and abilities. Educator, Roel Roehner wrote in his book 'Dalton is neither a method nor a system'.

The main advantage of the Dalton Plan is its flexibility, enabling its application to all subjects. Through discussion we get complete clarification regarding his ideas and the plan of procedure.

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The Dalton Plan education should be associated with autonomous and progressive style of education. Professor Karel Rýdl claims, 'The Dalton Plan enables us to make children active in an extreme way and it is "a way of life or an interpretation of life"'.

World Dalton schools in Sydney, Tokyo, Nagoya and New York successfully raise the level of education in their countries. They are especially famous for their reputation, for their organization of education and modern technology.

According to author, Stein, 'The leading educators from the public and private schools including the universities and from different states of America, visit Dalton on regular basis to observe the education system, so that they can learn more about the school's recognized achievements in the technology.'

The Dalton Plan has already influenced learning processes in many schools all around the world because of its suitability to every school environment. In another word, the Dalton organization is not fixed to any national curriculum.

Main Dalton rules and principles

Helen Parkhurst tried to create such a system where a pupil would not be only a passive receiver of a piece of information which is told to him or her but also an active one who would use especially responsibility for his behaviour and be free. The prominent features of the Dalton Plan are responsibility, self-reliance, cooperation. Parkhurst herself considered that the main principles of the Dalton Plan freedom of work and cooperation. (R. Roehner, *How Actual is Dalton?*)

Pupils themselves stand at the centre of an educational process, which has probably been the strongest value of the Dalton plan. Roel Roehner, the Dutch Dalton educator, defines the conditions of an effective education. He especially stresses on the importance of safety, respect, feeling of competency and feeling of independency: Children must have the feeling of being safe, children must have the feeling to be competent, children must have the feeling of being independent.

Roel Roehner, whose Dalton teaching practice spans more than 30 years, takes security as an absolute pre-condition for successful education. In this context Roehner pertinently uses a well-known Bertrand Russell quotation: 'What human beings really want is not knowledge but security'. (R. Roehner, *The Effect Of International Contacts*)

Freedom and Responsibility

Helen Parkhurst saw freedom as 'the first principle of the Dalton Laboratory Plan'. The idea of freedom incorporates a chance for a pupil to study on his own. Freedom is expressed as 'the possibility and necessity to make decisions and be responsible for them'.

The most significant aspect of the Dalton Plan is the fact that the pupil is responsible for his or her own work and his or her future development. A child is taught to understand that learning is their own responsibility.

A renowned educator, Hans Wenke who puts the Dalton principle into a new context changes the term ‘freedom’ into the term responsibility. Wenke observed that:

- It is necessary to give children responsibility.
- It is also necessary to make them responsible.

10.2.2 Winnetka Plan

The Winnetka plan was started up as an educational experiment which incorporated the idea of individualized learning. The Winnetka Plan was developed in 1919 under the leadership of an American educator and reformer, Carleton Washburne in the elementary school of Winnetka, III, U.S.

Children participating in the Winnetka Plan may undertake many activities at once. The curriculum is set up in two sections: the common essentials-wherein the grade work is divided into specific tasks to be learned by each child individually and through creative activities that includes- art, music, crafts, drama and physical activities. In this section, the students are free to move on as soon as they master their skills. On the other hand, the second section had no achievement standards.

The Winnetka Public Schools is a community that honors the whole child, fosters creativity, inspires lifelong learning, and develops civic responsibility.

Vision

The Winnetka public schools community empowers every student to flourish in an innovative, experiential environment. We support and challenge all learners to actively engage in continual growth and achievement to make a meaningful difference in the world. The following values are taught in the Winnetka public schools:

- Reflection
- Life-long Inquiry
- Whole Child
- Civic Responsibility
- Student Voice
- Creativity and Innovation
- Collaboration
- Meaningful, purposeful, and experiential learning

10.2.3 Howard Plan

The Howard Plan programme helps the students in the following ways:

- By individualizing the instructions and providing children, a supporting learning environment thereby, improving their reading, language, arts and mathematical skills.

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- Development of mutual respect and supportive learning system for the students and keeping the class size small.
- The parents and the staff monitor the progress of the student daily thereby, providing ample amount of opportunities to the students so that the get experience of community service as well.

10.2.4 Platoon Plan

Let us discuss some of the features of the Platoon plan.

- Once one school in a community has been started on the plan it ‘sells itself’, that is, the plan is adaptable to any type of community.
- It enables each school system to have an individuality of its own.
- This not only increases the capacity of the school but greatly enriches the school life of the children.
- It is not necessary that a city be industrial or crowded in order to have this plan –the plan lends itself to any kind of community.
- The academic work does not suffer but, on the contrary improves under this plan; and that education seems to be catching in the schools that have adopted this plan.

Check Your Progress

1. State the main advantage of Dalton Plan.
2. What are the prominent features of Dalton Plan?

10.3 DE-SCHOOLING AND IVAN ILLICH: IMPORTANT IDEAS

The concept of de-schooling was developed by Ivan Illich, a Croatian-Australian philosopher which ensures that the idea of self-learning in the child is provided to the child by the parents and relatives in the school itself. A child is taught in the comforts of his or her own home and is known as homeschooling. The benefit that a child gets from homeschooling is that the child can learn as much as he or she wants to while sitting at home. This method also saves time as well as money.

The most important benefit of de-schooling is that the child does not have to rush to the market to buy textbooks or learning material, as families can teach the child in their own way and they therefore, find de-schooling as a better option than school. It is also useful if a child is suffering from stress, anxiety or bullying at school. This helps the child to learn at their own pace as child does not to have to suffer from the stress of examination.

It also helps in providing an aim to the child. De-schooling is useful for the students with low IQ level and feels less confident among his or her classmates. The child can comfortably discuss his or her problems related to studies with the parents. He or she can learn by any methodology as it serves individual differences as well. The child can be taught in multiple ways at the same time.

Advantages of de-schooling: Arguments for de-schooling society

The following are the advantages listed below of de-schooling:

- Provides opportunity for self-learning.
- Naturalistic learning is possible.
- Child can learn at his or her own pace.
- Enhances family relationships.
- Saves time and money.
- Builds up self-esteem and self-confidence.
- Learning can happen anywhere, at any place.
- Provides opportunity to learn by self-discovery.
- Saves child from stress, anxiety and examination fear.
- Keeps the parents updated about the performance of the child.
- Helps the parents in diagnosing the strengths and weaknesses of the child.

Building family relationships and boosting the child's self-esteem are far more important. One will also find that parents themselves need to 'de-school'.

One must get past the idea that learning only happens in a classroom or during the duration of 40-minute periods. Education does not start at nine o'clock in the morning or stop in the afternoon. It is also not necessary that students must be taught using books and notebooks.

In a sense everything which children do is educational, from the time they wake up until the time they go to sleep. More formal learning can also happen in different ways, depending on the child and the circumstances.

Even in the early stages of home education, one can look out for 'teaching moments'. This happens when one child is interested in a topic and asks questions. This is a cue to provide resources, if he or she wants them. Then, parents can help them develop the skills which he or she needs to research his or her own answers. One must encourage their children to explore topics in any direction he or she likes. Learning can take place without any need to write the experience down.

Conclusion

Ivan believes that it is false to claim that most of the learning is the result of teaching. On the contrary, the teacher in a modern school is in fact acting in three roles as a custodian of society rituals, as therapist and as a preacher. He also proposes that

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instead of learning in a society where skill training is widely available and devastated of the ritualistic elements of schooling, and where citizens freely associate to develop a critical education, perhaps guided by Masters. He sees in model schools a false myth of Salvation.

He also points out to the fact that however, much amount of money is poured into public school in it always requires more and more and the outputs do not increase. It is thus, chasing the myth of unlimited progress. He sees educational credentials as an element in which one gets credential to enter on the next level but credential does not measure competence so much as the attendance at a school.

His analysis of manipulative institutions is therefore, concerned to eliminate spontaneous relating to the point where all relationship are programmed and managed it sadly all too evident in the recent promotion of technologies of control-talking CCTV, use of surveillance technologies which would not be out of place in top security prisons being used completely routinely in schools, and the school instruments of control which obtain the end by manipulating the criminal justice system parenting.

10.3.1 Learning Resources and Non-Classroom Learning

The increased influence of different forms of media, especially television, the Internet as well as Internet communication system along with the intense development of Science and Technology has reflected and paved the way for a society as a whole to improve its growth and development this has not only increase the rate of development of the society but also had involved the sphere of education. This is why it has become one of the reasons for students as opposed to those of twenty or even ten years of age who have different interest, priorities and views on education and educational process. They want education that is fun, dynamic and different, such as the digital images on television or websites.

Before the development of technology, the teaching process only included the lecture method which used only a chalk and blackboard to write the teaching learning material. The entire speech raised the most important asset in the teachers work, however, in the existing times; it is difficult to imagine teaching children without the use of different modern teaching and learning resources. These resources are beneficial not only for students but also for the trainee teachers for their own overall development of the personality. The teaching learning material has revolutionized the way of learning thereby, improving the learning capabilities of the student, enhancing their learning abilities and thus, making the teaching learning process much more effective and interesting for the students.

The contribution of the teaching learning material aids the teacher in the organization and quality of conducting the session in the classrooms. Teaching learning resources includes audio-visual aids, chalk, duster, marker, pen, text-books, books and any material that can help the child in the improvement of its learning ability.

Conclusion

It is easy to access different teaching and learning resources that can be used in the teaching learning classrooms. We are reminded of the fact that primarily by using the textbooks brimming with various teaching learning resources we can enhance the learning ability of the students. However, quality teaching is not determined by using various teaching and learning process instead by the success of students in academic and co-academic areas. When a teacher encourages the student to gain knowledge, profile different skills and accept and adopt positive attitude and values they enhance the complete education system, it is essential for the development of the nation.

In order to achieve the potential tasks of teaching and learning resources, it is essential to evaluate and analyse the teaching beliefs which is only possible by determining the advantages and disadvantages of learning resources.

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Check Your Progress

3. What is the most important benefit of de-schooling?
4. What are the advantages of de-schooling?

10.4 ANSWERS TO CHECK YOUR PROGRESS QUESTIONS

1. The main advantage of the Dalton Plan is its flexibility, enabling its application to all subjects.
2. The prominent features of the Dalton Plan are responsibility, self-reliance, cooperation.
3. The most important benefit of de-schooling is that the child does not have to rush to the market to buy textbooks or learning material, as families can teach the child in their own way and they therefore, find de-schooling as a better option than school.
4. The following are the advantages listed below of de-schooling:
 - (a) Provides opportunity for self-learning.
 - (b) Naturalistic learning is possible.
 - (c) Child can learn at his or her own pace.
 - (d) Enhances family relationships.
 - (e) Saves time and money.
 - (f) Builds up self-esteem and self-confidence.

- (g) Learning can happen anywhere, at any place.
- (h) Provides opportunity to learn by self-discovery.
- (i) Saves child from stress, anxiety and examination fear.

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10.5 SUMMARY

- The alternative schools are majorly designed to incorporate educational, behavioural, or medical needs of children and adolescents which are difficult to address in traditional school environment.
- Alternative education has long been an option for students who would be better served in a non-traditional academic setting.
- The Dalton Plan is an educational concept created by an American educator, *Helen Parkhurst*. It was created to solve didactic organizational problems in the classroom of different ages of pupils.
- The main advantage of the Dalton Plan is its flexibility, enabling its application to all subjects. Through discussion we get complete clarification regarding his ideas and the plan of procedure.
- The Dalton Plan education should be associated with autonomous and progressive style of education.
- The Dalton Plan has already influenced learning processes in many schools all around the world because of its suitability to every school environment. In another word, the Dalton organization is not fixed to any national curriculum.
- Helen Parkhurst tried to create such a system where a pupil would not be only a passive receiver of a piece of information which is told to him but also an active one who would use especially responsibility for his behaviour and be free.
- Parkhurst herself considered that the main principles of the Dalton Plan freedom of work and cooperation.
- Pupils themselves stand at the centre of an educational process, which has probably been the strongest value of the Dalton plan.
- Roel Roehner, the Dutch Dalton educator, defines the conditions of an effective education. He especially stresses on the importance of safety, respect, feeling of competency and feeling of independency.
- Helen Parkhurst saw freedom as ‘the first principle of the Dalton Laboratory Plan’. The idea of freedom incorporates a chance for a pupil to study on his own.

- The most significant aspect of the Dalton Plan is the fact that the pupil is responsible for his or her own work and his or her future development.
- A renowned educator, Hans Wenke who puts the Dalton principle into a new context changes the term ‘freedom’ into the term ‘responsibility’.
- The Winnetka plan was started up as an educational experiment which incorporated the idea of individualized learning.
- Children participating in the Winnetka Plan may undertake many activities at once. The curriculum is set up in two sections.
- The Winnetka Public Schools is a community that honors the whole child, fosters creativity, inspires lifelong learning, and develops civic responsibility.
- The Winnetka public schools community empowers every student to flourish in an innovative, experiential environment.
- The concept of de-schooling was developed by Ivan Illich, a Croatian-Australian philosopher which ensures that the idea of self-learning in the child is provided to the child by the parents and relatives in the school itself.
- The most important benefit of de-schooling is that the child does not have to rush to the market to buy textbooks or learning material, as families can teach the child in their own way and they therefore, find de-schooling as a better option than school.
- Ivan believes that it is false to claim that most of the learning is the result of teaching. On the contrary, the teacher in a modern school is in fact acting in three roles as a custodian of society rituals, as therapist and as a preacher.
- The contribution of the teaching learning material aids the teacher in the organization and quality of conducting the session in the classrooms.
- It is easy to access different teaching and learning resources that can be used in the teaching learning classrooms.
- In order to achieve the potential tasks of teaching and learning resources, it is essential to evaluate and analyse the teaching beliefs which is only possible by determining the advantages and disadvantages of learning resources.

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10.6 KEY WORDS

- **Alternative school:** It refers to a type of school in which the curriculum and method of teaching children are set up in a non-traditional environment.
- **Dalton Plan:** It refers to a plan which aimed at providing a balance between the child’s special needs and talents with the needs of the community.

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- **De-schooling:** It refers to a method of teaching in which a child is taught in an informal environment.
- **Winnetka plan:** It refers to a plan which focused on individualized ungraded learning and in this method; the curriculum was set up in two different sections.

10.7 SELF ASSESSMENT QUESTIONS AND EXERCISES

Short-Answer Questions

1. Why are alternative schools set up?
2. How did Hans Wenke viewed Dalton method?
3. List the benefits of the Howard programme.
4. How is the curriculum divided in the Winnetka plan?
5. What are the main of principles of Dalton Plan?

Long-Answer Questions

1. Discuss the concept of alternative schools.
2. Explain the importance of Dalton Plan in the education system.
3. Discuss the vision and importance of Winnetka plan.
4. What are learning resources? Discuss in detail.
5. Analyse the concept of de-schooling.

10.8 FURTHER READINGS

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Mota, Ronaldo and David Scott. 2014. *Education for Innovation and Independent Learning*. United Kingdom: Elsevier.

UNIT 11 DISTANCE EDUCATION

Structure

- 11.0 Introduction
- 11.1 Objectives
- 11.2 Distance Education: An Introduction
 - 11.2.1 Teacher Trainees Beliefs
 - 11.2.2 Types of Distance Education
- 11.3 Distance/Correspondence Education and its Need
 - 11.3.1 Different Formats and Innovative Elements
- 11.4 Answers to Check Your Progress Questions
- 11.5 Summary
- 11.6 Key Words
- 11.7 Self Assessment Questions and Exercises
- 11.8 Further Readings

NOTES

11.0 INTRODUCTION

The Educational Communications and Technology, defined distance education as the institution based formal education where the learning group is separated and interactive communication systems are used to connect the learners, resources and instructors.

Distance education or distance learning programmes deliver the education and teaching learning resources without much cost to the students, thus, providing them flexible learning environment. In order to obtain distance education, the students need not to be present physically in the traditional classroom settings rather the student can learn from the material provided by the universities.

Distance education provides access to learning when the source of information and the learners are separated by time and distance, or both. However, the distance education courses that require a physical on-site presence of the teacher for any reason (including taking examinations) are referred to as hybrid or blended courses.

In this unit, you will discuss the meaning of distance education, its types and importance. The importance of teacher trainee beliefs and its forms have also been highlighted. The unit will also explain the different formats and innovative elements of correspondence courses.

11.1 OBJECTIVES

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

- Discuss the meaning of distance education
- Explain the teacher trainee beliefs and its forms

- Interpret the types of distance education
- Analyse the need of distance education
- Explain the various formats and innovative elements of distance education

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11.2 DISTANCE EDUCATION: AN INTRODUCTION

Open and distance learning programmes have played a revolutionary role in the enhancement of teaching and learning programmes. The major role in the online education system has been credited to the teachers for enhancing the teaching learning resources and using them for updating the knowledge level of the students. The online learning system has been initiated since 1960s by United Nations Relief and Works. These programmes addressed the need for educating the children belonging to refugee region.

During the first decade of 21st century Open and Distance Learning (ODL) emerged as a national initial teacher education and training programme in both the developing as well as developed countries. It has been adopted as a potential solution to a range of teacher education issues, from cost and supply to access, diversity and quality.

Majorly ODL are being treated as one of the best strategy to achieve the World Forums Education for All and the United Nations Millennium Development Goals.

Distance education has two major components:

1. Distance teaching
2. Distance learning

Distance teaching is the efforts of the educational institutions to design develop and deliver the instructional experiences to the distant student so that learning occurs. Education and distance education is therefore, comprised of teaching and learning.

Pre Service Teacher Education

In the present times, it has been observed that the teaching learning programmes in the schools is very mechanical and result oriented. It is not able to make student beliefs, skills and personality of the kind which will enable them to perform their roles in their job, family and other spheres appropriately.

The root cause for this has been traced to the lack of educational level among teacher trainees. Where does the teacher acquire knowledge and skill of reflection? Is it the family or the training institute? When the teacher education institution takes the task of preparing teachers, it is their responsibility to train the teacher trainees in the skill of teaching.

The trainee before entering the teacher education institution already has some beliefs on ‘teaching’, ‘learner’, ‘evaluation’, ‘curricular content’, ‘classroom environment’. These beliefs are reinforced and shaped by the teacher education institution through active engagement in its curricula.

11.2.1 Teacher Trainees Beliefs

Much of the teacher’s beliefs come from their own experience as students. Through their own experience as students, they have formed unconscious beliefs about themselves and their abilities, about the nature of knowledge, and about how knowledge is acquired or learned.

Teacher’s beliefs are a part of subjective reality. The beliefs are formed of what they believe is real and that is true for them. Their beliefs guide their decision-making, behavior, and interactions with students and, in turn, create an objective reality in the classroom, what students experience as real and true.

Different Forms of Trainee Teacher Beliefs

Teachers beliefs about students include what it means to be a student, how students should relate to teachers, and the impact of student differences on classroom practice and culture. The common teacher beliefs have been discussed as follows:

- **Teachers beliefs about learning, classroom and students:** It will affect everything that they do in the classroom, whether these beliefs are implicit or explicit. We can only be really effective teachers if we are clear in our minds what we mean by learning, because only then can we know what kinds of learning outcomes we want our learners to achieve. Teaching well also means learning well to some extent, and teaching beliefs will impel them to adopt different teaching-learning methods. When teachers believe that teaching well primarily depends on making school work interesting, they will reject as irrelevant parts of the course that focus on reading to learn.
- **Beliefs about Student Activities:** Educators, Holt-Reynolds also predicted about the student teacher beliefs that that many prospective teachers believe that the academic tasks as well as the activities as less important for learning than the oral or written text that presented to the learner in the form of the content to be learned. Activities other than listening to lectures or reading might be seen as ‘frills’, nice things to do if there is time but not critical for learning.
- **Teachers beliefs about themselves:** Teachers hold beliefs about themselves, who they are in relation to curriculum, colleagues, and students, perceived strengths and weaknesses, values, and matters about which they feel responsible. These beliefs may be domain specific; teachers may hold beliefs about who they are as instructors that are different from their beliefs about themselves as classroom managers or content experts. These beliefs

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may be hierarchically organized in a way that a teacher may believe they are experts in their fields and they are strong instructors, but they struggle with classroom management.

A lot of teacher trainees perceive their teaching subjects as intellectually challenging and more closely aligned to their personal interest, hence, the trainees gets no relevance of teaching practice to their interest except in its assessment import on their grade point average. They believe that teaching is transmission of knowledge only. Close monitoring, adequate pacing, classroom management as well as clarity of presentation, are some of the main beliefs which teacher trainee believes are essential for student achievement.

Factors Influencing Teacher Trainees Beliefs

The following factors influence teacher trainee beliefs:

- Teacher's beliefs, practices and attitudes are very important to understand and improve the educational processes. Teacher's trainees, as adults, have already formed professional identity about their profession which are linked with their experiences of teaching and associated beliefs about learners, themselves as teachers and of the teaching-learning process.
- A teacher's beliefs are based on the prior experiences they faced as a student, the incidents happened in the classroom and outside the classroom environment.
- We learn most from our friend circle and the kind of environment we are surrounded by. Observation Learning has powerful influence on formation of beliefs, values and opinions about the teaching and learning process.
- Some teachers believe that teaching is transmission of timeless facts, that learning sole depends on teaching and that learning is acquisition of knowledge. These are preconceptions influencing teacher and learners interactions in the classroom environment.

Historical Development

While distance learning may seem like a relatively new phenomenon, given its increased popularity in the online format, in reality people have been taking courses offered by non-local instructors for hundreds of years. Some of the earliest distance learning on record dates back to 1728 and offered to teach students how to write in short hand through lessons sent to their home weekly. These simple, practical lessons were commonly taught through the mail throughout the 1700's and 1800's and allowed anyone to gain valuable job skills even if they lived well-away from major centers of education and commerce.

11.2.2 Types of Distance Education

The mode of distance education has two major types, mentioned as follows:

1. Synchronous mode of distance education

Through the synchronous mode of distance education programmes, learning is provided through conventional methods of teaching. Therefore, this method of teaching and learning resembles the traditional classroom based teaching learning methodology despite the participants being located remotely. This methodology of teaching requires the organized development of the timetable.

The different modes of distance education includes Web conferencing, television, instructional television and direct broadcast satellite based technology, it also includes the use of Internet radio, live streaming , telephone and Web based VoIP. The rough synchronous mode of distance education participants can get distance education theories their flexible timings and can learn at their own pace and comfort.

2. Asynchronous mode of distance education

Mail correspondence is the oldest form of distance education system. This is the asynchronous delivery of distance education as there are message forums, email, video and audio recordings.

When these two methods are combined they offer a blend of technologies and a blend of learning modalities that includes face to face distance and hybrid and all under the rubric of distance learning and education.

Distance learning also uses interactive radio instruction, interactive audio instruction, online virtual worlds, digital games, webinars and web casts.

Check Your Progress

1. What are the two main components of distance education?
2. What are some of the main trainee teacher beliefs?

11.3 DISTANCE/CORRESPONDENCE EDUCATION AND ITS NEED

Distance education is defined as an independent study which consists of various forms of teaching-learning arrangement, in which teachers and learners carry out their essential tasks and responsibilities apart from one another communicating in a variety of ways.

Its purposes is to provide free education on campus to all the internal learners in appropriate class placing or pattern, to provide off campus or external learners

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with the opportunity to continue learning in their own environment and develop in all the learners the ability to carry on self-directed learning that is the ultimate majority required for all the educated individuals.

Educator, Moore opined that distance teaching may be defined as the family of instructional methods in which the teaching behavior, including those that are in contiguous situation would be performed in the learner's presence. The communication between the teacher and learner is facilitated by Print electronic or other media device.

Another renowned educator, Peters (1973), defined distance education as a method of imparting knowledge skills and attitude to the learners which is rationalized by the application of division of labor and organizational principle as well as by the extensive use of technical media, especially for the purpose of reproducing high quality material, which makes it possible to instruct great number of students at the same time wherever they live and construct the knowledge it is an industrial form of teaching and learning experiences that is to be provided to the students.

Educator, Holmberg (1981), defines distance education as the kind of education which cover various forms of education at all the levels which are not under continuous immediate supervision of tutor present with the study in the lecture rooms on the same premise, but which benefit from the guided and tuition of a tutorial organization.

Need of Distance Education

Distance education programmes are most effective when they include careful planning and consistency among the courses. These courses are periodically reviewed and evaluated to ensure the quality and consistency with the curriculum currency and advancement of the student learning outcomes. It is important that the faculty who are engaged in the delivery of distance learning courses to take the advantage of appropriate professional developmental experiences.

Faculty must ensure that the incentives and reward for distance learning course development and delivery are clearly defined and understood. An assessment plan has to be adapted or developed in order to achieve the effectiveness continuity and sustainability of the assessment procedure. Course outcome assessment activities are to be integrated in the assessment plan. Learning activities must be organized around demonstrable learning outcomes embedded in the course components.

The development of content for distance learning courses must comply with the copyright law. The medium chosen to deliver the distance education courses or programmes must be pedagogically effectual, accessible to all the students and receptive to different learning styles and sensitive to the time and place limitation of the students.

Faculty members involved in the content development must be beware of the Institutions policies with regard to the content ownership. The institution must provide the appropriate sport services for the distance education students so that the equivalent services are provided for its on campus students. It is important to provide the appropriate developmental experiences for the faculty members who are engaged in the delivery of distance learning resources and management of distance learning education providing the students with different learning experiences.

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Distance education is thus, needed because of the following reasons:

- Increased access to learning as well as training opportunities.
- Increased opportunities for updating, retaining and personal enrichment.
- Improved cost effectiveness of educational resources.
- Support the quality and variety of educational structures.
- Enhance Co-operative capacity.
- Balance the inequalities between all the age groups.
- Extend geographical access to education.
- Delivery of educational campaigns and other education for educational resources.
- Providing speedy and efficient training for the people of all the age groups.
- Expanding the capacity of education in new and multidisciplinary subjects.
- Offers the combination of education with family and work life.

Scope of Open and Distance Education Programmes

The scope of distance education programmes can be summed up in the following points:

- Informatics education and digital literacy.
- Professional development of teachers as well as faculty members.
- The provision of pre-service and in-service teacher education so as to enable the teacher educators to use and contribute for the development of digital resources including professional learning network.
- Enhancement of professional development among the teacher trainees.
- Integration of Information and Communication Technology (ICT) knowledge and practice with other vocational and professional education.
- The use of computer is training methods was to deliver the professional and vocational education.
- The ongoing professional development and lifelong learning programmes of ICT practitioners.

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- Establishment of models for Informatics curricular, training programmes, and teaching methodologies.
- Promotion of ongoing education for ICT professionals and doors in the workplace whose employment involves the use of information communication and technology.
- Consideration of relationship between ICT and the curriculum students.
- Examine the impact of ICT on the whole educational environment so as to enhance the teaching and learning process.

11.3.1 Different Formats and Innovative Elements

We will discuss about the formats and innovative elements of distance education in this section.

- **Audio based distance education:** Audio based instruction for teacher education includes radio broadcast, interactive radio instruction, one and two way audio instruction and increasingly podcast. Like print based education, radio broadcast have been directly connected with the teachers. Content is created for the learners, and formal teacher learning occurs outside the classroom. The advantages of using audio based distance education resources are as follows:
- **Highly scaffold just-in-time professional development:** Radio provides structured, in class, job embedded teacher professional development. Teacher and student can react both verbally as well as physically to the prompts, commands, questions, and exercises posed by the different radio characters. The approach is highly behaviorist, overtime teachers, through ongoing the playoff broadcast call learn how to perform a set of instructional activities properly.
- **Use of formative assessment:** The evaluation procedure becomes easier and it occurs as a part through the process of audience research during piloting faces and through periodic interviews, observations.
- **Multimedia based distance education:** Multimedia based distance education is extensively used to support the student learning outcomes has been historically used less for the teacher learning, that disparity is now changing. In particular, at this point of time digital learning games have been completely overlooked as a teacher learning tool. Yes multimedia offers a wide range of benefits to all the learners as well as teachers as well as open and distance education learning programmes so as to enhance the teaching learning process.

First, the combination of text, audio, video, colour, animation, and various other ways of learning afforded by the multimedia are effectively used to address the needs of the teachers as well as individual differences among the learners so as

to inculcate motivation for the teaching learning process. Multimedia helps both the teacher as well as the student. It helps the student in learning the material in a proper way as well as the teacher in updating their knowledge and enhances the teaching learning process. The different kinds of teaching learning resources that are being used as a multimedia for distance education programme are as follows:

- (a) CD ROMs, DVDs and VCD
- (b) Group teaching and learning software
- (c) Web based models- web 2.0 Technology
- (d) Immersive environment
- (e) Virtual Worlds
- (f) Multi user virtual environment

Conclusion

Teacher education is an important anterior wherein distance education has been used extensively to promote the pre-service teacher preparation, up-gradation of academic qualification and in-service continuing professional development, especially for the subject, content area and instructional material. Many examples, particularly from both the developing as well as developed countries shows that the teacher training institution at a distance may reach a large number of teachers as well as the student and have an profound impact on the development of national education system. Distance education plays an important role during this decade in helping to address the issues of growing shortage of teachers education, administrator and other educational professionals experience in both the developing and developed countries. There is a growing number of high quality web and professional development resources available for the educator globally. These web based professional development resources available offer online degree programmes and courses for the educator across the globe which has been exponentially rising in the recent years.

Distance education has also played a major role in up-gradation of knowledge and skills of the teacher educators both in the higher education system as well as in schooling, research and educational agencies. Weber stitching facility helps the teacher in up-gradation of the knowledge and skills in the areas of new technology tools for learning in order so that they may infuse this technology in the courses they offered to the future teachers.

Finally, distance education and the new tools for learning act as a massive catalyst for changing teaching practices, the roles of teachers as well as the students as a part of an overall strategy for system exchange of the educational system to reflect the current knowledge on human learning and to help the educational system to be more responsive towards the local as well as national needs and so the global trend.

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Check Your Progress

3. Why is assessment plan developed in distance education?
4. What are the various forms of multimedia used in distance education programmes?

11.4 ANSWERS TO CHECK YOUR PROGRESS QUESTIONS

1. The two main components of distance education are distance teaching and distance learning.
2. Close monitoring, adequate pacing, classroom management as well as clarity of presentation, are some of the main beliefs which teacher trainee believes are essential for student achievement.
3. An assessment plan has to be developed in distance education in order to achieve the effectiveness continuity and sustainability of the assessment procedure. Course outcome assessment activities are to be integrated in the assessment plan.
4. The various forms of multimedia used in distance education programmes are as follows:
 - (a) CD ROMs, DVDs and VCD
 - (b) Group teaching and learning software
 - (c) Web based models- web 2.0 Technology
 - (d) Immersive environment
 - (e) Virtual Worlds
 - (f) Multi user virtual environment

11.5 SUMMARY

- Open and distance learning programmes have played a revolutionary role in the enhancement of teaching and learning programmes.
- The major role in the online education system has been credited to the teachers for enhancing the teaching learning resources and using them for updating the knowledge level of the students.
- During the first decade of 21st century Open and Distance Learning (ODL) emerged as a national initial teacher education and training programme in both the developing as well as developed countries.

- Distance teaching is the efforts of the educational institutions to design develop and deliver the instructional experiences to the distant student so that learning occurs.
- Much of the teacher's beliefs come from their own experience as students. Through their own experience as students, they have formed unconscious beliefs about themselves and their abilities, about the nature of knowledge, and about how knowledge is acquired or learned.
- Teacher's beliefs are a part of subjective reality. The beliefs are formed of what they believe is real and that is true for them.
- Teachers beliefs about students include what it means to be a student, how students should relate to teachers, and the impact of student differences on classroom practice and culture.
- A lot of teacher trainees perceive their teaching subjects as intellectually challenging and more closely aligned to their personal interest, hence, the trainees gets no relevance of teaching practice to their interest except in its assessment import on their grade point average.
- Close monitoring, adequate pacing, classroom management as well as clarity of presentation, are some of the main beliefs which teacher trainee believes are essential for student achievement.
- Teacher's beliefs, practices and attitudes are very important to understand and improve the educational processes.
- A teacher's beliefs are based on the prior experiences they faced as a student, the incidents happened in the classroom and outside the classroom environment.
- Through the synchronous mode of distance education programmes, learning is provided through conventional methods of teaching.
- Mail correspondence is the oldest form of distance education system. This is the asynchronous delivery of distance education as there are message forums, email, video and audio recordings.
- Distance education is defined as an independent study which consists of various forms of teaching-learning arrangement, in which teachers and learners carry out their essential tasks and responsibilities apart from one another communicating in a variety of ways.
- Distance education programmes are most effective when they include careful planning and consistency among the courses.
- Faculty must ensure that the incentives and reward for distance learning course development and delivery are clearly defined and understood.
- An assessment plan has to be adapted or developed in order to achieve the effectiveness continuity and sustainability of the assessment procedure.

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- Faculty members involved in the content development must be beware of the Institutions policies with regard to the content ownership.
- Audio based instruction for teacher education includes radio broadcast, interactive radio instruction, one and two way audio instruction and increasingly podcast.
- Multimedia based distance education is extensively used to support the student learning outcomes has been historically used less for the teacher learning, that disparity is now changing.
- Teacher education is an important area where in distance education has been used extensively to promote the pre-service teacher preparation, up-gradation of academic qualification and in-service continuing professional development, especially for the subject, content area and instructional material.
- Distance education play an important role during this decade in helping to address the issues of growing shortage of teachers education administrator and other educational professionals experience in both the developing and developed countries.
- Distance education has also played a major role in up-gradation of knowledge and skills of the teacher educators both in the higher education system as well as in schooling, research and educational agencies.

11.6 KEY WORDS

- **Distance education:** It refers to an independent study which consists of various forms of teaching-learning arrangement, in which teachers and learners carry out their essential tasks and responsibilities apart from one another communicating in a variety of ways.
- **Distance teaching:** It refers to the efforts made by the educational institutions to design develop and deliver the instructional experiences to the distant student so that learning occurs.
- **Synchronous mode of distance education:** It refers to a mode of distance education programmes in which learning is provided through conventional methods of teaching
- **Trainee teachers beliefs:** It refers to beliefs which a teacher has about students, such as what it means to be a student, how students should relate to teachers, and the impact of student differences on classroom practice and culture.

11.7 SELF ASSESSMENT QUESTIONS AND EXERCISES

Short-Answer Questions

1. What is pre-service teacher education?
2. Why is distance education a necessary form of education?
3. What are the factors which influence trainee teacher beliefs?
4. What are the different types of formats in distance education?
5. How has distance education changed the teaching practices?

Long-Answer Questions

1. Explain the concept of distance education.
2. Discuss the common trainee teacher beliefs in detail.
3. Analyse the types of distance education.
4. Discuss the scope of distance education programmes.
5. Why is teacher education an important part of distance education? Explain in detail.

11.8 FURTHER READINGS

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BLOCK - IV
SYSTEM APPROACH, LANGUAGE
LABORATORY AND NETWORK

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UNIT 12 SYSTEM APPROACH

Structure

- 12.0 Introduction
- 12.1 Objectives
- 12.2 Instructional Design and its Functions: Developing the Model
 - 12.2.1 System Approach
 - 12.2.2 Phases or Steps of System Analysis
- 12.3 Criteria for Evaluating System Analysis Project
 - 12.3.1 Application of System Analysis in Education
- 12.4 Answers to Check Your Progress Questions
- 12.5 Summary
- 12.6 Key Words
- 12.7 Self Assessment Questions and Exercises
- 12.8 Further Readings

12.0 INTRODUCTION

Instructional design is defined as the process in which creation of learning experiences and materials take place in such a way that acquisition of knowledge and skills take place. A system can be defined as a collection of interrelated parts which constitutes a larger whole.

The systems approach provides a basis to the learning and teaching solutions which is related to the development of modern education. System approach must be planned, designed, developed, installed and managed so that it can yield great results in the field of education.

In this unit, the meaning of instructional design and system approach has been discussed in detail. The procedure and the steps of system approach have been explained. The unit will also help you to analyse the criteria to evaluate the system approach of a project.

12.1 OBJECTIVES

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

- Discuss the functions of instructional design
- Explain the concept of system approach

- Analyse the procedure of system approach
- Discuss the criteria related to the evaluation of system analysis projecton
- Explain the uses of system analysis in the field of educat

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12.2 INSTRUCTIONAL DESIGN AND ITS FUNCTIONS: DEVELOPING THE MODEL

Instructional design is concerned with an application of modern skills and techniques for the requirement of education and training. It includes facilitation of learning by manipulation of media, methods and the control of environment so far as this reflects on learning.

Functions of Instructional Design

Instructional design provides the scientific basis for the instructional system. It develops the professional skill and efficiency of teachers. The sequence of teaching acts or events that a teacher plans, organizes and carries out to create a learning environment for the students is called instructional design. Instructional design is created because of the following reasons:

- The instructional task is analysed for the structure of content.
- Learners responses are analysed in terms of objectives and level of learning. The entry behaviours of the students are studied and appropriate stimuli are given for better performance.
- Teaching strategies, techniques and approaches are selected by the teachers for presenting the content so that the desired learning structure results.
- The performance of student is assessed to find out if the objective of learning has been realized.

Instructional design is therefore, concerned with the structuring of the content to create a suitable learning environment, the selection of appropriate teaching strategies and methods, and the assessment of the performance level of the students. The different phases in instructional design are as follows:

- Stimulating motivation
- Informing the learners the objectives of learning
- Gaining and directing attention
- Enhancing retention and transfer
- Providing learning guidance
- Eliciting performance
- Providing feedback
- Assessing performance
- Reviewing the process on the basis of assessment

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When a teacher designs his or her instructional hours, he or she should be conscious of the need to motivate the students not only at the beginning of the class but right through, whenever the opportunity arises. Through motivation, attention is sought, and the teacher adopts several ways to maintain it. Some of these steps may include listing the objective of learning for a particular topic, enhancing retention of material learnt during the class by active questioning and providing feedback on the responses given by the students. The questions should not only aim at recall responses but also include reflective thinking, reviewing, generalizing and reasoning. Selected instructional aids and media can also be used for better learning outcomes. The learning experiences thus, provided may be assessed for replanning the instructional design.

12.2.1 System Approach

The special meaning of the term 'systems' and such related terms as 'systems concept', and 'systems approach' and 'systems analysis', emerged during and after World War II as a result of research and development in problem solving, efficiency analysis and most important, the development of complex man-machine systems.

A classic example of this is the development of combat aircraft during World War II. In building such aircraft, designers realized that they could not simply take an existing airplane and add communications and detection equipment, weapons, bomb and fuel storage space. Adding such equipment at random restricted the plane's carrying capacity, range of flight, and other vital functions. Thus, a new methodology of planning and development emerged, in which designers learned that they first had to identify the purpose and performance expectations of the system before developing the component parts of the whole system. It is the system as a whole - and not its separate parts - that must be planned, designed, developed, installed and managed. What is really important is not how the individual components function separately, but the way they are integrated into the system to achieve its goal.

The concept of system analysis has emerged during Second World War. It has greatly influenced management decision making in business, industry, government and military. Known by several terms, system analysis had gained considerable standardization.

Meaning of System Analysis

The word system has been derived from the field to engineering. A system is the sum total of agents working independently and dependently together to achieve the required goals. The term 'system' conveys the meaning of analysis and development.

The term 'system analysis' emerged from the scientific management concept. In general, it involves utilization of scientific mathematical techniques applied to

organizational operation as a part of management decision making activities. It assumes that no comprehensive system development can take place without prior system analysis. It enables the administrators to use more scientific and quantitative methods for analyzing management problems.

The field of educational administration is becoming with the set quantitative-scientific techniques that helps the educational administrators in the decision making process. System technology brings to educational management a scientific-quantitative approach for solving complex educational administrative problems.

The system analyst gives a system development project meaning and direction. A candidate system is approached after the analyst has a thorough understanding of user needs and problems. A viable solution is worked out and then communicates the same. Candidate systems often cut across the boundaries of users in the organization. For example, a billing system may involve users in the sales order department, the credit department, the warehouse and the accounting department. To make sure that all users' needs are met, a project from that represents each user works with the analysis to carry out a system development project.

12.2.2 Phases or Steps of System Analysis

The following steps must be utilized for conducting system analysis study:

- **First Step: Formulation of objectives:** To formulate the specific objectives to be achieved. To state objectives in general terms an objective may be written in behavioral terms of fiscal functions.
- **Second Step: Review of System operation:** It includes a comprehensive review of the system operation. System analysis is problem-oriented. It is necessary to understand the system operation. The administrators do not always understand the main problem. Comprehensive review of the whole system is necessary to isolate the main problem to be solved.
- **Third Step: Collection of data:** The review of system for identifying the main problem yields the data within the problem area. It involves the statistical techniques and procedure. In many situations, the aspects of system analysis are the application of classical statistical procedure.
- **Fourth Step: Analysis of data:** It is done to make data meaningful. It is employed to experimental paradigms to study the effect of independent variable upon dependent variable. An objective analysis is made for determining the influence of variables. The investigator is concerned with interaction of many variables. This primary concern is to obtain correlation not to establish cause and effect.
- **Fifth Step: Isolation of the problem:** In order to isolate specific problem of the system, it is necessary to follow earlier steps. The collection and analysis of data helps in identifying and defining the problem.

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- **Sixth Step: Specify operations in the problem:** After identifying the specific problem, it is necessary to review the operations within problem area. It is much more comprehensive than the original review of the total operations. It helps to understand the relationship of all facts of the problem to the total operation system.
- **Seventh Step: Block Diagram:** In the final step, the problem is in the analytical stage of the system analysis; a block diagram is prepared for all functions of the sub-system that make up problem area. It denotes logical structure of the sub-system operations and similar to the block diagram.

Procedure of System Analysis: Selecting and Designing

We will in this section discuss the procedure of system analysis.

1. **Design:** After the system analysis, the investigator attempts to design and tentative solution of the problem. A new solution of the problem is subjected to testing. A tentative solution and retesting the tentative solution continues until an analyst reaches to an optimal solution. Once optimal solution is obtained, the analyst departs that loop.
2. **Evaluation:** The formal evaluation of the new solution is made for checking out its workability. It involves implementation of tentative solution in some aspect of the system. The analyst proceeds through the same steps of loop as mentioned earlier. It is advisable to evaluate all new system solutions in small scale of the required operations.
3. **System operations:** The new design has been implemented within the system for formal evaluation and acceptance for the solution of the problem. It involves two aspects-
 - (a) It is concerned with implementation of new system operations.
 - (b) It requires the maintenance of the system where a new system is designed. It continues as monitory of the system in order to check the effectiveness of the system.

In designing the system there are four functions that need to be accomplished. They are as follows:

- (a) Selection and organization of the content
- (b) Selection and organization of the learning experiences
- (c) Managing the learners
- (d) Evaluation

Let us now discuss these aspects in detail.

- **Selection and organization of the content:** Most subjects provide unlimited scope for choice of content. Selection is, therefore, a decision-making operation demanding a sound rational basis. Characterization

of the learning task is a primary basis for content selection as is information on the type of learning represented by a task.

For example, in the field of foreign languages, appropriate considerations affecting and influencing the selection of content include frequency of occurrence, availability of the item, its flexibility of expression and its learnability. The content selected has to be in line with the academic achievement and aptitude of each individual. The span and type of interest of the learner, his needs, his ability to comprehend the abstract or concrete and the specific level and style of his learning must also be considered. This rationale emphasizes the need for available alternatives in the content.

- **Organization must follow selection:** The most important strategies here are sequencing, arrangement and presentation. Two factors determine the sequences:
 - (a) The type of learning that a learning task represents and
 - (b) The notion of a logical sequence.

The characterization of certain learning tasks should be established. Within the domain of a subject matter, learning tasks that represent response learning should be pursued before tasks of the chain or multiple-discrimination type. The learning of specific concepts should precede the learning of any principle comprised of these concepts. Problem solving cannot be attempted until the principles to be used in the solution of the problem are established or mastered.

Within the realm of a specific kind of learning, tasks should be further ordered in a logical sequence. The designer should determine what should be known by the learner to undertake the learning of this specific task. To supply this information, arrangement of the learning priorities can be constructed. These learning priorities will state, for example, that the learning of task A is prerequisite to the learning of task \hat{A} and the learning of task \hat{A} to task \tilde{N} etc.

The arrangement of course content is a complex operation which requires appraisal of the compatibility of content units with the types and amount of learning that a selected content requires. Presentation is the final phase in the selection and organization of the content. During this operation the content selected as a result of the strategies described above, will be integrated into specific learning sequences, and specific learning units to be presented for the next phase of instructional systems development.

- **The management of learners:** It is process of identifying and affecting the functions that keep the learner participating productively in the learning activities. In developing a design for management of the learner's adequate data about the learner is needed to introduce short term and long-term incentives and to meet the individual requirements so that he

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can be kept optimally involved in learning. This management also includes the design of procedures and strategies to provide the teacher with an appropriate selection of suitable curriculum alternatives.

- **Monitoring of the learner and of the system:** It poses a continuous inquiry into the learner's achievements and into the effectiveness and efficiency of the system. More specifically, the designer of the system must find answers to the following questions. On the basis of the progress the learner is making, is he likely to attain his terminal objectives? If not, what adjustments ought to be made? Are the functions provided by the system the best to achieve the system's goals. What are some of the shortcomings? It could be by pursuing these inquiries and monitoring the learner and the system continuously.

Check Your Progress

1. State any one use of system analysis.
2. What are the two main aspects of system analysis?

12.3 CRITERIA FOR EVALUATING SYSTEM ANALYSIS PROJECT

Performance, cost, utility and time are included in any evaluation system. The total system should operate in an optimal fashion. These criteria are as follows:

1. **Performance:** The effectiveness of a system evaluated on the basis of performance. The design of the problem solution ascertains how far the new system is effective in achieving the objectives. The performance criterion is the concept of validity of the new system. The system is valid if it does what it is supposed to do. Thus, much of the evaluation of the performance is quantitative.
2. **Cost:** Analysis of system is influenced by cost function. The amount of resources is put into the system function in terms of money, staff and facilities. Comparisons are made regarding the investment resources in the new and old system of education. This is valuable criterion for evaluation system analysis projects.
3. **Utility:** The ultimate criterion for evaluating system project is utility of the system. The return on investment represents the utility of a given function. Many educational functions require an assignment of a numerical utility.
4. **Time:** Time factor as an evaluative criterion is closely associated with effectiveness. It is particularly relevant criterion in evaluating system projects. There is high correlation between time and cost. Much of the contribution of modern electronic data processing involves time.

12.3.1 Application of System Analysis in Education

The purpose of the system analysis is to get the ‘Best environment in the best place, for the best people, at the best time and in the best price’. ‘The system approach in instruction is an integrated, programmed complex of instructional media, hardware and personal whose components are structured as single unit with a schedule of time and sequential phasing’.

The system analysis greatly influences the educational administration and organization. It provides scientific and quantitative basis for studying the problems of educational system. The educational implication of system analysis has been found in the following areas of education:

1. **Approach:** It brings to educational management a scientific-quantitative approach for solving complex education administrative problems.
2. **Problems:** It enables educational administrator to identify the actual problem and abstains a verified solution of the problem.
3. **Training:** The training programmes can also be improved with the help of system analysis. The new concept of management may be implemented in training programs.
4. **Sub-systems:** The sub-systems of education are analysed to understand the actual problem and tentative solutions can be verified or tested on a segment of the system.
5. **Change:** Any change in the educational system can be brought objectively, empirically and economically with great utility with the help of system analysis.

Conclusion

The basis of a system for learning is its purpose from which systems objectives can be derived. From this the designer has to determine the variables to be learned to ensure the attainment of these pre-stated objectives.

Input competence for the learner can be assessed to see if he has already acquired capabilities relevant to his learning task. The differential analysis of learning tasks as opposed to input competence provides a set of actual learning experiences. Once the learning tasks have been identified and characterized the design of the system can commence.

It is essential to consider the functions of the system to ensure the mastery of learning tasks. Functions have to be distributed among components; decisions made on this basis lead to the design of the system. After evaluation and training for the system, installation should follow. Finally, the feedback gained from output testing and system monitoring is used to introduce adjustment and improvements in the system.

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Check Your Progress

3. How is analysis of system influenced by cost function?
4. What is the main use of system analysis?

12.4 ANSWERS TO CHECK YOUR PROGRESS QUESTIONS

1. It enables the administrators to use more scientific and quantitative methods for analysing management problems.
2. The two main aspects of system analysis are as follows:
 - (a) It is concerned with implementation of new system operations.
 - (b) It requires the maintenance of the system where a new system is designed. It continues as monitor of the system in order to check the effectiveness of the system.
3. Analysis of system is influenced by cost function. The amount of resources is put into the system function in terms of money, staff and facilities. Comparisons are made regarding the investment resources in the new and old system of education.
4. The system analysis greatly influences the educational administration and organization. It provides scientific and quantitative basis for studying the problems of educational system.

12.5 SUMMARY

- Instructional design is concerned with an application of modern skills and techniques for the requirement of education and training.
- Instructional design provides the scientific basis for the instructional system. It develops the professional skill and efficiency of teachers.
- Instructional design is therefore, concerned with the structuring of the content to create a suitable learning environment, the selection of appropriate teaching strategies and methods, and the assessment of the performance level of the students.
- When a teacher designs his or her instructional hours, he or she should be conscious of the need to motivate the students not only at the beginning of the class but right through, whenever the opportunity arises.
- The concept of system analysis has emerged during Second World War. It has greatly influenced management decision making in business, industry, government and military.

- A system is the sum total of agents working independently and dependently together to achieve the required goals. The term 'system' conveys the meaning of analysis and development.
- The term 'system analysis' emerged from the scientific management concept. In general, it involves utilization of scientific mathematical techniques applied to organizational operation as a part of management decision making activities.
- System technology brings to educational management a scientific-quantitative approach for solving complex educational administrative problems.
- The system analyst gives a system development project meaning and direction. A candidate system is approached after the analyst has a thorough understanding of user needs and problems.
- After the system analysis, the investigator attempts to design and tentative solution of the problem.
- The formal evaluation of the new solution is made for checking out its workability. It involves implementation of tentative solution in some aspect of the system.
- Most subjects provide unlimited scope for choice of content. Selection is, therefore, a decision-making operation demanding a sound rational basis.
- The characterization of certain learning tasks should be established. Within the domain of a subject matter, learning tasks that represent response learning should be pursued before tasks of the chain or multiple-discrimination type.
- Within the realm of a specific kind of learning, tasks should be further ordered in a logical sequence.
- The arrangement of course content is a complex operation which requires appraisal of the compatibility of content units with the types and amount of learning that a selected content requires.
- The management of learners is a process of identifying and affecting the functions that keep the learner participating productively in the learning activities.
- The effectiveness of a system evaluated on the basis of performance. The design of the problem solution ascertains how far the new system is effective in achieving the objectives.
- Analysis of system is influenced by cost function. The amount of resources is put into the system function in terms of money, staff and facilities.
- The ultimate criterion for evaluating system project is utility of the system. The return on investment represents the utility of a given function.
- Time factor as an evaluative criterion is closely associated with effectiveness. It is particularly relevant criterion in evaluating system projects.

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- The system analysis greatly influences the educational administration and organization. It provides scientific and quantitative basis for studying the problems of educational system.
- The basis of a system for learning is its purpose from which systems objectives can be derived. From this the designer has to determine the variables to be learned to ensure the attainment of these pre-stated objectives.
- Input competence for the learner can be assessed to see if he has already acquired capabilities relevant to his learning task.
- The differential analysis of learning tasks as opposed to input competence provides a set of actual learning experiences.
- Functions have to be distributed among components; decisions made on this basis lead to the design of the system.

12.6 KEY WORDS

- **Instructional design:** It refers to a design which is concerned with an application of modern skills and techniques for the requirement of education and training.
- **System:** It refers to the sum total of agents working independently and dependently together to achieve the required goals.
- **System analysis:** It refers to analyses which involve utilization of scientific mathematical techniques applied to organizational operation as a part of management decision making activities.

12.7 SELF ASSESSMENT QUESTIONS AND EXERCISES

Short-Answer Questions

1. Why is instructional design created?
2. What are the different phases of instructional design?
3. Write a short note on the role of a system analyst.
4. What are the various steps involved in the process of system analysis?
5. Why is the arrangement of course content a complex operation?

Long-Answer Questions

1. Discuss the concept of system approaches.
2. Interpret the procedure of system analysis.

3. 'It is essential to consider the functions of the system to ensure the mastery of learning tasks'. Explain the statement.
4. Discuss the function related to the designing of system operations.
5. Analyse the criteria related to the evaluation of system analysis project.

System Approach

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12.8 FURTHER READINGS

- Linton, Ralph. 1998. *The Cultural Background of Personality, Volume 1*. United Kingdom: Routledge.
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UNIT 13 LANGUAGE LABORATORY

NOTES

Structure

- 13.0 Introduction
- 13.1 Objectives
- 13.2 Language Laboratory and its Need
 - 13.2.1 Need and Equipment in Language Laboratory
- 13.3 Method of Providing Training and Language Operation Procedures
 - 13.3.1 Advantages of the Language Laboratory
- 13.4 Audio Cards, CCTVs, Compact Disc, Tele-Lecture and Tele-Conferencing
- 13.5 Answers to Check Your Progress Questions
- 13.6 Summary
- 13.7 Key Words
- 13.8 Self Assessment Questions and Exercises
- 13.9 Further Readings

13.0 INTRODUCTION

The word ‘laboratory’ originated in the late 15th century. It refers to a specific structure or a room for mixing chemicals and preparing medicines by science experts. Scientists used to follow structured steps to perform their experiments and research purpose. With the progress of science few types of mechanical and electronic equipments were added to this structure.

Later on this structure was introduced for teaching-learning process. Any learner can develop one’s subject knowledge practically in controlled conditions. Observe and improve through own experience is the key concern of any laboratory. Today specific requirements of subjects and technology have changed the form of laboratories. It has transcended the boundaries of various subjects. Nowadays laboratory is been used by engineering and language students as well. Popularly it is abbreviated as lab.

In this unit, we will understand the concept of language laboratory and its need. The uses of a laboratory, the points to be considered while constructing a laboratory and criteria related to the equipments in a laboratory have been discussed. The unit will also help you to analyse the advantages of a laboratory and the various forms of media which are used in a laboratory.

13.1 OBJECTIVES

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

- Discuss the meaning and importance of language laboratory
- Analyse the importance of language laboratory

- Interpret the steps to be considered while constructing a laboratory
- Explain the criteria related to equipment in a laboratory
- Discuss the methods related to training for working in a language laboratory
- Analyse the advantages of a language laboratory
- Discuss the various forms of communication modes used in a language laboratory

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13.2 LANGUAGE LABORATORY AND ITS NEED

We will in this section discuss the meaning and importance of language laboratory.

A language laboratory is a classroom or other area containing electronic and mechanical equipment designed and arranged to make foreign-language learning more effective than is usually possible without it.

Language laboratories may be very broadly classified into two groups according to the way they fit into the school's plan of operation. One group includes all class systems; according to this plan of operation, laboratory work is scheduled by classes. The second group includes all library systems; according to this plan of operation, laboratory work is conceived as comparable to library work, students attending at their own convenience, or scheduled at times unrelated to their language class meetings. Functional and budgetary considerations make, it necessary that many different features in many different physical arrangements be available to either type of system. So that the reader may become generally familiar with typical installations, a representative system from each group is described here, and some common terms are defined.

In both class and library systems, students sit at tables, and may be partially isolated from one another by dividing partitions. The space allotted to a single student is called a student position or student station; if dividing partitions are used, the resulting semi closed-individual space is called a booth.

Change is the law of nature. With the needs of time, a number of changes in the methods and processes of language teaching in schools as well as in the training in the colleges of education. It has been resulted on account of the some or other innovations introduced recently in the task of teaching of the student and training of the pupil teachers.

13.2.1 Need and Equipment in Language Laboratory

The study of language is not possible without a laboratory. The student can obtain proper and complete knowledge of the subject when the student works in the laboratory by himself, observes and based on these, he or she deduces conclusions and reaches the result. The word, 'laboratory' word is used for large room where practical classes are conducted.

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The aims and objectives of language cannot be achieved without laboratory. There should be no distinction in practical and theoretical work in fact both should complement each other.

The objectives of laboratory work and the learning outcomes of laboratory experience are as follows:

- Awakening and maintenance of curiosity in the environment
- Illustration and verification of abstract ideas
- Development of skills, using hearing booths, console and adviser's booth
- Control Room
- Prepare students for higher studies and careers
- Develop habit of speaking, reading, writing and listening
- Have a clear understanding of concept
- Improve observation and critical thinking

Language Laboratory Construction

A good laboratory should be designed in keeping in view the following points:

- It must be spacious so that students can work and moved easily
- Quite and conducive for hard work
- Should have fresh air, ventilation, light and heat
- Flexible for effective teaching and demonstration
- Must permit teachers supervision
- Storage space for chemicals and equipment's
- Must have water, gas and electric points
- Emergency exit
- Must have hearing booths, console booth and control room

Planning for infrastructure

The following points must be considered while constructing a biology laboratory.

- The number of pupils working at a time
- Minimum space required for each pupil
- Place for storage
- Complete teacher supervision
- Each student can see the demonstration
- Blackboard is visible to each student
- Master switches for water, gas and electricity
- Available finance

Similarly, the following points must be considered while constructing a laboratory:

- **Location:** Preferable located at the ground floor away from playground.
- **Flexibility:** Suitable for different types of activities in language club.
- **Furniture:** Should be portable and adaptable almirah with glass panel.
- **Ventilation:** Proper ventilation should be provided exhaust fan must be provided.
- **Supervision:** The class should be in visual control of teacher.
- **Safety:** Master controls and first date should be readily available.
- **Weight bench area:** Separate area for distribution, intercom and monitoring switches
- **Pupil working area:** Enough space, acid resistant table, stool, water supply, bookshelf, wall clock and All-call switches.
- **Teacher working area:** Demonstration table with a blackboard. A fixed screen for projections, films and diagrams. Blackboard 10' x 4' dark green or brown.
- **Preparation area:** Preparations equipped with all services like light, gas, electric points, waste disposal shelving and cupboards.
- **Storage room:** Storage space for prepared materials, equipment's, apparatus, charts, and models, audio visual aids, almirah, racks and sink.
- **Reference room:** Consult books.
- **Display Board:** Arouse curiosity and stimulate interest and raise questions.
- **Fire extinguisher:** In bio laboratory there is less chance of fire. It should have 1 fire extinguisher and one fire blanket.

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Importance of a Laboratory

The following are the points which highlight the main uses of a laboratory:

- In a laboratory, the student learns different languages.
- The student learns from his or her experience. They develop the power of thinking, observation and decision-making.
- The students develop self-discipline and self-confidence.
- The student understands the topic clearly and easily.
- Favorable atmosphere is created for science teaching.
- Working collectively, they develop the spirit of sociability.

Criteria for Equipment Selection

The criteria for selecting the equipment in a laboratory has been explained in the following section.

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- **The criterion of adequate practice time:** In view of the indispensable requirement of frequent, regular practice, equipment should be provided to allow at least twenty minutes use per class day per student. This means that, considering the number of students involved and the funds and space available, it may be advisable to install equipment that is far simpler. Effective use of good materials can begin with a single tape recorder or disk playback in each classroom at any level.
- **The criterion of evaluation of progress:** In view of the nature and importance of our grading system, provision should be made for tests of speaking ability. Students cannot be expected to learn to speak the foreign language if that skill is not to be evaluated regularly by tests. This means that there must be access to several tape recorders, enough to permit testing without serious disturbance of class schedules.
- **The criterion of extended practice:** In view of the requirement of frequent, regular practice, provision should be made for more work with recorded native models than can be supplied in the presence of the teacher. This criterion of outside-of-class or homework stems again from the close analogy between learning a foreign language and learning to play a musical instrument. In neither case are we doing complete justice to the student's need for practice if we confine his efforts to the time we can afford in the presence of his teacher.

Check Your Progress

1. What are the main uses of a laboratory?
2. Why is the study of language not possible without a laboratory?

13.3 METHOD OF PROVIDING TRAINING AND LANGUAGE OPERATION PROCEDURES

A detailed consideration of the nature of language and language learning, the teaching methods consistent with it, and the kinds of teaching materials most likely to implement these methods effectively, lead to certain assumptions which are basic to the planning, use, and maximum exploitation of language-laboratory equipment. The points to be considered are as follows:

1. Optimum learning requires native or near-native models of the foreign language for imitation.

2. Optimum learning calls for frequent, regular practice with these models, with overlearning to the point of automatic behavior in the foreign language.
3. Optimum teaching emphasizes extensive imitation and memorization of authentic, productive patterns of speech, extensive structure drills designed to foster the students' powers of analogy, immediate confirmation of correct responses, and immediate correction of incorrect responses.
4. The teaching materials, therefore, must provide authentic speech patterns, arranged in some form which permits them to be used as models for imitation and memorization. The dialogue is a powerful tool for the presentation and learning of model or pattern sentences, since it emphasizes that communication ordinarily involves at least two people and teaches the appropriate grammatical structures. Each pattern sentence, of necessity, contains one or more such structures, which occur repeatedly in the language. The materials must also provide the drills by means of which the structures learned in the pattern sentences are manipulated, highlighting necessary form and order changes, in enough quantity so that the student can, by analogy, automatically extend his use of these structures by the simple substitution of new vocabulary.
5. There is usually an initial period of exclusively audio-lingual (understanding-speaking) instruction; books and other printed materials are not used, and no reference is made to the written forms of what the student is learning to understand and say. The reasons for thus, postponing the use of printed materials derive from the need to allot all available time at the beginning of the course to the difficult primary skills of understanding and speaking, and from the need to avoid interference from written symbols until a proper foundation for good audio-lingual habits has been laid. The mechanics of subsequently learning to read and write are simplified by this order of presentation, since the number of simultaneous new learning tasks is thereby reduced at every point in the instructional sequence. Explicit procedures for teaching reading and writing in an audio-lingual course are required, of course, just as a child is not expected to learn to read and write his own language by himself. After this exclusively audio-lingual period and throughout the first 350 hours of instruction, new material is presented so that the student learns to understand and speak it before dealing with its written form.
6. The audio-lingual skills can be maintained and increased only by continued practice throughout all the years of foreign-language study. The level of difficulty of audio-lingual practice materials should increase in keeping with the difficulty of the reading and writing materials.

A language laboratory has three sections:

1. **Hearing Booth:** A language laboratory has generally sixteen to twenty hearing booths. In each hearing booth, there is a chair and a table at which a student can sit and work. It is provided with the telephone connected with

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an adviser's booth, earphones and switches for selecting the tape from the control room for playing and hearing the same, allows the student to record his own voice, and provides for stopping, rewinding and replaying the tape. Each booth has four-foot high walls or partitions so that each student can work without disturbing others. The students indicate the lesson by pressing a key. If needed, he can communicate directly with the adviser and seek his or her assistance.

2. **The Console:** The Console or adviser's room has one or more tapes and special equipment to monitor any student, thereby ensuring two-way communication. The console has the following switches:
 - Distribution switches for directing the recorded programmes for the students sitting in different booths.
 - Monitoring switches for enabling the teacher to listen and interact with any student as he works with the tape. This is necessary for correcting the errors in procedure, linguistic errors and evaluating and grading the students.
 - Intercom switches for two-way communication with any individual student.
 - Group call switches for making announcements to all the students in the laboratory, who are listening to a tape.
 - All call switches for making announcements for all the students in the laboratory, regardless of the programme they are working on.
3. **Control Room:** The Control Room has all the tapes, records and other equipment's of the language laboratory properly indexed and stored so that it can be readily made available to the student upon its request.

13.3.1 Advantages of the Language Laboratory

There are some certain specific advantages related to language laboratory and are as follows:

- In a language laboratory, all students present can practice aloud simultaneously, yet individually. In a class of 30 students, 29 are not idle while one is busy.
- The teacher is free to focus his attention on three individual student's performance without interrupting the work of the group C.
- Certain language laboratory facilities can provide for differences in learning rates.
- The language laboratory provides authentic, consistent, untiring models of speech for imitation and drill.

- The use of headphones gives a sense of isolation, intimate contact with the language, equal clarity of sound to all students, and facilitates complete concentration.
- Recordings provide many native voices. Without such variety it is common for students to be able to understand only the teacher.
- The language laboratory facilitates testing of each student for listening comprehension. It has generally been impracticable for the unaided teacher to test this skill.
- The language laboratory facilitates testing of the speaking ability of each student in a class. It has generally been impracticable for the unaided teacher to test this skill.
- Some teachers, for reasons beyond their control, do not themselves have enough preparation in understanding and speaking the foreign language. The language laboratory provides these teachers with an opportunity to improve their own proficiency.
- The language laboratory makes it possible to divide a class into teacher-directed and machine-directed groups.
- Certain language-laboratory facilities can enhance the student's potential for evaluating his own performance.
- Given specially-designed instructional materials, the language laboratory can provide technical facilities for efficient self-instruction.

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Uses of Language Laboratory

The following are the main uses of language laboratory:

- To think and speak in English
- To improve phonetics skills
- To develop effective communication skills
- To develop confidence to carry out a simple conversation
- To conduct a focused discussion
- To be attentive, alert and a careful listener
- To be able to handle conflict situation with ease

Check Your Progress

3. What are the uses of a language laboratory?
4. How can we maintain audio-lingual skills?

13.4 AUDIO CARDS, CCTVs, COMPACT DISC, TELE-LECTURE AND TELE-CONFERENCING

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We will in this section discuss the various modes which can be used in a language laboratory.

Audio Cards

A sound card (also referred to as an audio card) is a peripheral device that attaches to the ISA or PCI slot on a motherboard to enable the computer to input, process, and deliver sound. The sound card's four main functions are: as a synthesizer (generating sounds), as a MIDI interface, analog-to-digital conversion (used, for example, in recording sound from a microphone), and digital-to-analog conversion (used, for example, to reproduce sound for a speaker).

The three methods of sound synthesis are through frequency modulation (FM) technology, wavetable, and physical modeling. FM synthesis is the least expensive and least effective method. Sounds are simulated by using algorithms to create sine waves that are as close to the sound as possible. For example, the sound of a guitar can be simulated, although the result does not really sound very much like a guitar. Wavetable uses actual, digitally recorded sound samples stored on the card for the highest performance. Physical modeling is a new type of synthesizing, in which sounds are simulated through a complex programming procedure. Some sound cards can also have sounds downloaded to them.

Creative Lab's Sound Blaster is the de facto standard sound card, to the extent that some people use the name as a generic term. Most sound cards in the past have been Sound Blaster-compatible, because most programmes that use the sound card have been designed that way. Sound cards were once all connected to the ISA slot. However, because connection to the PCI bus offers advantages such as improved signal-to-noise ratio and decreased demand on the CPU, sound cards being produced today are intended for use with a PCI bus.

Some sound cards, such as Diamond MX300 and Sound Blaster Live! have 3-D capabilities enabled by processors on the card that use mathematical formulas to create greater depth, complexity, and realism of sound. High quality audio can be produced through a system that uses the Universal Serial Bus (USB) and does not require a sound card. Processing is left to the CPU, and digital-to-audio conversion to the speakers.

CCTV

Understanding the immense importance of CCTV Security Cameras for video security systems, we manufacture our range using the best quality instruments. These CCTV cameras can keep a track of student, classroom, playground, reception, employees, locations, entry ways, and other areas in an efficient manner.

We offer efficiently designed high quality CCTV cameras with true to life specification factors, offering excellent video images and audio quality. we have installed new range of CCTV in various school & college.

Compact disc

If any school or educational institute is in its initial stage Multimedia Lab is for them. Apart from computer it also uses CD-ROM, a projector and a set of speakers for common and controlled listening. Multimedia is used for presenting images, audio, video and text at one place and mostly on common screen. It is very helpful for those learners who are not comfortable with computer and technology or for kids.

Characteristics of Multimedia

The following are the characteristics of multimedia:

- Use of multimedia helps to inculcate language skills in learners.
- It provides more reliable and real learning situation.
- Functionality of language is emphasized over functions of language.
- Learners get a stream line learning of language which provides command over target language.

Teleconferencing and Tele-lectures

With the development of computer technology, lab got updated. At the end of 1980 communication technology was full-fledged. Common people could communicate faster with technology but the condition was to learn English as computer provides English language which is common to all. Many people started language learning with a view to communicate with others. Communicative Lab types started in 1980 and lasted up to 1990. In Communicative Lab the language is taught for interaction. Language is to communicate that's why priority is given to communication. Most people of the world are fluent of speaking their mother tongue though one has no knowledge of grammar. It means that without the knowledge of grammar and structure one can speak any language with practice. Anyone who is fluent in speaking can use the language well, so fluency is the target of communicative lab.

Tele-conferencing and tele-lectures has become a medium for communicating effectively. In communicative lab, all the computer-based exercises are also communicative one. communicative lab teaches English language rather teaching about language. Rather teaching rules and structure directly if we start teaching a foreign language with communicative practice it improves learner's willingness to learn an unfamiliar language. It also saves time, money and space. It helps the students in recording the lecture so that they can hear the same lecture after a certain period.

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Check Your Progress

5. State any one use of multimedia.
6. What are the three methods of sound synthesis?

13.5 ANSWERS TO CHECK YOUR PROGRESS QUESTIONS

1. The following are the main uses of a laboratory:
 - (a) In a laboratory, the student learns different languages.
 - (b) The student learns from his or her experience. They develop the power of thinking, observation and decision-making.
 - (c) The students develop self-discipline and self-confidence.
 - (d) The student understands the topic clearly and easily.
 - (e) Favorable atmosphere is created for science teaching.
2. The study of language is not possible without a laboratory because the student can obtain proper and complete knowledge of the subject when the student works in the laboratory by himself, observes and based on these, he or she deduces conclusions and reaches the result.
3. The following are the uses of a language laboratory:
 - (a) To think and speak in English
 - (b) To improve phonetics skills
 - (c) To develop effective communication skills
 - (d) To develop confidence to carry out a simple conversation
4. The audio-lingual skills can be maintained and increased only by continued practice throughout all the years of foreign-language study. The level of difficulty of audio-lingual practice materials should increase in keeping with the difficulty of the reading and writing materials.
5. Multimedia is used for presenting images, audio, video and text at one place and mostly on common screen.
6. The three methods of sound synthesis are through frequency modulation (FM) technology, wavetable, and physical modeling.

13.6 SUMMARY

- A language laboratory is a classroom or other area containing electronic and mechanical equipment designed and arranged to make foreign-language learning more effective than is usually possible without it.

- Language laboratories may be very broadly classified into two groups according to the way they fit into the school's plan of operation.
- The student can obtain proper and complete knowledge of the subject when the student works in the laboratory by himself, observes and based on these, he or she deduces conclusions and reaches the result.
- The aims and objectives of language cannot be achieved without laboratory. There should be no distinction in practical and theoretical work in fact both should complement each other.
- In view of the indispensable requirement of frequent, regular practice, equipment should be provided to allow at least twenty minutes use per class day per student.
- In view of the nature and importance of our grading system, provision should be made for tests of speaking ability.
- In view of the requirement of frequent, regular practice, provision should be made for more work with recorded native models than can be supplied in the presence of the teacher.
- Optimum learning requires native or near-native models of the foreign language for imitation.
- Optimum learning calls for frequent, regular practice with these models, with overlearning to the point of automatic behavior in the foreign language.
- The teaching materials, therefore, must provide authentic speech patterns, arranged in some form which permits them to be used as models for imitation and memorization.
- There is usually an initial period of exclusively audio-lingual (understanding-speaking) instruction; books and other printed materials are not used, and no reference is made to the written forms of what the student is learning to understand and say.
- The audio-lingual skills can be maintained and increased only by continued practice throughout all the years of foreign-language study.
- A language laboratory has generally sixteen to twenty hearing booths. In each hearing booth, there is a chair and a table at which a student can sit and work.
- The Console or adviser's room has one or more tapes and special equipment to monitor any student, thereby ensuring two-way communication.
- The Control Room has all the tapes, records and other equipment's of the language laboratory properly indexed and stored so that it can be readily made available to the student upon its request.
- Certain language-laboratory facilities can enhance the student's potential for evaluating his own performance.

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- A sound card (also referred to as an audio card) is a peripheral device that attaches to the ISA or PCI slot on a motherboard to enable the computer to input, process, and deliver sound.
- The three methods of sound synthesis are through frequency modulation (FM) technology, wavetable, and physical modeling.
- Multimedia is used for presenting images, audio, video and text at one place and mostly on common screen.

13.7 KEY WORDS

- **Control Room:** It refers to a room which has all the tapes, records and other equipment's of the language laboratory properly indexed and stored so that it can be readily made available to the student upon its request.
- **Laboratory:** It refers to a large room where practical classes are conducted.
- **Language laboratory:** It refers to a classroom or other area containing electronic and mechanical equipment designed and arranged to make foreign-language learning more effective than is usually possible without it.
- **Sound card:** It refers to a peripheral device that attaches to the ISA or PCI slot on a motherboard to enable the computer to input, process, and deliver sound.

13.8 SELF ASSESSMENT QUESTIONS AND EXERCISES

Short-Answer Questions

1. What are the two main types of language laboratory?
2. What are the three sections of a language laboratory?
3. Write a short note on the importance of CCTV.
4. What is physical modeling?
5. List the switches related to a console room.
6. What are the main functions of a sound card?
7. What are the characteristics of multimedia?

Long-Answer Questions

1. What are the main objectives of a laboratory work? Explain in detail.
2. Discuss the points to be considered while making a laboratory.

3. Interpret the advantages of a language laboratory.
4. Explain the various forms of communication modes which can be used in a language laboratory.

Language Laboratory

13.9 FURTHER READINGS

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NOTES

UNIT 14 NETWORK

NOTES

Structure

- 14.0 Introduction
- 14.1 Objectives
- 14.2 Network: An Introduction
 - 14.2.1 Aims of Forming Networks: LAN And WAN
- 14.3 Educational Technology for Exceptional Children
 - 14.3.1 Importance of Educational Technology for Exceptional Children
 - 14.3.2 Instructional Medium and Instructional Aids Types Methods
 - 14.3.3 The Effective Use of Teaching Aids
- 14.4 Answers to Check Your Progress Questions
- 14.5 Summary
- 14.6 Key Words
- 14.7 Self Assessment Questions and Exercises
- 14.8 Further Readings

14.0 INTRODUCTION

Computer network is defined as a set of computers which is connected to share resources. There are two main forms of computer networks that is WAN and LAN. A wide area network (WAN) is defined as computer network which extends over a large geographical area. On the other hand, a local area network (LAN) refers to a network in which a group of computers share a common communication line.

Educational technology is defined as the practice in which learning is facilitated by creating, and managing the approaches related to various technological processes. Instructional medium refers to a medium in which learning is imparted. It thus, means the way in which education is imparted through a computer.

In this unit, the concept of computer network, its aims and uses have been discussed. The meaning of educational technology and types of instructional medium have been explained. The unit will also help one to analyse the meaning of teaching aids and its main principles.

14.1 OBJECTIVES

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

- Discuss the meaning of computer network and its uses
- Identify the types of computer networks
- Explain the meaning of educational technology

- Analyse the various types of instructional aids
- Discuss the forms of computer-assisted instruction
- Interpret the principles of teaching aids

Network

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14.2 NETWORK: AN INTRODUCTION

When two or more computer systems are linked together they form a network there are different types of computer network such as Local area network, wide area network, campus area network, Metropolitan Area Network and home area network. It helps in the process of communication as it is comprised of several different computer systems which are being joined together to complete a network operation. The network helps in building up of Information and sharing the information through available resources. The applications/uses of network are as follows:

- It helps in sharing and communication of resources such as printers.
- Software and database sharing resource.
- Health in communication from one computer to another.
- Exchange of data and information among different users at the same time.
- Sharing of information over geographical large areas.
- Exchange of business applications such as online purchase of items.
- Useful for home applications such as email, chat.
- Supports mobile users through wireless networks such as PDA, mobile complain
- Helps in resolving social issues.
- Helps in sharing of hardware and software
- Centralization of administration and support so that everyone can have the access to the same administrative or support applications from their computer system.

There are some other uses of computer network which are as follows:

- Increased speed
- Reduced cost
- Improved security
- Centralized software management system
- Electronic mails
- Flexible
- Access

NOTES**Disadvantages of Computer Networks**

The disadvantages of computer networks are as follows:

- High cost of installation
- Required time for administration
- Server failure
- Cable faults
- Connectivity issues

14.2.1 Aims of Forming Networks: LAN And WAN

Local area network (LAN) is a network that is designed to operate a small range or a physical area such as an office, home, factory or a group of buildings. They are easy to design and troubleshoot the problems. They help in the exchange of Information and sharing of resources easily from one computer system to the other operating system.

Wide area network (WAN) can span large geographical area example multiple cities, countries or continents. The local area network can be wired or wireless or twisted pair cable or fibre radio or infrared. It can send data to only one computer at a time. It has a bit rate or speed usually from 1Mbps ~ 1 Gbps.

Check Your Progress

1. What are the disadvantages of computer networks?
2. State any two uses of computer network.

14.3 EDUCATIONAL TECHNOLOGY FOR EXCEPTIONAL CHILDREN

When technology is used for accelerating and facilitating educational processes with certain objective in view, that technology is called as educational technology. As it has already been stated that technology is not limited to the construction of machines and other devices. Designing, modelling and organization of hardware are needed before the construction which are primarily based on the well testified laws and principles. In educational technology, humans and machine both have their respective roles and both work as complements to each other in the process of education. It means that man uses his or her intellect and experiences along with the machine and devices and by using his or her arts he or she organizes the teaching learning process in the best possible manner.

According to a renowned author, G O M Leith, educational technology is the application of scientific knowledge about learning and conditions of learning to improve the effectiveness of teaching and training.

According to another author, Richmond, educational technology is concerned providing appropriately designed learning situations which holding in view the objectives of teaching or training bring to bear the best means of instruction.

According to author and educator, R A Cox, educational technology is an application of practical study which aims at maximizing educational effect by controlling such relevant facts and educational purposes, content, teaching materials, methods, educational requirement, conduct of students, behavior of instruction and interrelation between student and instruction.

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14.3.1 Importance of Educational Technology for Exceptional Children

The following are the characteristics of educational technology:

- The inputs are integrated and assimilated to the output in such a manner that the application of Science and Technology in education becomes an automatic process.
- Hear learning theories, art and science of teaching both go hand in hand. Thus, it removes the defects of educational psychology.
- It and sizes on the development of new strategies and techniques for an effective and result oriented learning. Thus, it is a constant process of research which can benefit all the future teachers of the society.
- It first defines the objectives in behavioral terms. Then it creates suitable teaching learning environment to realize those objectives.
- To evaluate the learning objectives, construct the relevant so that the efforts will go in the direction of goals only.

14.3.2 Instructional Medium and Instructional Aids Types Methods

In early years, the only term used for teaching aids was audio-visual aids but with the advancement and opening of new horizons in the field of electronic technology and communication media, new and improved equipments and aids for teaching and learning are developed, instead of mere teaching aids improved terms were used i.e. educational or instructional technology.

The present situation calls for a change at almost every level of education, so that practical and dynamic approach can be given to the existing and new field of education. The crux of this modern education is to awaken the hidden curiosity and interest of the learner, nourishing his behaviors, to develop basic and essential skills of lifelong learning as well as ability to think critically and to judge himself and others in a more beneficial manner.

There are different types of audio-visual equipments ranging from simple hand-made charts to highly sophisticated projectors available in the markets. In the broadest sense, teaching aids can be categorized under two heads according to authors, Sampath Pannneerselvam and Santhan, (1998) as under: 1. Projected Aids 2. Non-Projected Aids

These aids have been discussed in detail in the previous units.

Teaching aids may be classified as audio aids, visual aid, audio visual aids and activity aids.

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Instructional Medium: Definition

Instructional Medium or computer assisted instructional technology as the name suggests stands for the type of instruction aided or carried out with the help of computer as a machine. It is just one step ahead to the use of teaching machine and probably two, to the use of programmed text books in making the instructional process as self-directed and individualized as possible. The computer is said to be ahead of the teaching machine because of its unlimited capacity of doing more work and multiple type of works at the same time for unlimited number of individual learners than the teaching machine.

The definition brings into lime light the following things:

- In computer assisted instruction there is an interaction between an individual student and the computer just as happens in tutorial system between the teacher and individual student.
- Computer can display the instructional material to the individual student.
- The individual student takes benefit of the displayed material and respond to it. These responses are attended by the computer for deciding the future course of instruction displayed to the learner.
- The interaction between the individual learner and computer device helps in the realization of the set instruction objectives.

Types or modes of computer assisted instruction (CAI)

CAI can take a variety of forms as detailed below for providing self-individualized instruction to a learner depending upon the variety of uses to which computers services can be availed.

- **Informational computer assisted instruction:** This type of computer assisted instruction help the learners to get the desired information needed by him or her. The sole purpose of this type of CAI is to provide essential information for the acquisition of concept and skills. However, individual learner can learn a lot by adopting an enquiry or Discovery approach towards learning through such instruction.
- **Drill and practice programmes:** This type of computer assisted instruction provides the learner different types of drill and practice programs covering specific topics related with a subject. Through such drill and practice programs of CAI, the services of computers can be properly availed for providing practice in something already learned in some other way.
- **Tutorial type computer assisted instruction:** This type of computer assisted instruction the computers are engaged in actual teaching. Here,

they can play effectively the role of a tutor by maintaining a perfect interaction and dialogue with the individual students.

- **Educational games types:** This type of computer assisted instruction the learners are provided with the variety of well-designed computer games. These games should not be confused with academic type games. The purpose of such type of games is only to provide intellectual challenge, stimulation of curiosity and serve as a source of motivation to the individual learner.
- **Stimulation type of instruction:** This type of computer assisted instruction, stimulation is used as a technique for providing training to the students. Such type of instructional activities provides the most powerful learning tools to them. With the carefully prepared programs the students are made to face real or idealized situations. They must play an active role and are required to take decisions that have consequences.

Teaching aids are the means as well as the helping hand of a teacher for the realization of the stipulated teaching learning of instructional objectives of his or her lesson. A teacher must know to make use of an appropriate teaching aid most suitable for his or her teaching at a teaching-learning situation. As a matter of guidance, a teacher of a biological sciences, must take care of the following principle.

- **Relevance:** The aid used should be quite relevant to the topic in hand.
- **Suitability:** It should suit the topic as the best as possible by making it study quite comprehensive, interesting, permanent and effective.
- **Educative:** The aid should have specific educational value besides being interesting and motivating. In no case it should be confined to mere entertainment.
- **Best substitute for the firsthand experience:** The aid should be so chosen as to prove a best possible substitute in terms of reality, accuracy and truthful representation of object or the first-hand experiences.
- **Learner centred:** The aid material selected should be such that it suits the age level, grade level, basic instinct, urges, interest and other unique characteristic of the students of the class.
- **Simplicity:** The aid material should be quite simple in its construction and use. It must also be able to convey its sense as simply as possible.
- **Environment centred:** The aid material should suit the requirement of the physical, social and cultural environment of the students.
- **Practicability:** The aid material should be selected in view of prevailing circumstances available resources and purpose to be served. It should not be too costly in its purchase and collection or in terms of its use and demonstration in the class. It should meet the needs of available circumstances in terms of weather conditions, climatic requirement, handling by the teacher and students and other resources readily available in the Institution and classroom.

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- **Objectives attainment:** The aid material should be so selected as to help in the proper realization of the stipulated learning or instructional objectives of the topic in hand.

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14.3.3 The Effective Use of Teaching Aids

The task of teacher is not just finished by making the selection of the teaching aid for his or her topic. The selection however, judicially it may be made can prove truthful only when due to attention is paid over their wise use. The principles to be kept in mind can be summarized as follows:

1. **Principle of preparation:** According to this principle, the use of a material should have well chalked program concerning pre- preparation on the part of teacher as well as students. In other words, there should be proper planning as well as advance preparation of the utilization of the aid materials. In brief, the principle demand attention on the following points from the teacher and students:

On the part of teacher

- The full knowledge about the nature of the aid material, and the definite purpose to be served by it use.
- The linkage of the aid materials with the contents or learning experiences.
- Necessary skill of the training for the handling of the aid material and equipments.
- Proper planning and visualization the use of aid material before it actual use.
- Adequate rehearsal for the utilization of the aid material.

On the part of students

- Acquisition of the basic background in terms of previous learning attitudes and interest for receiving what is being presented to them through aid material.
- Clarity about the objectives of their participation the teaching learning activities involving the use of aid material
- Clarity about certain things like what they must observe, or know how it is being done, what specific roles they must play and how can they be most benefited by the use of the aid material.
- Essential skills and techniques for helping them in preparation and utilizing the material.

2. **Principle of proper presentation:** According to this principle for the effective use, the teacher aid and materials should be presented adequately as possible. Usually it demands attention to the following points on the part of the teacher:
 - Observance of the precaution for the safe and proper use of the aid material.

- To keep in control the physical facilities and conditions for the use of aid material and equipment.
 - Using aid material at the proper time in a proper sequence by integrating with it the subject matter of learning experiences.
 - Displaying or utilizing the aid in a proper way for enabling all the students of the class to derive maximum advantages out of it.
 - Helping the students to observe, record and participate in the use of aid material as adequately as possible.
3. **The principal of follow-up and evaluation:** The principle demands that an adequate follow up and appraisal of the use and consequences of the use of aid material should be made by the teacher through the help of the students. For example, after listening and educational program on radio or watching it on TV teachers should essentially have a follow-up program. There should be a lively discussion over the learning objectives achieved through such broadcasting or telecast. The student should also be given proper time to remove their doubts, difficulties and learning gaps. They can also be given due guidance in enhancing the span of knowledge and carrying out the ideas in actions. In addition to such follow up proper measures should also be taken for the assessment, of the adequacy of the material, the way of presentation and advantages drawn by its use.

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Check Your Progress

3. What is tutorial type computer assisted instruction?
4. State the premises of principle of preparation.
5. What is the purpose of informational computer assisted instruction?

14.4 ANSWERS TO CHECK YOUR PROGRESS QUESTIONS

1. The disadvantages of computer networks are as follows:
 - (a) High cost of installation
 - (b) Required time for administration
 - (c) Server failure
 - (d) Cable faults
 - (e) Connectivity issues
2. The following are the uses of computer networks:
 - (a) It helps in sharing and communication of resources such as printers.

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(b) Centralization of administration and support so that everyone can have the access to the same administrative or support applications from their computer system.

3. Tutorial type computer assisted instruction can be defined as the computer assisted instruction the computers are engaged in actual teaching. Here, they can play effectively the role of a tutor by maintaining a perfect interaction and dialogue with the individual students.
4. The principle of preparation states the use of a material should have well chalked program concerning pre- preparation on the part of teacher as well as students. In other words, there should be proper planning as well as advance preparation of the utilization of the aid materials.
5. The purpose of informational computer assisted instruction type is to provide essential information for the acquisition of concept and skills. However, individual learner can learn a lot by adopting an enquiry or Discovery approach towards learning through such instruction.

14.5 SUMMARY

- When two or more computer systems are linked together they form a network there are different types of computer network such as Local area network, wide area network, campus area network, Metropolitan Area Network and home area network.
- The network helps in building up of Information and sharing the information through available resources.
- Local area network (LAN) is a network that is designed to operate a small range or a physical area such as an office, home, factory or a group of buildings.
- Wide area network (WAN) can span large geographical area example multiple cities, countries or continents.
- When technology is used for accelerating and facilitating educational processes with certain objective in view, that technology is called as educational technology.
- In educational technology, humans and machine both have their respective roles and both work as complements to each other in the process of education.
- According to a renowned author, G O M Leith, educational technology is the application of scientific knowledge about learning and conditions of learning to improve the effectiveness of teaching and training.
- The inputs are integrated and assimilated to the output in such a manner that the application of Science and Technology in education becomes an automatic process.

- The present situation calls for a change at almost every level of education, so that practical and dynamic approach can be given to the existing and new field of education.
- Instructional Medium or computer assisted instructional technology as the name suggests stands for the type of instruction aided or carried out with the help of computer as a machine.
- The computer is said to be ahead of the teaching machine because of its unlimited capacity of doing more work and multiple type of works at the same time for unlimited number of individual learners than the teaching machine.
- CAI can take a variety of forms as detailed below for providing self-individualized instruction to a learner depending upon the variety of uses to which computers services can be availed.
- The sole purpose of Informational computer assisted instruction of CAI is to provide essential information for the acquisition of concept and skills.
- The purpose of educational games is only to provide intellectual challenge, stimulation of curiosity and serve as a source of motivation to the individual learner.
- Teaching aids are the means as well as the helping hand of a teacher for the realization of the stipulated teaching learning of instructional objectives of his or her lesson.
- The aid material should be selected in view of prevailing circumstances available resources and purpose to be served.
- The aid material should be so selected as to help in the proper realization of the stipulated learning or instructional objectives of the topic in hand.
- The task of teacher is not just finished by making the selection of the teaching aid for his or her topic.
- According to the principle of preparation, the use of a material should have well chalked program concerning pre- preparation on the part of teacher as well as students.
- According to principle of presentation, the teacher aid and materials should be presented adequately as possible.
- The principle of follow-up and evaluation demands that an adequate follow up and appraisal of the use and consequences of the use of aid material should be made by the teacher through the help of the students.

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14.6 KEY WORDS

- **Network:** It refers to a connection which is formed when two or more computer systems are linked together.

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- **Local area network (LAN):** It refers to a network that is designed to operate a small range or a physical area such as an office, home, factory or a group of buildings.
- **Wide area network (WAN):** It refers to a network that can span large geographical area example multiple cities, countries or continents.
- **Educational technology:** It refers to a technology which is used for accelerating and facilitating educational processes with certain objectives in view.

14.7 SELF ASSESSMENT QUESTIONS AND EXERCISES

Short-Answer Questions

1. What are the uses of a network?
2. Why is educational technology important for exceptional children?
3. What are teaching aids?
4. How has G O M Leith defined education technology?
5. State the premises of principle of proper presentation.

Long-Answer Questions

1. Discuss the concept of instructional medium and its aids.
2. Differentiate between WAN and LAN.
3. Explain the importance of educational technology.
4. Analyse the important characteristics of computer-assisted instruction (CAI).
5. Explain any one principle related to teaching aids.

14.8 FURTHER READINGS

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