UNIT 3 PEDAGOGICAL DESIGNS FOR COMMUNICATION TECHNOLOGY

Structure

3.0 INTRODUCTION

The use of communication technologies in teaching and learning process require us to think, plan and design its appropriate use to result in optimum level of effectiveness. We can't use technology indiscriminately for educational purpose. Just because technologies are available, they should not be used for teaching and learning without thinking about their appropriate usefulness. While access and availability are important considerations, the context of use (such as classroom, distance learning, online learning) becomes more significant for deciding on the *right* communication technology. However, there is no wrong technology as well. The appropriate mix and match of technology and pedagogy makes a technology better than another.

Education is all about student learning, and educators use technology to improve teaching and student learning. All technologies cannot be used in all the situations. With the change in learner profile and the context, the effectiveness of a technology would change, and therefore, it is the task of the teacher to think about the use of technology in specific contexts. You have studies about the instructional design models and learning theories in MDE-412, and in this unit, we would discuss some of the pedagogical designs for use in technology-mediated teaching and learning environments. As a distance educator, you should be aware of the different instructional design processes which are tailored to different contexts of teaching and learning.

3.1 LEARNING OUTCOMES

After working through this unit, you are expected to be able to:

- *Define* design and pedagogy;
- *Describe* pedagogical design as a creative process;
- *List* various pedagogical designs available for teaching through communication technology; and
- *Discuss* advantages and disadvantages of various pedagogical designs in an ICT-enabled environment.

3.2 DESIGN AND PEDAGOGY

The *Oxford Advanced Learner's Dictionary* equates 'design' with 'arrangement', 'drawing', 'plan', 'model', 'pattern' and 'intention' with the meaning 'the art or process of deciding how something will look, work etc., by drawing plans, making models etc. *Design is that area of human experience, skill and knowledge which is concerned with human being's ability to mould his or her environment to suit his or her needs.* Design is essentially a rational, logical, sequential process intended to solve problems. The process begins with the identification and analysis of a problem or need and proceeds through a structured sequence in which information is researched and ideas explored and evaluated until the optimum solution to the problem or need is devised. Design may also refer to the process of devising a system, component, or process to meet desired needs in any given field of human experience.

Design refers to a plan/document/blueprint for making something work. As a verb, "to design" means the process of developing a plan for a product, system, structure, etc. Used as a noun, "a design" may refer to a proposal, a model, a blueprint, etc. The person who creates a design is called a designer (such as instructional designer).

As you might have known, the word 'pedagogy' comes from the Greek word 'paidagôgeô' (*paíd*: child and *ágô*: lead) literally meaning "to lead the child". The Encyclopedia Britannica refers to pedagogy as study of teaching methods, including the aims of education and the ways in which such goals may be achieved. The word pedagogy in the modern context refers both to the art of teaching and science of learning.

When you think of design in the context of pedagogy, taking into consideration the foregoing discussion design and pedagogy will lead to a working definition on pedagogical design. You might have also heard of the term 'instructional design' in the field of education. What is Instructional Design? Instructional Design is the systematic process of translating general principles of learning and instruction into plans for instructional materials and learning. Instructional Design can be perceived in different ways as given below:

Instructional Design as a Process

Instructional Design is the systematic development of instructional specifications using learning and instructional theory to ensure the quality of instruction. It is the entire process of analysis of learning needs and goals and the development of a delivery system to meet those needs. It includes development of instructional materials and activities; and tryout and evaluation of all instruction and learner activities.

Instructional Design as a Discipline

Instructional Design is that branch of knowledge concerned with research and theory about instructional strategies and the process for developing and implementing those strategies.

Instructional Design as a Science

Instructional Design is the science of creating detailed specifications for the development, implementation, evaluation, and maintenance of situations that facilitate the learning of both large and small units of subject matter at all levels of complexity.

Instructional Design as Reality

Instructional Design can start at any point in the design process. Often a glimmer of an idea is developed to give the core of an instruction situation. By the time the entire process is done the designer looks back and he or she checks to see that all parts of the "science" have been taken into account. Then the entire process is written up as if it occurred in a systematic fashion.

Gagne and Briggs (1974) give four basic assumptions of instructional design which deserve a closer study. The first assumption is that instructional planning must be for the individual i.e. the instruction is to be oriented towards the human individual in his or her development from child to adult, as well as throughout the life. The second assumption is that the instructional design has phases that are both immediate and long-range. Here, design in the immediate sense is what the teacher does in preparing a "lesson plan" some hours before the instruction is given. The long-range aspects of instructional design are more complex and varied. They are more likely to be concerned with a set of lessons organized into 'topics', a set of topics to constitute a course or course sequence, or perhaps with an entire instructional system. The third assumption is that systematically designed instruction can greatly affect individual human development. Because, unplanned and undirected learning is almost certain to lead to the development of individuals who are in one way or another incompetent to derive personal satisfaction from living in our society of today or tomorrow. The fourth assumption is that designing instruction must be based upon knowledge of how human beings learn. Also, instructional design must take into account fully the learning conditions that need to be established in order for the desired effects to occur.

Besides these assumptions, a synthesis of the literature on Instructional Design reveals that pedagogically solid designs involve authentic, hands-on tasks; use familiar and easy-to-work materials; possess clearly defined outcomes that allow for multiple solutions; promote student-centered, collaborative work and higher order thinking; allow for multiple design iterations to improve the product. You have studied instructional design in detail in MDE-412.

3.2.1 Pedagogical Design as a Creative Process

Like any design process, pedagogical design can also be considered as a creative process. It is said that design is the process of 'management of constraints'. These constraints can be of two types – negotiable and non-negotiable. The non-negotiable constraints are those that must be adhered to while as a designer you may have some scope for manipulating the negotiable components. In the context of pedagogical designs, the non-negotiable constraints are given – a context or situation that you as instructional designer have little or no control. So, while designing you have to take care of these to create optimum learning scenario using communication technology. You need to be creative in each situation to design the nest possible learning environment. Creativity here does not mean original. To become creative is to know the previous works in the area and the ability to see connections and relationships in a new way. So, pedagogical design as a creative activity/process requires your in-depth and critical understanding of learning process, instructional methods, and media and technologies available to creatively weave together possible solutions as designs for specific purpose and context. The design process in therefore never final; it remains an iterative process with incremental development through experimentation and experience. So, pedagogical designs are also never static. These are dynamic models that can be sued creatively.

Check Your Progress 3.1

Notes: *a) Write your answers in the space given below.*

b) Compare your answers with those given at the end of this Unit.

1) List the four basic assumptions of instructional design.

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2) Why pedagogical design is a creative process?

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3.3 PEDAGOGICAL DESIGN: PROCESS

When we consider pedagogical design as a creative process, then it becomes imperative to discuss this in its context. As discussed earlier, design is specific to the opportunities and constraints of a specific situation, and therefore each teacher or for that matter each programme will have its unique design challenge. As a designer or teacher responsible for designing the system, you must justify the design. In this section we will discuss in brief three different scenario and their generic features to help you design specific pedagogical designs.

In Classroom

The classroom is our conventional benchmark for all educational transactions. Most of the education received in the formal setting is from the classroom from elementary to the higher degrees. The overall setting is the same with minor difference in the access to technology and the characteristics of the learners and the subject taught. The curriculum is defined, and given to the teacher who prepares the lesson plans, and delivers the content using different pedagogical designs. It is at this stage the teacher decides what design to bank upon depending on the subject matter and the facilities available. In our context of communication technology, depending upon the availability the teacher can make use of audio, video, computer (for presentation as well practical work by learners individually or in group), the Web, etc. So, the use of communication technology in the classroom becomes more instructor-led, but still it can be collaborative, problem solving and discovery based. So, the teacher decides the methods and media to be used, and how to deploy these effectively. Learners may have to be oriented to the instructional approaches adopted by the teacher, and use of different designs help the teacher to make the learner more attentive, interested and motivated to learn.

In Distance Learning

Distance Education has its own uniqueness as an asynchronous learning system that has been slowly adopting methods of synchronous learning through the use of communication technology. As you know, it is a technology–mediated teaching and learning system, where teachers and learners are at a distance. The learning milieu of the student could be home or office, with access to technology or not. So, while using communication technology in the pedagogical designs, it is important to assess the access or provide access to technology as the study centres or some other facilities near the office/home of the learner. While this is a pre-requisite, distance learning can use a variety of communication media and technology, and the media mix are normally decided by the team of experts. The software is developed by a team to ensure quality. The role of a teacher may be reduced to just a coordinator or someone who is responsible for vetting the quality of the content that goes into the software. The content is normally a pre-designed package of materials in different media, including print. These materials are sent to the learners, who attend occasional face-to-face counseling at study centres, and may also attend to practical and synchronous teleconference sessions. The pedagogical design process pertains to all these stages in the distance learning, starting form the curriculum design to course development to delivery of the course. It is important to note that some of these can be standardized, while others have to be left open-ended to facilitate the creativity of the tutors and teachers in the counseling sessions and the teleconference sessions.

In Online Learning

Online learning environments provide us the best of both synchronous and asynchronous learning opportunity without the learners and teacher being present in the same physical place like that of the classroom learning environment. Thus, it provides the best interaction and learning affordances possible with the use of appropriate communication technologies. These technologies range from simple audio available online to use of sophisticated simulation and virtual worlds that re-create real situations. Thus, the possibilities are enormous, but the challenges are many. The pedagogical design process shall have to take into account *a priori* model as well as *iterative* model that can be adapted/adopted to change as the course progress. As designer of the online system, you need to consider the media mix, and its delivery through an appropriate Learning Management System (LMS), and decide the level of interaction to be provided. It has been observed that the more the interaction between the learner and the student, and the tutor assessed activities in the programme, the more workload for the teacher. That means the design has to consider the number of teachers required in teaching-learning and delivery of the programme unlike the classroom or the distance learning. While the online learning environment provides opportunity to you to think different pedagogical designs, it may be useful to consider suitable designs useful for the course in the overriding principles of constructivist learning framework, as it is considered the most useful one. In the next section in the unit, we will discuss many pedagogical designs, but online lecture using synchronous tools can also be considered as an alternate pedagogical design that we have not discussed as lecture method is all pervasive. We will discuss about online learning/e-learning in Unit-9 where you may like to use the discussions of pedagogical designs.

Check Your Progress 3.2

Notes: *a) Write your answer in the space given below.*

b) Compare your answer with the one given at the end of this Unit.

Describe the pedagogical design process in distance learning in about 150 words.

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3.4 SOME TYPICAL PEDAGOGICAL DESIGNS

Over the years, a number of different pedagogical designs have been tried out in the field of education with varying degrees of success. A deep understanding of these pedagogical designs would be of much use for you as a distance education practitioner. To facilitate the same, a few important pedagogical designs are presented below as examples. A word of caution here is that besides the following, there are a number of pedagogical designs with little or more variations from the ones discussed here are available for use.

3.4.1 Anchored Video Instruction

Anchored Instruction is a learning strategy that situates or "anchors" instruction in a realistic case-study, or problem-solving situation. Anchored Instruction challenges and motivates learners to find the story's embedded data thru a realistic, narrative, storyline format. Learners use this data to solve complex and interconnected sub-problems within the "macro-context," by employing problem solving and critical thinking skills. Consequently, learners generate the solution that will ultimately be the story's ending. Learners tend to transfer skills and link subject matter to other contexts as a result of Anchored Instruction's realistic story settings, characters and events (Crews et al, 1997).

The anchored instruction approach is an attempt to help students become more actively engaged in learning by situating or anchoring instruction around an interesting topic. The learning environments are designed to provoke the kinds of thoughtful engagement that helps students develop effective thinking skills and attitudes that contribute to effective problem solving and critical thinking.

The principles of anchored instruction are

- Learning and teaching activities should be designed around an "anchor" which is often a story, adventure, or situation that includes a problem or issue to be dealt with that is of interest to the students.
- Instructional materials should include rich resources that students can explore as they try to decide how to solve a problem (e.g., interactive videodisc programs).

Anchored instruction emphasizes the need to provide students with opportunities to think about and work on problems, which is an emphasis of cognitive constructivists. Anchored instruction also emphasizes group or collaborative problem solving, which is an emphasis of social constructivists.

Anchored Instruction's model uses seven interwoven and interdependent cognitive and instructional design principles to create instruction:

1) **Generative learning format** enhances learner motivation by allowing learners to create or "generate" the story's ending by solving open-ended problems.
2) **Video-based presentation** improves on text book learning by adding related background information, animation, graphics, audio, simulation, rich colors and realism.
3) **Narrative format** enhances the story's setting, characters, initial and ending events that enrich the realism and authenticity of the storyline.
4) **Problem complexity** increases learner's interests and requires full commitment to follow interrelated steps to solve the problem.
5) **Embedded data designs** add the storyline with both needed and unneeded data. As a result, learners become engaged in the exploration and discovery process to identify the problem and search for the pertinent data.
6) **Opportunities for transfer** are created by offering the same subject, such as geometry, within three different, realistic settings that allows learners to view other opportunities to use learned skills and knowledge.
7) **Links across the curriculum** are rooted within a realistic story line, with content that applies to other areas of study. Therefore learners are exposed to these new subject matters that may broaden their views to explore other studies of interest.

The Anchored Instruction model was developed between the late 1980s and early 1990s by the Cognition and Technology Group at Vanderbilt University, lead by John Bransford. The Jasper Woodbury series of adventures, which were created by the group at Vanderbilt University, tell interesting stories in which there are problems to be solved. The Jasper Woodbury Problem Solving Series was designed for 5th grade students and above, to help improve their math, science and group collaboration skills. Titled as the "Adventures of Jasper Woodbury", this video-based, instructional package contains 12 stories. The stories cover various topics and areas of study in realistic settings that focus on exploration, problem solving and critical thinking skills (Bransford, 1989).

Within Jasper's typical problem-solving story line, there is a complex problem that has about a dozen steps learners will take to solve it. As the embedded data is presented, learners have the option to record the data or replay the video to find it. A typical video is approximately 17 minutes. Video pauses are at predetermined moments, within the story, for learners to answer intermediate questions and find solutions. Learners will need these solutions to put together the answer to the larger, more complex question, which also creates the story's ending. More than one solution is okay, and focus is on group problem solving.

The Jasper adventures go well beyond the "word problems" typically found in math textbooks for the middle grades. Jasper adventures use a visual story format to present problems. Students watch video segments from a videodisc to understand the situation and the problem. The materials available to the students also have "embedded data" and "embedded teaching" to seed the environment with ideas relevant to problem solving.

Yet another example for Anchored Instruction is "The Voyage of the Mimi", which was developed by Bank Street College of Education, that involves students as the crew on an ocean voyage of the 72-foot ketch, Mimi, a converted French tuna trawler outfitted as a modern ocean-going vessel.

The purpose of the voyage is to study whales. It is also intended to help students develop science and mathematics skills. To successfully complete the first voyage, students must learn and use navigation principles, map reading, and many other skills.

The First Voyage of the Mimi series consists of twenty-six 15-minute programs. In the adventure story, two scientists and their teenage research assistants embark on a seagoing expedition to study humpback whales. Each drama (episode) is paired with a 15-minute documentary (expedition) that develops a scientific or mathematical concept presented in the drama. Seven videodisks support this program with video clips that illustrate different phases of the voyage as well as simulated trips to museums, aquariums, and other places where scholars study the marine life.

3.4.2 Collaborative Learning

Collaborative Learning is an umbrella term for a variety of approaches in education that involve joint intellectual effort by students or students and teachers. Collaborative learning refers to methodologies and environments in which learners engage in a common task in which each individual depends on and is accountable to each other. Groups of students work together in searching for understanding, meaning or solutions or in creating an artifact of their learning such as a product. The approach is closely related to cooperative learning. Cooperative or collaborative learning is a team process where members support and rely on each other to achieve an agreed-upon goal. Collaborative learning activities vary widely, but most centre on students' exploration or application of the course material, not simply the teacher's presentation or explication of it. Collaborative learning represents a significant shift away from the typical teacher-centered or lecture-centered milieu in college classrooms. In collaborative classrooms, the lecturing/ listening/note-taking process may not disappear entirely, but it lives alongside other processes that are based in students' discussion and active work with the course material. Teachers who use collaborative learning approaches tend to think of themselves less as expert transmitters of knowledge to students, and more as expert designers of intellectual experiences for students as coaches or mid-wives of a more emergent learning process. Collaborative learning is a relationship among learners that requires positive interdependence (a sense of sink or swim together), individual accountability (each of us has to contribute and learn), interpersonal skills (communication, trust, leadership, decision making, and conflict resolution), face-to-face interaction, and processing (reflecting on how well the team is functioning and how to function even better).

Proponents of collaborative learning claim that the active exchange of ideas within small groups not only increases interest among the participants but also promotes critical thinking. There is persuasive evidence that cooperative teams achieve at higher levels of thought and retain information longer than learners who work quietly as individuals. The shared learning gives learners an opportunity to engage in discussion, take responsibility for their own learning become critical thinkers. Some of the important approaches to collaborative learning are as follows:

1) Learning is an active process whereby learners assimilate the information and relate this new knowledge to a framework of prior knowledge.
2) Learning requires a challenge that opens the door for the learner to actively engage his/her peers, and to process and synthesize information rather than simply memorize and regurgitate it.
3) Learners benefit when exposed to diverse viewpoints from people with varied backgrounds.
4) Learning flourishes in a social environment where conversation between learners takes place. During this intellectual gymnastics, the learner creates a framework and meaning to the discourse.
5) In the collaborative learning environment, the learners are challenged both socially and emotionally as they listen to different perspectives, and are required to articulate and defend their ideas. In so doing, the learners begin to create their own unique conceptual frameworks and not rely solely on an expert's or a text's framework.

Thus, in a collaborative learning setting, learners have the opportunity to converse with peers, present and defend ideas, exchange diverse beliefs, question other conceptual frameworks, and are actively engaged.

Collaborative Learning is instruction that involves students working in teams to accomplish a common goal, under conditions that include the following elements (Johnson, Johnson, and Smith, 1991):

1) **Positive interdependence.** Team members are obliged to rely on one another to achieve the goal. If any team members fail to do their part, everyone suffers consequences.
2) **Individual accountability.** All students in a group are held accountable for doing their share of the work and for mastery of all of the material to be learned.
3) **Face-to-face interaction.** Although some of the group work may be divided and done individually, some must be done interactively, with group members providing one another with feedback, challenging one another's conclusions and reasoning, and perhaps most importantly, teaching and encouraging one another.
4) **Appropriate use of collaborative skills.** Students are encouraged and helped to develop and practice trust-building, leadership, decision-making, communication, and conflict management skills.
5) **Group processing.** Team members set group goals, periodically assess what they are doing well as a team, and identify changes they will make to function more effectively in the future.

Collaborative learning is not simply a synonym for students working in groups. A learning exercise only qualifies as collaborative learning to the extent that the above listed elements are present. From various sources, the following list of advantages of collaborative learning has been drawn:

1) Develops higher level thinking skills
2) Promotes student-faculty interaction and familiarity
3) Increases student retention
4) Builds self esteem in students
5) Enhances student satisfaction with the learning experience
6) Promotes a positive attitude toward the subject matter
7) Develops oral communication skills
8) Develops social interaction skills
9) Promotes positive race relations
10) Creates an environment of active, involved, exploratory learning
11) Uses a team approach to problem solving while maintaining individual accountability
12) Encourages diversity understanding
13) Encourages student responsibility for learning
14) Involves students in developing curriculum and class procedures
15) Students explore alternate problem solutions in a safe environment
16) Stimulates critical thinking and helps students clarify ideas through discussion and debate
17) Enhances self management skills
18) Fits in well with the constructivist approach
19) Establishes an atmosphere of cooperation and helping school-wide
20) Students develop responsibility for each other
21) Builds more positive heterogeneous relationships
22) Encourages alternate student assessment techniques
23) Fosters and develops interpersonal relationships
24) Modelling problem solving techniques by students' peers
25) Students are taught how to criticize ideas, not people
26) Sets high expectations for students and teachers
27) Promotes higher achievement and class attendance.
28) Students stay on task more and are less disruptive
29) Greater ability of students to view situations from others' perspectives (development of empathy)
30) Creates a stronger social support system
31) Creates a more positive attitude toward teachers, principals and other school personnel by students and creates a more positive attitude by teachers toward their students
32) Addresses learning style differences among students
33) Promotes innovation in teaching and classroom techniques
34) Classroom anxiety is significantly reduced
35) Test anxiety is significantly reduced
36) Classroom resembles real life social and employment situations
37) Students practice modeling societal and work related roles
38) Collaborative learning is synergistic with writing across the curriculum
39) Collaborative learning activities can be used to personalize large lecture classes
40) Skill building and practice can be enhanced and made less tedious through CL activities in and out of class.

41) Collaborative learning activities promote social and academic relationships well beyond the classroom and individual course
42) Collaborative learning processes create environments where students can practice building leadership skills.
43) Collaborative learning increases leadership skills of female students
44) In educational institutions where students commute to classes and do not remain on campus to participate in campus life activities, collaborative learning creates a community environment within the classroom.

Collaborative Learning Techniques

- **Think-Pair-Share:** (1) The instructor poses a question, preferable one demanding analysis, evaluation, or synthesis, and gives students about a minute to think through an appropriate response. This "think-time" can be spent writing, also. (2) Students then turn to a partner and share their responses. (3) During the third step, student responses can be shared within a four-person learning team, within a larger group, or with an entire class during a follow-up discussion. The caliber of discussion is enhanced by this technique, and all students have an opportunity to learn by reflection and by verbalization.
- **Three-Step Interview:** Common as an ice-breaker or a team-building exercise, this structure can also be used also to share information such as hypotheses or reactions to a film or article. (1) Students form dyads; one student interviews the other. (2) Students switch roles. (3) The dyad links with a second dyad. This four-member learning team then discusses the information or insights gleaned from the initial paired interviews.
- **Simple Jigsaw:** The faculty member divides an assignment or topic into four parts with all students from each LEARNING TEAM volunteering to become "experts" on one of the parts. EXPERT TEAMS then work together to master their fourth of the material and also to discover the best way to help others learn it. All experts then reassemble in their home LEARNING TEAMS where they teach the other group members.
- **Roundtable:** Roundtable structures can be used to brainstorm ideas and to generate a large number of responses to a single question or a group of questions.
  - Faculty poses question.
  - One piece of paper and pen per group.
  - First student writes one response, and says it out loud.
  - First student passes paper to the left, second student writes response, etc.
  - Continues around group until time elapses.
  - Students may say "pass" at any time.
  - Group stops when time is called.

The key here is the question or the problem you've asked the students to consider. It has to be one that has the potential for a number of different "right" answers. Relate the question to the course unit, but keep it simple so every student can have some input. Once time is called, determine what you want to have the students do with the lists. They may want to discuss the multitude of answers or solutions or they may want to share the lists with the entire class.

- **Focused Listing:** Focused listing is used as a brainstorming technique and also as a technique to generate descriptions and definitions for concepts. Focused listing asks the students to generate words to define or describe something. Once students have completed this activity, you can use these lists to facilitate group and class discussion. Example: Ask students to list 5-7 words or phrases that describe or define what a motivated student does. From there, you might ask students to get together in small groups to discuss the lists, or to select the one that they can all agree on. Combine this technique with a number of the other techniques and you can have a powerful collaborative learning structure.
- **Structured Problem-Solving:** Structured problem-solving can be used in conjunction with several other cooperative learning structures.
  - Have the participants brainstorm or select a problem for them to consider.
  - Assign numbers to members of each group (or use playing cards). Have each member of the group be a different number or suit.
  - Discuss task as group.
  - Each participant should be prepared to respond. Each member of the group needs to understand the response well enough to give the response with no help from the other members of the group.
  - Ask an individual from each group to respond. Call on the individual by number.

From the foregoing discussion on different collaborative learning techniques, you might have understood that at their best, collaborative classrooms stimulate both students and teachers. Learning collaboratively demands responsibility, persistence and sensitivity, but the result can be a community of learners in which everyone is welcome to join, participate and grow.

Check Your Progress 3.3

Notes: *a) Write your answers in the space given below.*

b) Compare your answers with those given at the end of this Unit.

1) Write the two basic principles of Anchored Video Instruction.

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2) Write True or False.

a) Collaborative learning is a team effort where members rely on each other.

b) Collaborative learning does not help in developing social skills.

c) Collaborative learning helps students to develop critical thinking.

d) Think-Pair-Share is an example of collaborative learning.

3.4.3 Problem-based Learning

Problem-based Learning (PBL) was developed in the mid-1960s as a useful instructional alternative to conventional teaching. It originated in medical education and was introduced because many students in medical education could not see the relevance of first-year course material (e.g., anatomy, physiology, or biochemistry) to their future professions as medical doctors. Students were looking forward to working with real patients and trying to solve their problems, which typically does not happen until the internships. This led to disappointment among students as well as difficulties with integrating subject matter of different medical disciplines. The medical school of McMaster University in Hamilton, Canada was the first to tackle these issues and they designed an instructional format that made use of "problems" that reflected realistic medical problems that physicians encounter. However, the use of problems in education was not new since some Law and Business schools had long been using real-life problems. Problem-based Learning's "creative" element was the moment at which students encountered such problems. At McMaster, students started to work with problems before they had acquired any significant knowledge of the topic at hand, which differed from the situation in Law and Business schools where problems were encountered and solved after some competence was achieved. In other words, PBL distinguished itself by making problems a starting point of the learning process. It is assumed that Donald Woods of McMaster University Medical School was the first to use the term "problem-based learning. Since its origin, problem-based Learning has been implemented in numerous courses across many domains such as Law, Economics, Business Administration, Social Sciences, and even in secondary education.

Problem-based learning (PBL) is a student-centered instructional strategy in which students collaboratively solve problems and reflect on their experiences. Finkle and Torp (1995) state that "problem-based learning is a curriculum development and instructional system that simultaneously develops both problem solving strategies and disciplinary knowledge bases and skills by placing students in the active role of problem solvers confronted with an ill-structured problem that mirrors real-world problems". Characteristics of PBL are:

- Learning is driven by challenging, open-ended problems.
- Students work in small collaborative groups.
- Teachers take on the role as "facilitators" of learning.

Accordingly, students are encouraged to take responsibility for their group and organize and direct the learning process with support from a tutor or instructor. Advocates of PBL claim it can be used to enhance content knowledge and foster the development of communication, problem-solving, and self-directed learning skill. Problem-based learning (PBL) is typically organized with small groups of learners, accompanied by an instructor, faculty person, or facilitator. During this process, a series of problems are provided to learners with guidance early in the PBL process (with introductory problems), and then later guidance is faded as learners gain expertise. Guidance is faded as group members feel more confident with the subject matter and become more competent with the learned procedures. Specific tasks in a problem-based learning environment include:

- determining whether a problem exists;
- creating an exact statement of the problem;

- identifying information needed to understand the problem;
- identifying resources to be used to gather information;
- generating possible solutions;
- analyzing the solutions; and
- presenting the solution, orally and/or in writing.

The acquisition and structuring of knowledge in PBL is thought to work through the following cognitive effects:

- initial analysis of the problem and activation of prior knowledge through small-group discussion
- elaboration on prior knowledge and active processing of new information
- restructuring of knowledge, construction of a semantic network
- social knowledge construction
- learning in context
- stimulation of curiosity related to presentation of a relevant problem

Some theories suggest that learning occurs as students collaboratively engage with concepts in meaningful problem solving. In this view, knowledge is seen as a tool for thinking and for enabling learners to participate in meaningful activity. Problem-based learning is often referred to as a form of Inquiry-based Learning (IBL), which describes an environment in which learning is driven by a process of inquiry owned by the student.

As you would have understood by now problem-based learning (PBL) is an instructional method that challenges students to "learn to learn," working cooperatively in groups to seek solutions to real world problems. These problems are used to engage students' curiosity and initiate learning the subject matter. PBL prepares students to think critically and analytically, and to find and use appropriate learning resources.

3.4.4 Discovery Learning

Discovery learning has various definitions. At one end of the spectrum we find discovery learning in its simplest form. The tools and information needed to solve a problem or learn a concept are provided and the learner "makes sense" of them. Another definition is discovery learning as experimentation with some extrinsic intervention - clues, coaching, and a framework to help learners get to a reasonable conclusion. At the other end of the continuum is the expository teaching model of discovery learning where the learner "discovers" what the teacher decides he is to discover using a process prescribed by the teacher.

Jerome Bruner is thought to have originated discovery learning in the 1960s, but his ideas are very similar to those of earlier writers like John Dewey. Bruner argues that "Practice in discovering for oneself teaches one to acquire information in a way that makes that information more readily viable in problem solving" (Bruner, 1961). This philosophy later became the discovery learning movement of the 1960s. The mantra of this philosophical movement suggests that we should 'learn by doing'. Discovery Learning is an inquiry-based learning method. The concept of discovery learning has appeared numerous times throughout history as a part of the educational philosophy of many great philosophers particularly Rousseau, Pestalozzi and Dewey. "There is an intimate and necessary relation between the processes of actual experience and education" wrote Dewey. It also enjoys the support of learning theorists and psychologists Piaget, Bruner, and Papert. Jerome Bruner lays out two targets for discovery learning theory:

- Discovery Learning Theory should act as a refined extension of the broad based theory of constructivism by focusing on the individual.
- Discovery Learning Theory should serve as a way of defining and providing structure to the way in which individuals learn thus acting as a guide for educational research.

There are four components to the Discovery Learning Theory:

1) Curiosity and uncertainty
2) Structure of knowledge
3) Sequencing
4) Motivation

There are three principles associated with Discovery Learning Theory:

- Instruction must be concerned with the experiences and contexts that make the student willing and able to learn (readiness).
- Instruction must be structured so that it can be easily grasped by the student (spiral organization).
- Instruction should be designed to facilitate extrapolation and or fill in the gaps (going beyond the information given).

The discovery learning mode requires that the student participates in making many of the decisions about what, how, and when something is to be learned and even plays a major role in making such decisions. Instead of being 'told' the content by the teacher, it is expected that the student will have to explore examples and from them 'discover' the principles or concepts, which are to be learned. Discovery learning takes place in problem solving situations where the learner draws on his own experience and prior knowledge to discover the truths that are to be learned and is a method of instruction through which students interact with their environment by exploring and manipulating objects, wrestling with questions and controversies, or performing experiments. It is a personal, internal, constructivist learning environment. Bruner wrote "Emphasis on discovery in learning has precisely the effect on the learner of leading him to be a constructionist, to organize what he is encountering in a manner not only designed to discover regularity and relatedness, but also to avoid the kind of information drift that fails to keep account of the uses to which information might have to be put" (Bruner, 1961). Students interact with the world by exploring and manipulating objects, wrestling with questions and controversies, or performing experiments. As a result, students may be more likely to remember concepts and knowledge discovered on their own (in contrast to a transmissionist model). Models that are based upon discovery learning model include: guided discovery, problem-based learning, simulation-based learning, case-based learning, incidental learning, among others. Proponents of this theory believe that discovery learning has many advantages, including:

- encourages active engagement
- fosters curiosity
- enables the development of lifelong learning skills
- personalizes the learning experience
- promotes motivation

- promotes autonomy, responsibility, independence
- the development of creativity and problem solving skills
- is a tailored learning experience
- builds on the student's prior knowledge and understanding

While we understand that discovery learning is a sound pedagogical design, we must also be aware that there are potential disadvantages in it. Discovery learning may confuse the student, if no initial framework is available, be inefficient and time consuming and teachers may fail to detect problems and misconceptions while practicing discovery learning.

3.4.5 Scenario-based Learning

Scenario-based Learning (SBL) refers to learning based on context or situations and social frameworks. It is based on concept of situated cognition. Situated cognition is a relation between an individual and a social and/or physical situation. In line with the observation of Orey and Nelson (1997), scenario-based learning works on the basic premise that knowledge cannot be known and fully understood independent of its context. Context is a pervasive and potent force in any learning event. Yet instructional design models contain little guidance about how to accommodate contextual elements to improve learning and transfer. On the other hand, scenario-based learning firmly believes in the powerful role that the context can play in facilitating learning. The basic assumptions of the role of context in the instructional design of scenario-based learning are as follows:

- Context is an influential and inevitable part of every learning experience.
- Context is a medley of factors that inhibit or facilitate learning to varying degrees.
- There may be multiple contexts for a given learning or performance.
- Instructional designs can accommodate context, but cannot control it.
- The impact of context varies with the nature of the learner, the content, and the intensity of the contextual elements.
- Successful instructional designs must be, to a great extent, situation-specific.
- Instructional designers are responsible for the successful application as well as acquisition of learning, and therefore must respond to orienting and performance contexts as well as instructional contexts.

Scenario-based learning puts the student in a situation or context and exposes them to issues, challenges and dilemmas and asks them to apply knowledge and practice skills relevant to the situation. The student navigates through by choosing options and is given feedback based upon their choice.

Scenario-based learning occurs by following a series of success and failure paths through a realistic situation based on achieving the main learning objective. It is important to establish the boundaries of the scenarios. These are done using behaviour-based learning objectives as opposed to knowledge-based learning objectives.

- Scenarios are most effective when they have a game-like appearance.
- It accords with a performance improvement and behaviour change philosophy of the learning function.
- Remediation (learner feedback) is essential to successful Scenario-based learning.

- Scenario-based learning can:
  - o Reinforce learning
  - o Establish gaps in learning
  - o Overcome learning blocks
  - o Change behaviour
  - o Prepare students for panel observation
  - o Save time and/or money by replicating complex or expensive experiments.

Scenario is the description of a task or a job situation from the learner's perspective. A sequence of concrete problems is described and choices are presented that enable the learners to reach a satisfactory outcome. The key to success is the learner's situational awareness and judgment. Scenario-based learning differs from other forms like drill and practice in that it requires the selection of responses to move through the lessons, instead of content answers to questions. It supplies information only needed. As a result, it focuses on performance improvement rather than correct answers. It exposes the learners to a situation outlined in a scenario and makes the learner apply their knowledge relevant to that situation by making choices and attempting to follow a desirable path that demonstrates their ability to achieve a successful outcome. Instead of right or wrong answers, there are success and failure paths.

Scenario-based learning takes the form of a storyline in which learners are required to assume a key role. The roles need to be carefully selected, preferably something that a learner might actually perform in real life. Supporting materials and resources in the form of readings, and other forms of resource materials can wrap around the scenario for deeper understanding of the concepts. A well designed scenario can offer learners and teachers a highly interactive and engaging learning and teaching environment that is imperative in open and distance educational settings. The scenario-based learning can be used for teaching of any kind of subject matter, at any level of education and training and via any delivery mode. However, experience in scenario-based learning indicates that it has particular advantages for practice-based discipline areas where the experience of practitioners is especially relevant to what constitutes knowledge and understanding in the field. Scenario-based learning is widely in practice in the world of e-learning.

3.4.6 Case-based Learning

Case-based learning focuses on the building of knowledge and the group works together to examine the case. The instructor's role is that of a facilitator and the students collaboratively address problems from a perspective that requires analysis. Much of case-based learning involves learners striving to resolve questions that have no single right answer. This method is learner-centered, and involves intense interaction between the participants. Using a case-based approach engages students in discussion of specific situations, typically real-world examples.

The use of case studies holds great promise as a pedagogical technique for teaching. Many faculty use case studies in their curriculum to teach content, involve students with real life data to provide opportunities for students to put themselves in the decision maker's shoes.

Cases add meaning by providing students with the opportunity to see theory in practice. Real world or authentic contexts expose students to viewpoints from multiple sources and see why people may want different outcomes. Students can also see how a decision will impact different participants, both positively and negatively.

Cases usually require students to analyze data in order to reach a conclusion. Since many assignments are open-ended, students can practice choosing appropriate analytic techniques as well. Instructors who use case-based learning say that their students are more engaged, interested, and involved in the class.

In their effort to find solutions and reach decisions through discussion, students sort out factual data, apply analytic tools, articulate issues, reflect on their relevant experiences, and draw conclusions they can relate to new situations. In the process, they acquire substantive knowledge and develop analytic, collaborative, and communication skills.

Cases are important for bringing real world problems into a classroom or a workshop. They ensure active participation and may lead to innovative solutions to problems. The Formats for Cases are as follows:

- *"Finished" cases based on facts*—for analysis only, since the solution is indicated or alternate solutions are suggested.
- *"Unfinished" open-ended cases*, where the results are not yet clear (either because the case has not come to a factual conclusion in real life, or because the instructor has eliminated the final facts.) Students must predict, make choices and offer suggestions that will affect the outcome.
- *Fictional cases* entirely written by the instructor—can be open-ended or finished. Cautionary note: the case must be both complex enough to mimic reality, yet not have so many "red herrings" as to obscure the goal of the exercise.
- *Original documents*—news articles, reports with data and statistics, summaries, excerpts from historical writings, artifacts, literary passages, video and audio recordings, ethnographies, etc. With the right questions, these can become problem-solving opportunities. Comparison between two original documents related to the same topic or theme is a strong strategy for encouraging both analysis and synthesis. This gives the opportunity for presenting more than one side of an argument, making the conflicts more complex.

The different types of cases along with brief descriptions are presented below for your understanding:

1) Extensive, detailed case study.
   - Frequently used in business courses,
   - Often center on a particular decision, the people who made it, the people affected by it, and the impact of that decision on all parties.
   - May run 100 pages or more. Usually the student reads the entire case individually and prepares an analysis of the decisions with recommendations for change. The case is then discussed.
2) Descriptive, narrative cases, parts of which are given successively
   - Up to 5 pages
   - 1-2 paragraphs per page
   - Designed to be used over the course of two or more class meetings.
   - Disclosed to the students one page at a time, with discussion, hypothesis generation and development of learning goals and study questions for each part of the case.

- Objectives are given to the student toward the end of the case.
- This style of case originated in medical settings.

3) Mini Cases
   - designed to be used in a single class meeting,
   - usually tightly focused.
   - useful for helping students apply concepts, for introducing practical applications in lab settings, or as a pre-lab exercise designed to make lab work more meaningful.

4) Bullet Cases
   - Two or three sentences with a single teaching point.
   - Similar to problems commonly used on exams, however, students discuss them in small groups.

5) Directed Case Study
   - Short cases are followed immediately with highly directed questions.

6) Fixed Choice Options (Multiple Choice Cases)
   - May be a variation on bullet cases above,
   - Is a minicase with 4-5 plausible solutions. In groups students must choose and defend one solution.
   - Useful for policy, ethics, design decisions.
   - Good for short, in-class uses.
   - Multiple choice questions might convert easily to these.

The characteristics of a good case are as follows:

- A good case tells a story. (It must have an interesting plot that relates to the experiences of the audience. It must have a beginning, a middle, and an end. The end may not exist yet; it will be what the students need to supply once the case is discussed.)
- A good case focuses on an interest-arousing issue.
- A good case is set in the context of current relevance.
- A good case creates empathy with the central characters.
- A good case includes quotations.
- A good case is relevant to the reader.
- A good case must have pedagogic utility.
- A good case is decision forcing.
- A good case has generality.
- A good case is short.

The methods of managing a Case assignment are as follows:

- Design discussions for small groups: 3-6 students are an ideal group size for setting up a discussion on a case.
- Design the narrative or situation such that it requires participants to reach a *judgment, decision, recommendation, prediction or other concrete outcome*. If possible, require each group to reach a consensus on the decision requested.
- Structure the discussion. The instructor should provide a series of written questions to guide small group discussion. Pay careful attention to the sequencing of the questions. Early questions might ask participants to make observations about the facts of the case. Later

questions could ask for comparisons, contrasts, and analyses of competing observations or hypotheses. Final questions might ask students to take a position on the matter. The purpose of these questions is to stimulate, guide or prod (but not dictate) participants' observations and analyses. The questions should be impossible to answer with a simple yes or no.

- Debrief the discussion to compare group responses. Help the whole class interprets and understand the implications of their solutions.
- Allow groups to work without instructor interference. The instructor must be comfortable with ambiguity and with adopting the non-traditional roles of witness and resource, rather than authority.

3.4.7 Learning by Designing

When people think about learning and education, they often think about one person transmitting information to another. Increasingly, educators are recognizing that this "transmission approach" doesn't work very well. Research has shown that people learn best not when they are passively receiving information, but when they are actively engaged in exploring, experimenting, and expressing themselves. More and more schools are focusing on learning-by-doing, engaging students in hands-on activities. Students are made to simply get their hands on computers; they use computers to design, create, and invent things. It's not just learning by-doing; it's learning-by-designing.

Learning by designing approach is inspired by two important theories of learning and education viz., the constructivist theory of learning and the constructionist approach to education. The constructivist theory of learning, developed by Swiss psychologist Jean Piaget, views learning as a very active process in which people continually construct new knowledge from their experiences in the world. According to this theory, people don't get ideas, they make them. Constructivist theory is the underpinning for many educational reform initiatives. The constructionist approach to education, developed by Seymour Papert, is based on two types of construction: it argues that people construct new knowledge especially well when they are engaged in constructing things in the world. They might be constructing sand castles or computer programs. What's important is that they are actively engaged in creating something meaningful to themselves or others around them.

The reasons for and the advantages of use of learning-by-doing approach are as follows:

- Design projects engage kids as active participants, giving them a greater sense of control and responsibility for the learning process.
- Design projects encourage creative problem-solving.
- Design projects are often interdisciplinary, bringing together ideas from art, technology, math, and sciences.
- Design projects help kids learn to put themselves in the minds of others, since they need to consider how others will use the things they create.
- Design projects provide opportunities for reflection and collaboration.
- Design projects set up a positive-feedback loop of learning: when kids design things, they get new ideas, leading them to design new things, from which they get even more ideas, leading them to design yet more things.

3.4.8 Self Learning

Self-Learning is otherwise known as Self Directed Learning (SDL) and Self Regulated Learning. In self-directed learning (SDL), the individual takes the initiative and the responsibility for what occurs. Self-directed learning has been described as "a process in which individuals take the initiative, with or without the help of others," to diagnose their learning needs, formulate learning goals, identify resources for learning, select and implement learning strategies, and evaluate learning outcomes. Individuals select, manage, and assess their own learning activities, which can be pursued at any time, in any place, through any means, at any age. For the individual, SDL involves initiating personal challenge activities and developing the personal qualities to pursue them successfully. Self-directed Learning includes the learner initiating the learning, making the decisions about what training and development experiences will occur, and how. The learner selects and carries out their own learning goals, objectives, methods and means to verifying that the goals were met. Self-directed learning becomes even more powerful when it's systematic, that is, when we decide:

1) What areas of knowledge and skills we need to gain in order to get something done (our learning needs and goals)?
2) How we will gain the areas of knowledge and skills (our learning objectives and activities)?
3) How we will know that we've gained the areas of knowledge and skills (learning evaluation)?

Elements of Self-Directed Learning

The first element is student control over as much of the learning experience as possible. The major shift from teacher directed learning to self directed learning is a shift in the locus of control from the teacher to the student. For the student, this represents a shift from outer control to inner control. Such a shift reflects the major change underway in the lives of adolescents as they begin to establish themselves as individuals separate from their childhood dependencies. During these years they begin to shape their own opinions and ideas, to make their own decisions, choose their own activities, take more responsibility for themselves and begin to work. Charging students with the task of developing their own learning, turns them to their own resources, which develops their emerging individuality and helps them to rehearse more adult roles.

The second element of SDL is skill development. Inner control is aimless unless students learn to focus and apply their talents and energies intensely. For this reason the emphasis in SDL is on the development of skills and processes that lead to productive activity. Students learn to achieve course outcomes, to think independently and to plan and execute their own activities. These processes, and the skills involved in them, come together in student proposals for study and action. They prepare and then negotiate them with their teachers, often in the form of written agreements, which become records of the contracts that they negotiate. The intent is to provide a framework that enables students to identify their interests and equips them to realize them successfully.

The third element is students learning to challenge themselves to their best possible performance. Self-direction is dormant without challenge. First teachers challenge students and then they challenge them to challenge themselves. Challenge involves reaching for a new level of performance in a familiar field or launching an adventure into a new field of interest. It means setting the standard of achievement a step higher than one can readily achieve. Challenging oneself means taking the risk to go beyond the easy and familiar. For those willing, it means reaching regularly for performances that demand from them the very best they have to offer. The challenge is to go out far and in deep: it is the challenge of the hero's journey.

The fourth element is student self-management, management of themselves and of their learning enterprises. In SDL choices and freedoms are matched by self-control and responsibilities. Students learn to express self-control by searching for, and making a commitment to, core personal interests and aspirations. In this process they determine not only what they will do but the kind of performer they will become. SDL requires confidence, courage and determination to energize the effort involved. Students develop these attributes as they become skilled in managing their own time, effort and the resources they need to conduct their work. Even well organized efforts run aground. In the face of obstacles, students learn to face their difficulties, find alternatives and solve their problems in order to maintain effective productivity. The combination of inner resources and performative skill required for self-management in SDL is the same process students will require for the successful management of growth and productivity throughout their lives.

The fifth element is that students motivate and assess their own efforts. Many principles of motivation are built into the design of SDL, such as the pursuit of one's own high-interest goals. When students adopt these principles they become the major elements of self-motivation. By setting important goals for themselves, arranging for feedback on their work and achieving success, for example, they learn to inspire their own efforts. Similarly, students learn to evaluate their own progress. They plan the method by which their work will be assessed and usually negotiate the terms with the teachers. These terms are often stated in the learning proposals that students present. Since the responsibility for proving that they have achieved their goals lies with students, they gather their proofs and/or products in a portfolio, which becomes the focus of evaluation. Just as self-motivation energizes students to produce the achievements that are evaluated, self-assessment motivates students to seek the best possible achievement.

Self-Regulated Learning Activities

Self-regulated learners engage recursively in a cycle of cognitive activities as they work through a given task. To begin, self-regulated learners analyze task demands. When presented with a history report, for example, a self-regulated learner examines cues to determine what is required. The student might review notes from a teacher's verbal instructions or scrutinize assignment descriptions to extract information regarding the topic, expected procedures, required products, and/or marking criteria. As part of this process, the student would draw on his or her prior knowledge about what makes a good "report" (i.e., "metacognitive knowledge" about the task). For example, the student might recall that, in a report, teachers expect solid research, a clear and organized presentation, and/ or appropriate references. Task analysis is critical to effective self-regulation because it sets the context for further learning. Students base subsequent decisions (e.g., about strategies to use) on their perception of task demands.

Based on the requirements of a particular task, self-regulated learners then select, adapt, or even invent strategic approaches to achieve task objectives.

As in task analysis, students draw on prior knowledge and experience to make strategy decisions (i.e., metacognitive knowledge about strategies).

Once self-regulated learners implement strategies, they monitor outcomes associated with strategy use. Effective learners self-evaluate by comparing progress against task criteria to generate judgments about how they are doing. If they perceive gaps between desired and actual performance, they adjust learning activities accordingly. Effective learners also interpret externally provided feedback (e.g., marks on tests, teacher or peer comments on writing) as they self-evaluate performance. They use feedback strategically to diagnose challenges and problem solving solutions. As with task analysis, monitoring is critical to effective self-regulation. This is because, during monitoring, students generate judgments about progress and make decisions that shape further learning activities.

Characteristics of Self-Regulating Students

What characterizes the self-regulating students is their active participation in learning. Characteristics attributed to self-regulating persons coincide with those attributed to high-performance, high-capacity students as opposed to those with low performance. Studies show that the following characteristics differentiate students who self-regulate their learning from those who do not:

1) They are familiar with and know how to use a series of cognitive strategies (repetition, elaboration, organization etc.,) which help them to attend to, transform, organize, elaborate and recover information.
2) They know how to plan, control and direct their mental processes towards the achievement of personal goals.
3) They show a set of motivational beliefs and adaptive emotions, such as a high sense of academic self-efficacy, the adoption of learning goals, the development of positive emotion towards tasks, as well as the capacity to control and modify these, adjusting them to the requirements of the task and of the specific learning situation.
4. They plan and control the time and effort to be used on the tasks, and they know how to create and structure favourable learning environments, such as finding a suitable place to study, and help-seeking from teachers and classmates when they have difficulties.
5. They show greater efforts to participate in the control of academic tasks, classroom climate and structure.
6. They are able to put into play a series of volitional strategies, aimed at avoiding external and internal distractions, in order to maintain their concentration, effort and motivation while performing academic tasks.

In a nutshell, the self-regulating learners see themselves as agents of their own behaviour, they believe learning is a proactive process, they are self-motivated and they use strategies that enable them to achieve desired academic results.

In the context of communication technologies, the use of appropriate pedagogical designs becomes important. While self-learning is an over-riding model used in distance education, the use of Anchored Video Instructions (AVI), Collaborative Learning, Case Study, and Problem-Based Learning designs can be used in both print and non-print media. While AVI and collaborative learning designs can be suitably used in teleconference, the use of problem based learning and discovery learning are suitable for multimedia and web-based learning environments. Learning by designing is highly significant when we want to develop skills and project work experience to internship, where learners may be asked to design and project or prototype. Scenario-based learning is useful in professional courses where the learners may take a specific role, such as a teacher or teacher-educator. The exposure to these learning designs shall help you in thinking about teaching and learning using technology, and not just production of media materials. Non-print materials without thinking of how they would be delivered or used in teaching learning may not promote effective learning. You are expected to relate these learning to developments of technical skills in this course and use of production of appropriate learning materials for your students.

Check Your Progress 3.4

Notes: *a) Write your answer in the space given below.*

b) Compare your answer with the one given at the end of this unit.

Match the pedagogical designs in Column B with the learning scenario/subject in Column A in the best possible way.

Column A	Column B
Organizational Problems	Anchored Video Instruction
Project Management	Collaborative Learning
Hazardous situation in a Steel Plant	Problem-based Learning
Topics in Dental Science	Discovery Learning
Forest and environment in a CD	Scenario-based Learning
Teacher Professional Development	Case Study
Negotiation skills	Learning by Design

3.5 LET US SUM UP

This Unit is all about teaching and learning using technology. We used pedagogiacal designs in this Unit in the context of the art of teaching and the science of learning. It was emphasized that teaching is an organized act where design becomes highly important. The design or the blueprint of teaching using technology makes all the difference in learning. It is a creative process, where you are expected to have a thorough understanding of learning theories, instructional design models, teaching methods and media, and educational technologies. We also discussed some pedagogical designs in details. These are: Anchored Video Instruction, Collaborative Learning, Problem-Based Learning, Discovery Learning, Scenario-Based Learning, Case-Based Learning, Learning by Designing, Self-Learning, etc. While each one has its own unique qualities and advantages, we discussed how these can be applied in teaching and learning situations in general, including technology mediated communication technology enabled learning environments. As you progress in this course, keep these pedagogical designs in mind to think how you can use these for different kinds of technologies. Each of these demands high levels of teacher and student engagements. Though in self learning (which in most case is true for distance and online learning) the student is mostly self directed and requires little help from the teacher, we can design the systems in such a way so as to have high interaction using the designs discussed. However, as can be seen from the discussions, these designs would require more systematic planning for distance and online learning systems.

3.6 KEYWORDS

Anchored Video Instruction: is a system of instruction that uses video 'anchors' to provide authentic learning environments.

Case Based Learning: uses case studies of various types to help the student develop critical understanding of the problem, and argue in favour or against the case to give solutions/recommendations.

Collaborative Learning: is an umbrella term that involves students working in groups to accomplish common goals, where they are interdependent, but individually accountable for their action. There are various techniques of collaboration to facilitate learning.

Design: refers to a plan/document/blueprint for making something to work. It can be used a s verb or noun to show process or a product.

Discovery Learning: is a teaching and learning strategy where the teacher provides clues and the learner makes self efforts to discover knowledge.

Pedagogy: is art of teaching and science of learning. Used mostly in school level, we have used this as generic term in this unit.

Problem-based Learning: is a teaching strategy where learning is driven by challenging tasks that are given to them as problem, and the students use various methods to analyse and solve the problem. Learning happens when the student is in a position to identify the problem correctly, find appropriate solutions and suggest the right solution for the given problem.

Scenario-based Learning: refers to learning based on context or situations and social frameworks. It is mostly used in teaching professional courses, where students can be assigned specific roles to develop skills and knowledge.

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3.8 FEEDBACK TO CHECK YOUR PROGRESS QUESTIONS

Check Your Progress 3.1

1) The assumptions of instructional design are:
   a) that instructional planning must be oriented towards individual to help them develop knowledge and skills;
   b) instructional design has phases where the teacher prepares lesson plan and executes it later;
   c) systematically designed instruction can greatly affect individual human development; and

d) designing instruction must be based upon knowledge of how human beings learn.

2) Pedagogical design is a creative process, where the teacher is expected to design instruction for student learning. As in any creative process, it is management of constraints. There are some non-negotiable situations and some negotiable situations. For example in distance learning, the situation is given, and we have to teach the students who are dispersed, and may not be available synchronously. So, the design process has to take this constraint in mind. But, there may be some negotiable situations, as to when the students may be asked to come to a study centre or attend a teleconference or practical session. So, as a designer, you have the creativity to design the learning environment appropriately. Here creativity does not mean to be original, but to use previous knowledge and develop connections in the present context to use the available resources suitably to increase effectiveness. So, pedagogical design is a creative process.

Check Your Progress 3.2

Distance learning is primarily an asynchronous teaching and learning scenario, where the students are separated from the teaching institution. They study at their own place, pace and time. Prepackaged learning materials are supplied to the learners that are designed specially to help them learn individually with minimal support of others. These materials are print-based, but other media are also used. It is in this context that as designer of the pedagogical process that one needs to think about the access and availability of specific technology before we can include that technology in the learning package. With the advent of newer technologies, distance learning is becoming more and more synchronous as virtual conferences are being used to organize classes regularly. The pedagogical design process demands that issues related to access, cost, teaching value, etc of the technology be considered.

Check Your Progress 3.3

1) The two basic principles of anchored instruction are:
   - Learning and teaching activities should be designed around an "anchor" which is often a story, adventure, or situation that includes a problem or issue to be dealt with that is of interest to the students.
   - Instructional materials should include rich resources that students can explore as they try to decide how to solve a problem (e.g., interactive videodisc programs).

2) (a) True (b) False (c) True (d) True.

Check Your Progress 3.4

Column A	**Column B**
Organizational Problems	Case Study
Project Management	Learning by Design
Hazardous situation in a Steel Plant	Anchored Video Instruction
Topics in Dental Science	Problem-based Learning
Forest and environment in a CD	Discovery Learning
Teacher Professional Development	Scenario-based Learning
Negotiation skills	Collaborative Learning