
UNIT 4 CONSTRUCTIVIST SCHOOL OF THOUGHT

Structure

- 4.1 Introduction
- 4.2 Learning Outcomes
- 4.3 What is Constructivism
- 4.4 Constructivism and Instructional Design
 - 4.4.1 Discovery Learning
 - 4.4.2 Zone of Proximal Development
 - 4.4.3 Scaffolding
 - 4.4.4 Cognitive Apprenticeship
 - 4.4.5 Coaching
 - 4.4.6 Contextual Learning
- 4.5 Application of Constructivism in Instructional Design
 - 4.5.1 Anchored Instruction
- 4.6 Let Us Sum Up
- 4.7 Check Your Progress: Hints to Answers

4.1 INTRODUCTION

The different schools of learning that have evolved through times show us how an array of ideas and establishment of developmental schools resulted in schools of thoughts such as behaviourism and cognitivism.

Behaviouristic school of thought associates learning with response strengthening where the learner is repeatedly cued to give simple responses followed by immediate feedback, and receives rewards and punishment accordingly. It focuses on observable changes in behaviour, and new behavioural pattern being repeated until it becomes automatic. Cognitivism is based on the thought process behind the behaviour. Changes in behaviour are observed, and used as indicators to what is happening inside the learner's mind, while constructivism tells that we all construct our own perspective of the world through individual experiences and schema. Constructivism focuses on preparing the learner to solve problems in ambiguous situations.

This unit discusses the meaning of constructivism, its essential features, the main principles of constructivism that play a role in creating a learning environment where learners construct knowledge on their own, and problem-based learning that lead to constructing knowledge and other cognitive processes and their assessment in different sections. The unit also incorporates several activities and exercises for you to do during the course of your interaction with the study material.

4.2 LEARNING OUTCOMES

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

- explain the meaning of constructivism and its essential features;
- analyze the social and psychological constructivists' views and their applicability to design instruction;
- design learning contexts in which students learn through discovery method;

- explain the meanings of Zone of Proximal Development (ZPD), cognitive apprenticeship and contextual learning and their relationship with each other in the construction of knowledge;
- describe the use of scaffolding in forming cognitive structures; and
- write the implications of this theory for designing instruction.

4.3 WHAT IS CONSTRUCTIVISM?

All knowledge is constructed and consists of what individuals create and express. It is also claimed that all knowledge is tentative, subjective and personal, since individuals make their own meaning from their beliefs and experiences.

What is knowledge? What is knowing? How do we come to know what we know? These were important questions that became the concern for the epistemologists or philosophers who studied knowledge. In the history of epistemology, the trend has been to move from a static, passive view of knowledge towards a more adaptive and active view. It is a theory of learning that has roots in both philosophy and psychology. It has a long history and major theorists such as John Dewey, Jean Piaget, Maria Montessori, Jerome Bruner and Lev Vygotsky have contributed to the field.

Constructivism suggests that individuals create their own understanding based on the interaction of what they already know and believe, and the phenomena or ideas with which they come into contact. It is a theory of how the learner constructs knowledge from experience, which is unique to each individual. Constructivism is a system of explanations of how learners, as individuals, adapt and refine knowledge. Here, learners actively restructure knowledge in highly individualized ways, based on intellectual configurations on existing knowledge and formal instructional experiences.

Among the constructivists, there are those who focus on the individual acting as sole agent in the process of constructing and reconstructing meaning. Others focus on the socio-cultural context of the individual, which influences the construction of knowledge. There are different schools of constructivism, some of which are discussed below.

- **Trivial Constructivism:** This view of learning emphasises that learning occurs when a learner actively constructs a knowledge representation. Here, the learner constructs his/her own understanding of the world by reflecting on his/her experiences. In the learning process, the learner selects, organises and integrates information to construct knowledge. Here, the learner is an active player in the process of constructing knowledge. Therefore, instructions are to be provided to the learner with appropriate experiences with a view that enables them to construct knowledge.
- **Social Constructivism:** In this view, the idea is that learning occurs in a socio-constructive context of the learner through social interaction.

Students have also to include the social and cultural settings, which they learn and which also have impact on students as they change their ideas. From this perspective, sometimes referred to as 'situated cognition', the cultural and the social background of students, use of language, and how meaning is derived from various contexts play a role in the students' construction of ideas. In other words, constructivist learning has a social and cultural aspect. Social context and language are therefore 'fundamental to any learning'. Social constructivism recognizes these aspects of learning and knowledge construction.

Vygotsky is one of the exponents of social constructivism. Social constructivism views each learner as a unique individual with unique needs and backgrounds. The learner is also seen as complex and multidimensional. Social constructivism acknowledges the uniqueness and complexity of the learner. It utilises encouragement and rewards as an integral part of learning.

From the social constructivist viewpoint, it is important to take into account the background and culture of the learner throughout the learning process, as this background also helps to shape the knowledge and truth that the learner creates, discovers and attains in the learning process.

Based on the above discussion, we may say that constructivism acknowledges that:

- knowledge is not fully known and fixed,
- there is a real world that we experience, but many ways to structure the world,
- knowledge is somewhat personal. The learner plays an active role in the personal creation of knowledge through experiences, and
- learning is a social process in which the learner constructs meaning that is influenced by the interaction of prior knowledge and new learning events.

Check Your Progress 1

- Note:** i) Write your answers in the space given below.
ii) Check your answers with the answers given at the end of this Unit.

1) Explain the concept of Constructivism in your own words.

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2) Describe different types of Constructivism.

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4.4 CONSTRUCTIVISM AND INSTRUCTIONAL DESIGN

As you have seen in the preceding sections, constructivism emphasizes knowledge construction rather than the reproduction of knowledge in the form of rote memory. Knowledge construction takes place in individual contexts and through negotiating and collaborating with the group members. The learner's previous knowledge, beliefs and attitudes are considered in the knowledge construction process. The process of constructing knowledge involves observing relationship between the concepts and viewing things in a holistic or integrated manner. Constructing knowledge is through discovery. Therefore, learning is inquiry-based and discovery-based. The role of an instructional designer is to set up problems or projects, and provide mechanisms to monitor, to explain and, guide the direction of inquiry to the learner.

The essential features of constructivism that find prominence in the instructional design are discussed in the following sub-sections.

4.4.1 Discovery Learning

Learning through discovery is an important component involved in constructing knowledge. Jerome Bruner is often credited with originating the concept of discovery learning in the 1960s, but his ideas are very similar to those of earlier psychologists like John Dewey. In the opinion of Bruner, the “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, p.26). This philosophy later became the discovery learning movement of the 1960s. This philosophical movement suggests that we should ‘learn by doing’, which is the important core of constructivism.

Construction of meanings or concepts or principles, etc., take place through discovery where the learners are placed in problem-solving situations. The learner draws on his/her own experience and prior knowledge and interacts with his/her environment by exploring and manipulating objects, wrestling with questions and controversies, or performing experiments. The learners construct new ideas by selecting and transforming ideas, propounding tentative views, and by taking ownership of the learning process and outcomes. For this reason, instruction must be concerned with presenting experiences and contexts that make learners willing and able to learn through discovery of meaning. According to Bruner, information or knowledge is most effectively gained by personal discovery and that the goal of education should be intellectual development. The curricular materials designed for learners should foster the development of problem solving skills through inquiry and discovery.

One of the main reasons for constructing knowledge through discovery is that “you cannot teach people everything they need to know. The best way you can do this is to position them where they can find what they need to know, when they need to know it”. Thus, constructing knowledge through discovery can be equated to the proverb ‘teaching how to catch fish rather than giving him/her fish’, because it reduces the dependency of the student on information.

4.4.2 Zone of Proximal Development (ZPD)

Vygotsky emphasized that learners begin learning from their surroundings, from people around, and from their social world. He believed that our social world is the source of all concepts, ideas, facts, skills and attitudes. All personal psychological processes begin as social processes shared among people. Let us look into some of the ideas of Vygotsky that play a vital role in learning.

According to Vygotsky, there are three ways of learning:

- 1) Imitative learning where one person tries to imitate the other.
- 2) Instructed learning where learners internalise the instructions of the teacher and use these to control their learning.
- 3) Collaborative learning where a group of peers strives to understand each other and through their interactions, learning occurs.

Let us see how Vygotsky’s ideas contribute to the process of learning. Vygotsky thought that through instruction, learners would develop the skills associated with living successfully in the culture. In particular, he was interested in collaborative activity between learners and more matured members of the society, through which children will be able to master activities and think in ways that have meaning in their culture. The concept, called Zone of Proximal Development (ZPD), explains how learning occurs.

Zone of Proximal Development (ZPD)

The distance between the actual development level of a learner as determined by independent problem solving, and the level of potential development as determined through problem solving under adult guidance or in collaboration with more capable peers (Vygotsky 1978).

Vygotsky recognised that there is a gap between what the person could do without assistance and what they could do if some help was provided. He called this gap “the Zone of Proximal Development”. When we provide a set of temporary supports so that someone can complete a task, we are working in their Zone of Proximal Development. This is typically thought of as each person’s range of potential for learning, where that learning is culturally shaped by the social environment. A learner ultimately appropriates and internalizes the knowledge transacted through assisted performance so that it becomes their own. A distance teacher instructional designer has to design learning within this zone.

According to psychologists Ronald Gallimore and Ronald Tharp (1990), there are four stages of Zone of Proximal Development that a learner goes through:

First stage: In this stage, the learner’s performance is assisted by more capable persons, such as parents, teachers, and peers.

Second stage: In this stage, there is less dependence on external assistance and the performance begins to become internalised. The learners help themselves by using self-directed speech.

Third stage: In this stage, the performance is developed, automated and fossilised. At this time assistance from others and self-directed speech is not required. Task performance is smooth and integrated, and internalised and automated.

Fourth stage: In this stage, deautomatization of performance takes place, which leads the individual to re-enter the ZPD. For example, at times, even, well learnt responses are forgotten, or become rusty. At these times, the individual re-enters the ZPD and consciously talks through the matter internally or seeks external assistance. To this extent there is a continual movement in and out of the ZPD. Gallimore and Tharp term this a ‘recursion’.

4.4.3 Scaffolding

In the previous sections, you have seen that Vygotsky’s theory suggests that students learn through contact with more capable members of a society. The more capable member organises activities so that the students participate in real activities at their own level of capability. The system of support is called a scaffold. The activity is organised so that it is within the learner’s zone of proximal development. To place learning in the ZPD, an appropriate level of difficulty needs to be established. This level, assumed to be at the proximal level, must be challenging. The adult then needs to provide for assisted performance. This is referred to as instruction. The adult provides guided practice to the child with a clear sense of the goal or outcome of the learner’s performance. As with scaffolding around a building, it is gradually removed, so that the learner can perform the task independently.

4.4.4 Cognitive Apprenticeship

Cognitive apprenticeships are situated within the social constructivist paradigm. Students work in teams on projects or problems with close scaffolding of the instructor. Cognitive apprenticeships are representative of Vygotskian Zones of Proximal Development in which the students’ tasks are slightly more difficult than they can manage independently, requiring the aid of their peers and instructor to succeed.

Cognitive apprenticeship is an approach to the learning process where a master of a skill teaches that skill to an apprentice. Constructivist approaches to human learning have led to the development of a theory of cognitive apprenticeship, which holds that the masters of a skill often fail to take into account the implicit processes involved in carrying out complex skills when they are novices or beginners. To combat these tendencies, “cognitive apprenticeships” are designed, among other things, to bring these tacit processes into the open, where students can observe, enact, and practice them with help or assistance from the teacher. By using processes, such as modelling and coaching, cognitive apprenticeships also support the three stages of skill acquisition. They are: the cognitive stage, the associative stage, and the autonomous stage.

In the cognitive stage, learners develop declarative understanding of the skill. In the associative stage, mistakes and misinterpretations learnt in the cognitive stage are detected and eliminated, while in the associative stage, associations between the critical elements involved in the skill are strengthened. Finally, in the autonomous stage, the learner’s skill becomes honed and perfected until it is executed at an expert level. For example, in traditional apprenticeships the apprentice learns a trade such as tailoring or carpentry by working under a master teacher. The cognitive apprenticeships allow the master to model behaviours in a real world context with cognitive modeling. By listening to the master explain exactly what she is doing and thinking as she models the skill, the apprentice can identify relevant behaviours and develop a conceptual model of the processes involved. The apprentice then attempts to imitate those behaviours with the master observing and providing coaching.

4.4.5 Coaching

Coaching provides assistance at the most critical level – the skill level just beyond what the learner/apprentice could accomplish by herself. This may be referred to as the Zone of Proximal Development, where fostering development within this zone leads to the most rapid development. The coaching process includes additional modeling as necessary, corrective feedback, and reminders, all intended to bring the apprentice’s performance closer to that of the master’s. As the apprentice becomes more skilled through the repetition of this process, the feedback and instruction provided by the master “fades” until the apprentice is, ideally, performing the skill at a close approximation of the master level. A part of the effectiveness of the cognitive apprenticeship model comes from learning in context. Coaching and scaffolding is a key part of situated learning materials.

It is argued that cognitive apprenticeships are less effective when skills and concepts are taught independent of their real world context and situation. Situations might be said to co-produce knowledge through activity. It is also argued that learning and cognition are fundamentally “situated” In cognitive apprenticeships; the activity being taught is modeled in real world situations.

4.4.6 Contextual Learning

In the preceding sections we saw that learners construct meanings by connecting the experiences, which they are already exposed to in various contexts with the new learning. The teacher/instructor/academic counselors plays a role of scaffolder while the learner makes connections.

Contextualized learning is a proven concept that incorporates much of the most recent research in cognitive science. The contextual approach recognizes that learning is a

complex and multifaceted process that goes far beyond drill-oriented, stimulus-and-response methodologies.

In contexts, learning occurs only when students process new information or knowledge in such a way that it makes sense to them in their own frames of reference (their own inner worlds of memory, experience, and response). This approach to learning and teaching assumes, that the mind naturally seeks meaning in context, that is, in relation to the person's current environment, and that it does so by searching for relationships that make sense and appear useful.

Contextual learning focuses on the multiple aspects of any learning environment, whether a classroom, a laboratory, a computer lab or a worksite. It encourages distance teachers to choose and/or design learning environments that incorporate as many different forms of experience as possible (social, cultural, physical, and psychological) in working toward the desired learning outcomes. In such an environment, students discover meaningful relationships between abstract ideas and practical applications in the context of the real world. Concepts are internalized through the process of discovering, reinforcing, and relating. For example, in a biology or chemistry class, students might learn basic science concept of plants by observing different types of plants and their structure, and relate them while studying about the modifications of roots, stems and leaves.

Contextual learning helps students to relate the subject matter content to real world situations and motivate them to make connections between knowledge and its applications to their lives as family members, citizens, and workers and engage in the hard work that learning requires.

Contextual Instruction and Learning (CIL) strategies

- **Problem based learning:** Contextual learning can be problem based where the students begin with a simulated or real problem. Students use critical thinking skills and a scientific approach to inquire to address the problem or issue. They may also draw upon multiple content areas to solve these problems. Worthwhile problems that are relevant to students' families, school experiences, workplaces, and communities hold greater personal meaning for students.
- **Using multiple contexts:** While constructing knowledge, the students might use various resources and contexts, such as community, neighborhood, family, school and so on. We have already seen that knowledge cannot be separated from the physical and social context in which it develops. How and where a person acquires and creates knowledge is, therefore, very important. The contextual learning experiences are enriched when students learn skills in multiple contexts.
- **Drawing upon student diversity:** Students come from diverse backgrounds with differences in values, social mores, and perspectives. These differences can be the impetus for learning and can add complexity to the CIL experience. Team collaboration and group learning activities respect students' diverse histories, broaden perspectives, and build inter-personal skills.
- **Self-regulated learning:** Ultimately, students must become lifelong learners. Lifelong learners are able to seek out, analyze, and use information with little to no supervision. To do so, students must become more aware how they process information, employ problem-solving strategies, and use background knowledge. Contextual experiences should allow for trial and error; provide time and structure for reflection; and provide adequate support to assist students to move from dependent to independent learning.

- **Interdependent learning groups:** Students will be influenced by and will contribute to the knowledge and beliefs of others. Learning groups, or learning communities are established in workplaces and institutions with an effort to share knowledge, focus on goals, and allow all to teach and learn from each other. When learning communities are established in different institutions, educators act as coaches, facilitators, and mentors.
- **Authentic assessment:** Contextual learning is intended to build knowledge and skills in meaningful ways by engaging students in real life, or authentic contexts. Assessment of learning should correspond with the methods and purposes of instruction. Authentic assessments show among other things that learning has occurred; are blended into the teaching/learning process; and provide students with opportunities and direction for improvement. Authentic assessment is used to monitor student progress and inform teaching practices.

Activities, such as team teaching, cooperative learning, integrated learning, work-based learning, service learning, problem-based learning, and other support that are contextual in nature are required in a distance learning context where the constructivist approach to learning is intended.

Check Your Progress 2

- Note:** i) Write your answers in the space given below.
ii) Check your answers with the answers given at the end of this Unit.

1) Explain the concept of discovery learning.

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2) What is Scaffolding in educational learning terms?

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4.5 APPLICATION OF CONSTRUCTIVISM IN INSTRUCTIONAL DESIGN

It is necessary to change our perspectives of a learner, learning process and learning system, so that a conducive, democratic learning environment is created for the learners where they can explore, analyze, share ideas, reflect, communicate and learn together in groups. Each learner needs to be valued for his or her own experiences that he/she brings to the learning environment. The role of a distance teacher/unit designer becomes more critical in a constructivist learning situation when compared to that of a conventional teacher. We will expand this concept in the following sections that concentrate on creating a constructivist distance learning with various approaches and techniques. Constructivism can be applied to the distance education instruction scenario wherein the students while going through the study materials construct meanings on their own by connecting the known knowledge to the unknown, explore through activities and discover, solve problems through engaging in meaningful tasks, share knowledge with peer groups e.g., through online discuss forums, apply or extend the meanings

constructed to the new situations, and assess themselves through reflective exercises etc.

In the context of the constructivist pedagogy, the views about a learner, learning process and the teacher's planning of a unit undergo a vast change. This section discusses one of the learning cycles and the unit plan format that can be used by teachers/instructional designers for visualizing and creating learning situations in the classrooms.

4.5.1 Anchored Instruction

The anchored instruction approach is an attempt to help a learner become more actively engaged in learning in a situation or anchoring instruction in a unit. The learning environments are designed to provoke the kinds of thoughtful engagement that helps learners develop effective thinking skills and attitudes that contribute to effective problem solving and critical thinking.

Therefore, learning 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, which is of interest to the learners. Instructional materials should include rich resources that learners can explore as they try to decide how to solve a problem.

Thus, we see that anchored instruction requires putting the learner in the context of a problem. The students 'play' an authentic role while investigating the problem, identifying gaps to their knowledge, researching the information needed to solve the problem and developing solutions.

Characteristics of anchored instruction: Learning activities should be designed around an 'anchor', which is based on a contextualized case study or problem situation. The following may be taken into consideration:

- Distance learning materials should allow exploration by the learner to allow active manipulation, questioning and involvement in the situation.
- Learners identify with problem and become actively involved in generating solutions.
- The distance educator should use instructional materials and websites to provide the context of a problem. This might include news clips, pictures or graphics. Features, such as a virtual field trip, virtual tours, and simulations could act as anchors.
- Learners can use the World Wide Web to search for information needed to solve the problem, identify pictures, graphics, video clips and audio clips that help them develop a solution to a problem.

From the above discussion we can say that anchored instruction is a learner-centered, contextualized approach to learning. In this approach the learner begins with a problem to be solved rather than content to be mastered. Anchored instruction is also a type of problem based learning that uses a complex interesting situation as an anchor for learning.

Problem-based learning (PBL) which includes anchored instruction is a total approach to students learning. PBL is both a curriculum and a process. The curriculum consists of carefully selected and designed-problems that demand from the learner an acquisition of critical knowledge, problem solving proficiency, self-directed learning strategies, and team participation skills. The process replicates the commonly used systemic approach to resolving problems or meeting challenges that are encountered in life and in a career. In problem-based learning, the roles of a teacher and student change. The

students assume increasing responsibility for their learning, giving them more motivation and more feelings of accomplishment, setting the pattern for them to become successful lifelong learners. The faculty in turn becomes resources, tutors, and evaluators, guiding the students in their problems solving efforts. Thus, we can suggest that anchored instruction is a student centered, contextualized approach to learning. In this approach the learner begins with a problem to be solved rather than content to be mastered. The concept of anchored instruction was stimulated by the merit knowledge problem, which states that knowledge can be recallable only when the individual is questioned explicitly, about the context in which it was learnt. The issue of learning transfer, situated cognition and collaborative learning are primary concerns in anchored instruction. It emphasizes the importance of creating an anchor that generates interest and enables subjects to identify and define problem, and to pay attention to their own perception and comprehension of these problems.

Vygotsky's theory emphasizes that social interactions can facilitate learners' progression to more advanced ways of thinking and problem solving. Instructional designers should, therefore, consider opportunities to incorporate into lesson designs, cooperative learning or tutoring from peers or adults.

4.6 LET US SUM UP

Constructivism suggests that individuals create their own understandings based upon the interaction of what they already know and believe and the phenomena or ideas with which they come into contact. Constructivism is a descriptive theory of learning, which has its roots in philosophy, cognitive psychology and sociology as well. Constructivism is an approach to learning that permits students to form their own concepts and models of those things they observe in the natural world. There are different types of constructivism, such as trivial, social constructivism. This School of thought recognizes that the students have a Zone of Proximal Development and instructional materials should be designed using questions, discussions and scaffolding.

4.7 CHECK YOUR PROGRESS: HINTS TO ANSWERS

Check Your Progress 1

- 1) Please look at section 4.3. Constructivism deals with the idea that individual creates their own understanding based upon their own experiences and therefore learning is highly individualised.
- 2) Please see section 4.3 and read about the trivial constructivism and social constructivism.

Check Your Progress 2

- 3) Please see sub-section 4.4.1. In discovery learning, the learner draws upon his/her own prior knowledge, experiences, interaction and construct new ideas. This leads to knowledge gained by personal discovery.
- 4) Please see sub-section 4.4.3. Scaffolding is based on Vygotsy's theory that learners learn from contact with other learners and members of society and this provides them a support system for their learning and helps them to learn better.

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