

CONSTRUCTIVISM IN EDUCATION WITH RESPECT TO TECHNOLOGY

Anuja Pathak,
Assistant Professor (B.Ed),
S.S.Khanna Girls Degree College,
University Of Allahabad,
Allahabad 211003,
India.

Abstract:

Learning is meaningful if all senses are utilized simultaneously in the process of acquiring knowledge. As we move to the higher level of learning the abstractness in the concepts go on increasing. Mere verbal explanation can never reduce this complexity. Usually a teacher makes the child accept it as it is and moves ahead. The child takes it as it is, crams it or omits it as an option. All these are not healthy way of learning.

Constructivist learning theory has its place in the educational setting, but may not be appropriate as an exclusive practice. We've detailed some of the pros and cons of constructivist learning theory as well as some ideas on how to integrate its principles into the learning environment.

Constructivism in education is the need of time. The constructivist approach through the medium of technology helps to achieve the major aims of education. Biological science Curriculum Study (BSCS), explains the process of constructivism by employing five "E"s. they are Engage, Explore, Explain, Elaborate, and Evaluation.

In our Indian classroom setup, the heterogeneity bound to exist. We never attempt to overcome it, but our attempt is to provide conducive environment which caters to the individual differences. The teaching-learning process must facilitate the gifted as well as the slow learners to perceive and understand the concept in a meaningful way. It must provide an individual to construct his own knowledge rather than reproducing facts. A constructivist approach through technology is the best means to cater the need of heterogeneous group. It encourages active participation on the part of the learner and helps them to explore and elaborate the fund of knowledge. Even students find it more interesting.

Keywords: Constructivist, individual, technology, transformation and traditional.

Introduction:

As per Swami Vivekananda "Education is the manifestation of perfection already in man". Education works out to nurture the potentials of individuals for a overall development. Education today has undergone a major shift from traditional chalk and talk method to constructivist approach. The world is changing at a faster pace and to keep in line with the changing world we need to update our teaching-learning process. Technology has made tremendous progress in the past few years and the application of technology in our present day class room teaching can intern prove to be essential means to overcome the drawback of present Educational System.

Today Class room teaching has become monotonous and passive activity. The students are only inactive listener passive by nature who just mugged up the content in the form it is being taught in class without giving it a second thought. In order to attain Quantity in Education we are losing out the Quality. Our students who are rankers out here at State and National level fail to complete at international level; why? Its not that the students don't have ability to compete, they do have, but it's not nurtured the way it needs to be. The mere mechanical class room teaching of the concept will never create creative citizens. Here Technology has a major role to play. It's said that, the more I see, the more I perceive.

An Indian class room consists of heterogeneous group of students. Catering to the needs of each and every one is not an easy task at all. Also we are bound to accept the individual differences in each student. The individual difference is basically due to the;

- (a) Innate abilities.
- (b) Environmental influence.

The innate ability of an individual cannot be changed, but of course the environment can be made facilitating and conducive for an individual. To make the class room environment conducive and enhance the teaching-learning process, Technology has major role to play. If the class room instructions include technical inputs, then it would enhance the concept clarity and perception of the students. Even the average and below average students can try to grasp the concepts according to his understanding instead being just passive listeners or seating in class with the absent mind. At least the picture or visual may arise the curiosity in a child and maybe he starts thinking in his own rather than accepting blindly what is feed to him.

HETEROGENITY IN INDIAN CLASSROOM:

The Psychological growth of the child is kept in mind while designing entire school curriculum. Sometimes psychological aspect of child is neglected when it comes to teaching-learning process. Psychologists say that “All individuals are different in degrees and not in kind.” Though every student has the ability to grasp and conceptualize the concept, but pace of it is different for every child. In every class there is mixed group of fast and slow learners here we are not concerned about how to bring them on same platform but is to provide an exposure to knowledge and facilitate them to explore their own words.

Eminent Psychologist Bruner, Gagne, Eric Erickson and many others emphasize on the environmental factors contributing development of the Childs personality. Here the major emphasize is on the construction of one’s own knowledge by the child. The teaching-learning process must be effective enough to plunder the mind of the child with questions like, Why, How, etc. Arousing curiosity in a child’s mind is the basic purpose of the class room instruction. Even educationist now-a-days emphasize more on the construction of once ones knowledge rather than producing facts.

Learning is meaningful if all senses are utilized simultaneously in the process of acquiring knowledge. As we move to the higher level of learning the abstractness in the concepts go on increasing. Mere verbal explanation can never reduce this complexity. Usually a teacher makes the child accept it as it is and moves ahead. The child takes it as it is, crams it or omits it as an option. All these are not healthy way of learning.

Here of course technology can prove to be a boon. Using technology in teaching of such concepts can provide a direction to a child’s imagination. This will in turn lead to his concept clarity. Basically when a child visualizes a virtual image, he uses his senses of hearing as well as vision to perceive it. This helps in acquisition of higher order skills of reasoning (why) and analyzing it critically based on his prior knowledge. The retention of such processed knowledge from the information is of longer duration. A teacher’s task of teaching gets fulfilled when a child can relate the concept to the world outside.

What is constructivism?

“As long as there were people asking each other questions, we have had constructivist classrooms. Constructivism, the study of learning, is about how we all make sense of our world, and that really hasn't changed.”
- Jacqueline Grennan Brooks (1999)

The concept of constructivism has roots in classical antiquity, going back to Socrates's dialogues with his followers, in which he asked directed questions that led his students to realize for themselves the weaknesses in their thinking. The Socratic dialogue is still an important tool in the way constructivist educators assess their students' learning and plan new learning experiences. Constructivism is basically a theory - based on observation and scientific study - about how people learn. By experiencing things and acting upon those experiences people build their own understanding and knowledge of the world. When we encounter something new, we have to reconcile it with our previous ideas and experience, maybe changing what we believe, or maybe discarding the new information as irrelevant. In any case, we are active creators of our own knowledge. To do this, we must ask questions, explore, and assess what we know. In the classroom, the constructivist view of learning can point towards a number of different teaching practices. In the most general sense, it usually means encouraging students to use active techniques (experiments, real-world problem solving) to create more knowledge and then to reflect on and talk about what they are doing and how their understanding is changing. The teacher should be aware of the previous knowledge of children and accordingly she should guide the activity to address them. Constructivist teachers encourage students to constantly assess how the activity is helping them gain understanding. By questioning themselves and their strategies, students in the constructivist classroom ideally become "expert learners." This gives them ever-broadening tools to keep learning. With a well-planned classroom environment, the students learn HOW TO LEARN. Constructivism is also often misconstrued as a learning theory that compels students to "reinvent the wheel." In fact, constructivism taps into and triggers the student's innate curiosity about the world and how things work. Students do not reinvent the wheel but, rather, attempt to understand how it turns, how it functions. They become engaged by applying their existing knowledge and real-world experience, learning to hypothesize, testing their theories, and ultimately drawing conclusions from their findings.

Though Constructivist learning holds a significant place in the educational setting, then to it is not regarded as appropriate as an exclusive practice. We've detailed some of the pros and cons of constructivist learning theory as well as some ideas on how to integrate its principles into the learning environment. Constructivist learning theory operates based on the principle that students build knowledge based upon prior knowledge. Constructivism theory states that there is no knowledge independent of the knower, only the knowledge that they create for themselves based on the information that they obtain from the world around them. Instead of having a finite answer, constructivism teaches that the learner creates the answer as they see it. Since students begin with existing knowledge as the starting point, teachers are less like dispensers of information and more like teach guides that allow students to make their own conclusions. This method of teaching tends to be more tolerant of different cultures and encourages diversity rather than other theories.

Constructivism avoids direct instruction. Instead, the teacher guides students in discovering knowledge on their own. In constructivism,

- Here students are not passive listener they are actively involved;
- The role of teacher here is of learning guide so the environment is democratic, rather than autocratic;
- the activities are students oriented nor lesson oriented;
- a teacher facilitates activities in which students are responsible for their own learning and are autonomous from one another.

Difference between Traditional & Constructivist Classroom:

Basis	Traditional Classroom	Constructivist Classroom
1. Concept	1. Curriculum begins with the parts of the whole and emphasizes on basic skill,	1. Curriculum emphasizes big concept, beginning with the whole and expanding to include the parts.
2.Scope	2. Strict adherence to fixed curriculum is highly valued	2. Pursuit of student questions and interests is valued
3.Material Used	3. Materials are primarily textbooks and workbooks.	3. Materials include primary sources of material and manipulative materials
4.Basis of Learning	4. Learning is based on repetition	4. Learning is interactive, building on what the student already knows
5.Role of Student	5. Teachers disseminate information to students; students are recipients of knowledge.	5. Teachers have a dialogue with students, helping students construct their own knowledge.
6. Role of Teacher	6. Teacher's role is directive, rooted in authority	6. Teacher's role is interactive, rooted in negotiation.
7.Method of Evaluation	7. Assessment is through testing, correct answers	7. Assessment includes student works, observations, and points of view, as well as tests. Process is as important as product.
8. Perception	8. Knowledge is seen as inert.	8. Knowledge is seen as dynamic, ever changing with our experiences.
9.Number of Students required	9. Students work primarily alone	Students work primarily in groups.

Roles of the Teacher in Constructivist teaching

According to David Jonassen, Distinguished Professor of Learning Technologies at the University of Missouri, there are three roles for teachers who use the constructivist learning theory in their class.

- Modeling
- Coaching
- Scaffolding-to provides sufficient support to promote learning when new concepts are introduced.

Constructivist learning environments, according to Jonassen, should have specific learning goals, where teachers make activities interesting and engaging, but not overly structured. Examples of how teachers could approach learning goals would be having the students answer a specific, open-ended question or a broad issue, examine a case study, undertake a long-term project or examine a problem with multiple projects or cases integrated together.

Benefits of Constructivist teaching

Constructivist teaching places more emphasis on sensory input, something that has long been over looked by many traditional educators. In the days of old, students were expected to sit through lectures, take notes and take tests. While some of that still occurs in classrooms, more and more educators are learning that students need to be fully involved in the learning process, using all of their senses, not just their eyes and ears. Learners aren't just passive participants in the classroom; they need to be actively involved in "the bigger picture" of the world around them. The constructivist teaching method has been used in special education settings for some time. It is quite effective for those students who have special needs like sensory processing disorder or those on the Autistic spectrum. Some of these students have brilliant minds, but simply can't be reached through traditional methods. Rather than simply doling out information, a teacher is more of a guide for a learning journey and actively participates in the learning process with the students as well as encouraging them to challenge ideas.

Constructivist Application of Technology:

We already discussed about facilitating each and every individual to actively participate in the teaching-learning process in classroom. Facilitate here means to provide them a medium which activates all their senses and make them a mentally ready to perceive and relate to things. Even Gestalt, believes that the foremost principle which contribute learning is the principle of readiness; here we mean physical and mental readiness. To make an individual ready to learn some stimulus which a rise his curiosity should be provided to him. An environment for the stimulus of any of any of a wide range of devises and machines, physical systems, work environments, human and animal populations, individual processes, as well as natural or artificial systems can be provided through Technology. Here technology enables to the construction of knowledge. Here the concept of constructivist learning through technology gets focused.

Constructivism in education is the need of time. The constructivist approach through the medium of technology helps to achieve the major aims of education.

The process of constructivism by employing five "E"s. they are Engage, Explore, Explain, Elaborate, and Evaluation.

1. ENGAGE:

In this stage the instructional task are first identified by student which they encounter. Connection building of past and present learning experiences should be made lay the organizational ground work for the activities ahead and stimulate their involvement in the anticipation of these activities. The technology can be a great help here as sawing the surprising event, and animated series (i.e. forming of a DNA structure, how a human body functions, eruption of volcano and the flow of lava, lifestyle of people at northern poles, icebergs in sea, the wild life and its habitat etc.) are ways to engage the students and focus them on instructional tasks. Unless the senses of students are not involved attentiveness and appropriate learning can't be developed as to motivate students for active participation technology plays an important role.

2. EXPLORE:

In this stage students gets straight away involved with phenomena and material. Involving themselves in activities they develop a grounding of experiences with phenomenon. Here technology is the best source for exploration of knowledge. If technology is tactfully used to teach a particular concept; in depth detailed study could be done and concept clarity on part of the student be achieved. Even students can explore the ocean of knowledge through internet nowadays. The student's inquiry process drives the instruction during an exploration.

3. EXPLAIN:

The third stage, explain, is the point at which the learner begins to put the abstract experiences through which s/he has undergone into a communicable form. In order to format sequencing events in logical format language acts as a motivating agent. Learner support each other understands as they articulate their observations. Explanations from the teacher can provide names that correspond to historical and standard language, for student findings and events. For example a child through her exploration, may state they have noticed that a magnet has a tendency to "stick" to a certain metallic object. The teacher, in her discussion, may at this stage introduce the terminology referring to "an attracting force". The misconceptions can be removed during the discussion which facilitates even an average student to gain an insight of the concept. There are many created works like drawing, video or tape recording and writing acts as evidences of learner's development progress and growth.

4. ELABORATE:

In the stage four, the students expand on the concepts they have learned, make connections to other related concepts, and apply their understanding to the world around them.

For example; while exploring light phenomena, a learner constructs an understanding of the path light travels through space.

Examining a lamp post, she may notice that the shadow of the post changes its location as the day grows later. This observation can lead to further inquiry as to possible connections between the shadow's changing location and the changes in the direction of the light source, the sun.

Applications to real world event such as where to plant flowers so that they receive sunlight most of the day, or how to probe up a beach umbrella for shade from the sun, are both extension and applications of the concept that the light travels in a straight path. These connections

often lead to further inquiry and new understandings which could be nurtured and motivated through technical inputs.

5. **EVALUATION:**

Evaluate, the fifth “E” is an ongoing diagnostic process that allows the teacher to determine if the learner has attained understanding of concepts and knowledge. The evidence of learning serves to guide the teacher in future technical lesson planning (Digital lesson plan) and may signal the need for modification and change of direction.

The learning process is open-ended and open to change. There is an on going loop where questions lead to answers but more questions and instruction is driven by both predetermined lesson design and the inquiry process. The constructivist through technology caters to the individual differences in a heterogeneous classroom set up.

1. It activates several cognitive processes in the learner during learning including relevant information, organizing incoming information and integrating information with the existing knowledge.
2. It enhances the possibility of individualizing the educational process to accommodate the needs, interests, current knowledge and learning styles of each particular student to construct his\her own knowledge.
3. It leads to more positive attitude towards learning and it also increases student participation in classroom.
4. It provides opportunity to each student to explore his\her own knowledge.

Student’s positive attitude towards the technical approach:

Researches show that students show a greater liking to the technology integrated approach in classroom rather than the routine chalk and talk approach. The main reasons they specify is because it is a

- Learning is individualizing in nature.
- Learning according to self pace.
- No humiliation for doing mistake.
- Experimenting with different options is possible.
- Are more objective than teachers.
- Free teachers for more meaningful contact with students
- Great motivator.
- Give a sense of heuristic learning to students.
- Are excellent for drill and practice
- Provides stimulus which arose curiosity to enquiry.
- Teach in small increments
- Build proficiency in technological use, which will be valuable later in life.
- Sensitize the hearing, touch and sight to perceive knowledge for longer retention.
- Helps to conceptualize the applications of the content in day to day life situation.

Hurdles in the path of technical integration in teaching-learning process:

Up till now we discussed how technology proves helpful in the teaching learning process to cater the individual differences in the class. We are also in brief known from researches that students too like to learn through technological package.

Though technology has a number of benefits, it is not being used to the extent and way it could be used. Many hurdles come in the way of applying technology in the teaching learning process in the classroom.

1. Though many schools of today's era are well equipped with latest hardware and software but benefit of it largely depends upon the skill of teachers who are using it.
2. For using educational technology more effectively, teacher have to master a variety of powerful tools, have to redesign lesson plans as per technology enhance resources with less number of computers how more and more number of students can be taught logistic problems and teacher should take on a complex new role in technology transformed classroom.
3. Teachers currently receive little technical, pedagogic or administrative support for these fundamental changes and few colleges of education adequately prepare their graduates to use information technologies in their teaching. As a result, most teachers are left largely on their own as they struggle to integrate technology into their curricula.
4. Moreover when teachers do make us information technologies they are often used for either teaching students about computers or for drill and practice sessions focusing on the acquisition of isolated basic skills. Most teachers report that computers initially make their job more difficult. Despite the daunting challenge of using computers and networks appropriately within an educational context, however, teachers commonly report that they have not received adequate preparation in the effective use of computers within the classroom.
5. Towards technology related courses teacher generally have a negative reactions to narrowly technical orientation. This pursue them just operation of computers but not how to use it for enhancing their teaching.
6. Most teachers, however, cannot use computers effectively someone is available to help not only with the technical problems that are likely to arise from time to time but also with the deeper pedagogic challenges of choosing software, organizing project that make use of technology, and learning how to guide students in the use of computer-based resources.
7. A main challenge before a teacher is to evaluate the cost of time that is required for teachers to incorporate technology effectively in the curriculum. Especially in the inception period the effective utilization of education technology is a challenge.
8. One of the biggest hurdles in technology integration in the process of teaching learning is its acceptance by teachers who are still not showing positive approach towards it.
9. The status of teacher's training institute regarding its curriculum, syllabus etc which is still outdated and teachers teaching is also not justify it so the result is that the pupil teacher who undergo this training don't become efficient enough in incorporation of technology in their life while teaching in class.

CONCLUSION:

As far as Indian classroom is concerned heterogeneity exist by and large. We never wanted to overcome or hampered this unity in diversity but just to attempt for the favorable environment which approach to words individual differences. Though the students is gifted or slow learners teaching learning process should facilitate both of them in perceiving and understanding the

concept in meaningful way. Building of self knowledge rather than reproducing facts in the basic target. A constructivist approach through technology is the best means to cater the need of heterogeneous group. It encourages active participation on the part of the learner and helps them to explore and elaborate the fund of knowledge. Even students find it more interesting. But still in most of the schools in India integration of technology in teaching learning process is not proper, because of many reasons some of the important one is teacher's attitude and inefficiency to integrate technology to teach the subject content.

Looking at the data, over 200,000 new teachers enter the profession each year, and there is 50% turn over in the teaching force approximately every 15 years. While advances in underlying technologies, educational software and pedagogic methods will result in an ongoing need for in service training, colleges of education have a valuable opportunity to introduce future teacher to the use of educational technology before the demands of an actual teaching position began to intrude on the time available for such training.

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