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Constructivist Pedagogy & Learning

CONSTRUCTIVIST PEDAGOGY :
Teaching for Knowledge Construction

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Abstract

The latest catchword in educational circle is constructivism which is applied to both learning theory and epistemology. Constructivist approaches to learning based on distinctly different epistemic and pedagogical assumptions than classical approaches to instructional design. Here the role of teacher is as a facilitator who encourages learners to reflect, analyze, design and develop the process of knowledge construction and the learners are active agents who engage in own knowledge construction by integrating new information into their schema. Learning can be seen as a process that of understanding and contextualizing socially, culturally, historically and politically relevant issues. Hence it is important that the teachers' role has to be revitalized and the teacher education system has to inculcate the culture of germination of new ideas, incubation, innovation, creation and construction.

Introduction:

"In order for any discipline to survive, it must accommodate changes in theory and practice and do so in a way that adds value to the discipline" (Kuhn, 1972). Pedagogy is a collaborative, interactive process between teachers and learners and other members of the community. Pedagogy evolves progressively in the ebb and flow of context and conditions. Teachers are always curious to design, develop and deploy the most compatible pedagogy.

A distinction is often made between Pedagogy and Education. This is more than mere semantics, although the words do have different Greek and Latin derivations. Pedagogy comes from the Greek *paidagogos* (the leading of the child), where as education comes from the Latin *educare* (to bring up/nourish). The discipline and discourse of education is more likely to be descriptive and normative, whereas pedagogy is relatively creative and constructive. Pedagogy is more than the accumulation of techniques and strategies, more than arranging class-room, formulating questions and developing explanations. It is informed by a view of mind of learning and learners and the kind of knowledge and outcomes that are valued.

Learning is a social process. This view of leaning takes a broad view of learners' trajectories through the world- their sense of self, where they are coming from, where they think they are going, what sort of person they want to be. Pedagogy must

build the self-esteem and identity of learners, developing their sense of what they believe or indeed hope themselves to be capable of Developing habits of mind that are questioning and critical is central to pedagogy. The latest catchword in educational circle is *Constructivism*, applied to both learning theory and epistemology. Constructivist pedagogy is the link between theory and practice. Instruction that is based on constructivist principles is extremely demanding for the teacher.

Pedagogical constructivism views the individual learner as the only location where knowledge is generated and maintained. Knowledge is bound to the person who generates it. And a person's knowledge always depends on how a person approaches a learning experience, what he or she actively does during the experience, and how the resulting knowledge is integrated into what the person knows. Interactions with others and with nature may influence the learner's construction of knowledge. The notion of constructivism with its roots in ancient philosophy has been informed over time by wide range theories. Jean Piaget and John Dewey were the first major contemporaries to develop a clear idea of constructivism as it might be applied to childhood development and classrooms. That major tenet of all aspects of constructivism is that *knowledge is constructed*, not transmitted or absorbed.

Although constructivism embraces many theoretical perspectives on learning and does not itself suggest particular pedagogy. This view takes learner agency as a given and has spawned a wide range of pedagogic strategies by which learners can be encouraged and enabled to select and transform information, construct their own hypotheses and can be active in their own learning.

This approach to learning impacts strongly on view of the teachers' role. By emphasizing the interaction between the learner and the activity, the focus moves away from the teacher and the content to learning mechanisms and learners' cognitive processes. From a constructivist perspective, teachers need to adopt the role of facilitator.

The constructivist studies investigate children's scientific thinking, that is, their intuitive conceptualizations of natural phenomena (Brumby, 1982; Gilbert et al., 1982; Muthukrishna, Carnine, Grossen, & Miller, 1993). When the elementary child arrives in science class he or she has successfully experienced ways of observing and interacting with the world outside of school. In order for the child to successfully learn new science ideas, it is necessary to bring to light their already existing ideas about natural phenomena. This information provides the teacher with an understanding of ways in which the old ideas may interfere with the present interactions.

Principles of constructivist pedagogy:

1. Construction of knowledge is an active process involving mental action of the learner. Constructivism needs active engagement of learning in social setting. It involves enquiry, debating, questioning, application and reflection leading to theory building and the creation of ideas. *Piaget*, as reported by *Kamii (1974)* says that good pedagogy must involve presenting the child with situations in which he himself experiments and tries to see what happens, manipulating symbols, posing questions and seeking his own answer, reconciling what he finds one time with what he finds at another, comparing his finding with that of other children.
2. Intellectual activity based on actual experiences occupies priority in constructivist pedagogy. Construction of knowledge takes place when mind actively reacts and interacts with

physical and social world of experiences. Design for any experiments, their results, interpretations of their findings all result from sharing, thinking and decision making. To create social interaction researches have called for the creation of "communities of learners" within classrooms *(Brown & Campione, 1994)*. Learning communities encourage students to take responsibility for their own learning through cooperative ventures. *Vygotsky (1986)* believes that the learning is meaningful to children when it builds (scaffolds) on experiences they have already with them. Children are more likely to retain knowledge that they build or generate themselves rather than which they simply receive passively.

3. The critical dimension of constructivist pedagogy is structuring learning around primary concepts and "big" ideas *(Brooks & Brooks 1993)*. When designing curriculum, constructivist teachers organize information around conceptual clusters of problems, questions and discrepant situations. Students are most engaged in learning when problems and ideas are presented holistically rather than in separate, isolated parts.
4. Constructivist focus on children's' ability to solve the real life practical problems and constructivist methods call for students to construct knowledge themselves without receiving it from teachers. In contrast to directed instructions, where a teacher sets the goal and delivers most of the instructions, the job of the teacher in constructivist is to arrange required resources and acts as a guide to children while they set their own goals and learn themselves.
5. Constructivism believes on the principle of unstructured knowledge domain which bears significance for designing curriculum for constructivist classroom. *Papert (1980)* feels that learning activities should be fairly unstructured and open ended with no goal in mind other than discovery of powerful ideas. In the similar line, *Spiro et al.,(1991)* call for the varied opportunities for exploration when learning takes place in ill-structured knowledge domains, through advocate for at least acquisition of some specific skills and information. Experiences and activities to be selected for engaging learners for knowledge construction process in construction process in elementary school should be relevant from social and individual points.
6. Constructivist pedagogy is based on principle of problem oriented activities. Constructivist method focuses on problem posing and persuasion of peers *(Jungck, 1991)*. Problems may be posed in terms of specific goals as 'what...if' questions, open ended questions.
7. Constructivist pedagogy centers on the principle of assimilation when it is held that learners construct knowledge by relating new information to the existing knowledge which they already possess. Fundamental knowledge originated from ones' own culture serves as a base upon which new knowledge is built by assimilating new incoming information into it meaningfully.
8. Seeking and valuing students' points of view is also essential constructivist education. These are windows into a students' reasoning. It helps teacher to challenge students, making school experiences both contextual and meaningful Each student's point of view is an instructional entry point. Teachers who operate without awareness of students' points of view often doom students to dull, irrelevant experiences and even failure.

Nature of Knowledge

Knowledge as constructivist believed is situated in the real world Constructivists argue that knowledge is actively constructed by learners and that any account of knowledge makes essential references to cognitive structures. Knowledge comprises active systems of intentional mental representations derived from learning experiences. Each learner interprets experiences and information in the light of their extant knowledge, their stage of cognitive development, their cultural background, their personal history. Learners use these factors to organize their experience and to elect and transform new information. It is essentially dependent on the standpoint from which the learner approaches it. It recognizes the construction of new understanding as a combination of prior learning, new information and the readiness to learn. Individuals make choices about new ideas to accept and how to fit them into their established views of the world. *Immanuel Kant* elaborates this idea by asserting that human beings are not passive recipients of information. Learners actively take knowledge, connect it to previously assimilated knowledge and make it their own interpretation *(Cheek, 1992).*

Constructivist View of Learning:

Learning takes place not only adopting new ideas, but also ... modifying or abandoning pre-existing ones" This is the constructivist sense of constructing meaning and Learning. Students make sense of their experiences via a Piagetian accommodation.

- It is necessary to take into account what is already in the learner's mind for they come into the classroom with a pre-established worldview.
- Individuals construct their own meaning of events which is filtered by prior beliefs and experiences.
- The construction of meaning is a continuous and active process; learning may involve conceptual change, that is, a kind of a radical re-organization which requires effort and purposeful activity.
- Learners have the responsibility for their learning

The child's active action is necessary for the learning process, as a problem can only emerge in an action. A problem in the action is a prerequisite for an individual to learn new things. According to *Mead (Rucker 1968, p. 151)*, the human being has qualities that enable "creative faculties of imagination" and, further, the emergence of thinking. *Mead* suggests that three different levels can be found in the construction and development of thinking On the first level, the child "awakes", becoming conscious of his/her own possibilities to make selections and combinations of objects in the action environment instead of blindly following the organs of sight and hearing. In this way the child can tell apart different objects in the action environment and keeps these objects under examination. The second level of creative imagination is the "logical state", in which the child becomes conscious of his/her resources for combining things and ideas. then comes the "philosophic stage", at which time the child chops his/her world up into pieces and tries to reassemble everything as it was before and absorbs everything into his/her own thinking.

Dewey describes the experiences as follows. "When we experience something we act upon it, we do something with it; then we suffer or undergo the consequences " The "educative experience" produces ways of action that make it possible to control and predict action. Learning refers to a situation in which the results of an individual's action can be identified and it can be established that a new result of action has arisen as a result of the action *(Dewey, 1955).*

Learning also means that the new model or way of action arising as a result of the action is a combination of different ways of action. According to *Dewey (1966, p. 323)*, the image is a factor that enables learning. The nature of an image is such that it represents some fact of reality. An image can be understood as the realization of an immediate experience and as a mediating factor that enables transition from one experience to another.

Constructivist classrooms:

A constructivist classroom must obviously operate in the backdrop of constructivist learning environments and key principle of constructivism. Here the focus will be on students, this classroom is no longer a place where the teacher pours knowledge into the passive students, and instead students are actively involved in the learning process. According to *Brooks and Brooks (1993)*, student's autonomy and initiative are accepted and encouraged, the teacher asks open-ended questions and provides ample time for discussion and responses, higher level thinking is encouraged, students are engaged in dialogue with a teacher and with each other, students are engaged in experiences that challenge hypotheses and encourage discussion. The class uses raw data, primary sources, and manipulative, physical and interactive materials. Constructivist classrooms are based on the theory of Collaboration, Cooperation, Interaction, and Project based activities. The classroom environment is in such a way that full freedom is given to the learners to think freely in multidirectional ways on single idea. Providing rich experiences to the learner will relatively help him to construct the knowledge and meaning.

Constructivist Teacher:

In the context of constructivist pedagogy the teacher is a facilitator who encourages learners to reflect, analyze, classify, predict, create and interpret in the process of knowledge construction (NCF, 2005). Constructivist teachers recognize that what the learner already knows is a critical factor affecting learning and that it is incumbent upon teachers to ascertain the understandings held by their students *(Brooks & Brooks, 1999)*. In regular teaching learners' prior understandings are frequently discounted, and learning paths are not well designed to lead to new understanding for students *(Duit & Treagust, 1998)*. Teachers with a constructivist orientation believe that the learning opportunities they plan are the mediating processes that help students move from their current understanding to a new understanding. They can reflect on what learning experiences can be provided to encourage the development of conceptual understanding.

The teachers own role in children's cognition could be enhanced if they assume a more active role in relation to the process of knowledge construction in which children are engaged. Allowing children to ask questions that require them to relate what they are learning in the school to things happening outside, encouraging children to answer in their own words and from their own experiences, rather than simply memorizing and getting answers right in just one way. Intelligent guessing must be encouraged as a valid pedagogic tool. Quite often, children have an idea arising from their everyday experiences or because of their exposure to the media but they are not quite ready to articulate it in ways that a teacher might appreciate. It is in this zone between what you know and what you almost know that new knowledge is constructed that is metacognition. Such knowledge often takes the form of skills, which are cultivated outside the school, at their home or the community. Constructivist teachers provide time for students to

construct relationship and create metaphor. A sensitive and informed teacher is aware of this and is able to engage children through well-chosen tasks and questions, so that they are able to realize their developmental potential (NCF, 2005). Teachers require a conceptual framework to guide group activities in which students cooperatively construct new knowledge. They must have a clear picture of the desired goals of the overall concept and nurture students' natural curiosity through frequent use of learning cycle model. Teacher's role should be like guide on the side.

Constructivist Instructional Strategies:

Constructivist Instructional Strategies should be mainly based on three elements *(Brooks & Brooks, 1999).*

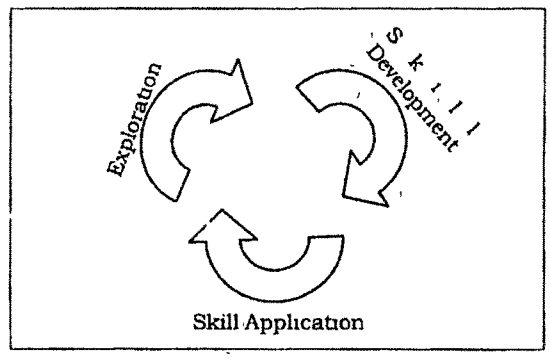
1. Students Prior Knowledge which affects future learning because what a learner already knows interacts with the new conception to which the learner has been exposed.
2. Students construct meaning through interaction with others, with materials and by observation and exploration of interesting and challenging activities.
3. Students should construct understanding around core concepts and big ideas.

So constructivist teachers ascertain the understanding of their students, plan mediating events that assist students in moving from a current understanding to a more scientifically accepted understanding and provide time for discussion on any needed additional experiences for students to construct deep conceptual understanding.

Many learning designs based on constructivist assumptions are available in the literature of constructivism. Constructivist pedagogy is not attached to a single model or strategy, but it will provide a view of various strategies that suggests specific instructional principles that can be a great use to create constructive learning environment in the classroom. The important worth mentioning designs which have drawn attention of educators in the past several years are,

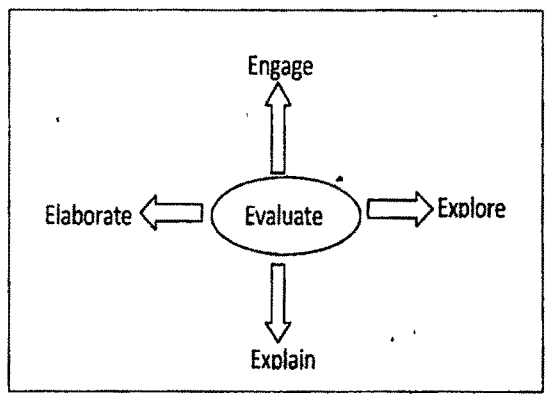
Constructivist learning cycle design: Exploration, Concept/Skill Development and Concept/Skill Application

Fig. 1
Constructivist learning Cycle



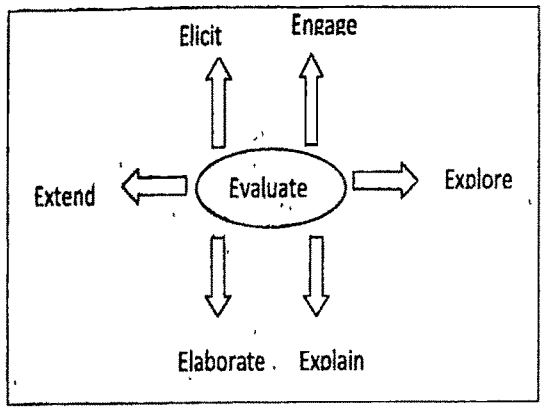
5E model Proposed by *Bybee in 1997* which include,
Engage, Explore, Explain, Elaborate and Evaluate.

Fig. 2
5E model Proposed by Bybee



7E model Proposed by *Arthur Eisenkraft in 2003* include, :
Elicit, Engage, Explore, Explain, Elaborate, Evaluate, and Extend

Fig. 3
7E model Proposed by Arthur Eisenkraft



Constructivist view of Assessment:
Assessment in the class should be an opportunity for the students to reveal their changed conceptual understanding of the course content. In constructivist perspective, assessments are made using portfolios, rubrics, teacher's rating, observation, interview and challenging questions to solve complex real world problems. Since learning is largely self motivated in this pedagogy, learners self assessment of their own learning can be used to help students to assess themselves about what they have learnt. Brown (1985) has suggested methods, like, use of learning journals by students to monitor progress and highlight any recurring difficulties and analyze study habits. Student discussions and observation of discussions provides the teacher with valuable information about all aspects of student achievement, conceptual understanding, and logical quality of arguments. This helps the teacher to modify the instructional planning. When the teachers' plans are well matched with the students' previous learning, the prediction is that students' future achievement will be enhanced. In toto, it should be an ongoing process, evaluation of student learning should not be judged only on the specific knowledge, but whether the student can solve the problem posed with viable solution.

Conclusion:
The constructivist view of the world gives new status to the learner as the active constructor within the learning activity instead of being the passive respondent to externally determined world of education. Constructivism develops thinking skills, Communication skills and social skills; encourages alternative methods of assessment; helps students to transfer skills to the real world; and promotes intrinsic motivation to learn. Their implications on educational practice are enormous. Constructivist pedagogy offers a bold departure from traditional classroom strategies. The goal is for the learner to plan an active role in assimilating knowledge into one's existing cognitive structure. The constructivist approach requires the teacher to relinquish one's role as sole information-dispenser and instead to continually analyze one's curriculum planning and instructional methodologies. Constructivist argues that knowledge is actively constructed by the learners and that any account of knowledge makes essential references to cognitive structures. Each learner interprets experience information in their light of their extant knowledge. Study topics could include the constructivist implementation of cooperative learning, scaffolding techniques, problem-based learning, or multi faceted assessment strategies At the same time there are various new demands on the part of teachers; Constructivism is a culture - not a fragmented collection of practices. Crafting instruction based on constructivism is not as straightforward as it seems. It could be developed as a culture of the class.

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