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Constructivism as paradigm for teaching and learning

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Abstract
Constructivism is basically a theory based on observation and scientific study – about how people learn. 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 to create more knowledge and then to reflect on and talk about what they are doing and how their understanding is changing. Constructivist teachers encourage students to constantly assess how the activity is helping them to 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 learns "HOW TO LEARN". If our efforts in reforming education for all students are to succeed, then we must focus on students. To date, a focus on student – centered learning may well be the most important contribution of constructivism. This paper will focus on constructivism as paradigm for teaching and learning.

Keywords: constructivism, paradigm, teaching and learning

Introduction
Education involves the process of the development and learning of the child on multiple dimensions, facilitated by the teacher, who is guided by a curriculum. Effective education is a process where the teacher, children and the schools involved and participated actively. However our present education system emphasizes on preparing students for tests and don't foster deep learning and is in the midst of a crisis of quality-starting from primary schools to universities, the dominant view is that our students are not learning as much as they ideally should and what is more worrisome is that rote learning and memorization seems to be the dominant mode at all levels. Traditional teaching approach (lecture method) commonly adopted by teachers in Indian schools involves coverage of the context and rote memorization on the part of the students and does not involve students in creative thinking and participation in the creative part of activities. Most of the time, during teaching learning process, instruction remains unilateral which is considered to be an orthodox activity. The upcoming trends in education changed the present scenario and adopted the constructivist approach which is moral and more focused on innovative activities and knowledge acquisition and therefore, the academic results of the students of constructivist classrooms are better than traditional classrooms.

Need of constructivism
The present article concentrates on providing an alternative pedagogy based on the principles of constructivism theory given by Piaget, Vygotsky and other theoreticians including psychologists and sociologists. If we accept constructivist theory, then we have to give up platonic and all subsequent realistic views of epistemology. We have to recognize that there is no such thing as knowledge "out there", independent of the knower but only knowledge we construct for ourselves as we learn is the true knowledge. If we believe that knowledge consists of learning about the real world "out there", then the power of organizing and presenting the knowledge is passed on to the teacher who ultimately passes this on to the learner. In the process of disseminating knowledge to learners the teacher may use activities and opportunities to experiment but here the teacher is helping the learner to understand the world but don't ask the learner to construct his/her own world.

Traditional and Constructivist Instructional Methodologies

The traditional classroom often looks like a one-person show with a largely uninvolved learner. Traditional classes are usually dominated by direct and unilateral instruction. Traditional approach followers assume that there is a fixed body of knowledge that the student must come to know. Students are expected to blindly accept the information they are given without questioning the instructor (Stofflett, 1998). The teacher seeks to transfer thoughts and meanings to the passive student leaving little room for student-initiated questions, independent thought or interaction between students (VAST, 1998). Even the in activities based subjects, although activities are done in a group but do not encourage discussion or exploration of the concepts involved. This tends to overlook the critical thinking and unifying concepts essential to true science literacy and appreciation (Yore, 2001). This teacher-centered method of teaching also assumes that all students have the same level of background knowledge in the subject matter and are able to absorb the material at the same pace (Lord, 1999). In contrast, constructivist or student-centered learning poses a question to the students, who then work together in small groups to discover one or more solutions (Yager, 1991). Students play an active role in carrying out experiments and reaching their own conclusions. Teachers assist the students in developing new insights and connecting them with previous knowledge, but leave the discovery and discussion to the student groups (VAST, 1998). Questions are posed to the class and student teams work together to discuss and reach agreement on their answers, which are then shared with the entire class. Students are able to develop their own understanding of the subject matter based on previous knowledge, and can correct any misconceptions they have. Both teaching styles can lead to successful learning but it has been shown that students in the constructivist environmental demonstrated more enthusiasm and interest in the subject matter. In fact, repeated research has found that teacher-centered lessons can be less or non-productive, and in some cases, detrimental to the students' learning process (Zoller, 2000). Many teachers are hesitant to try the constructivist model, because it requires additional planning and a relaxation of the traditional rules of the classroom (Scheurman, 1998).

Characteristics of Constructivist Teaching

One of the primary goals of using constructivist teaching is that students learn how to learn by giving them the training to take initiative for their own learning experiences.

According to Audrey Gray, the characteristics of a constructivist classroom are as follows:

- The learners are actively involved
- The environment is democratic
- The activities are interactive and student-centered
- The teacher facilitates a process of learning in which students are encouraged to be responsible and autonomous.

Furthermore, in the constructivist classroom, students work primarily in groups and learning and knowledge are interactive and dynamic. There is a great focus and emphasis on social and communication skills, as well as collaboration and exchange of ideas. This is contrary to the traditional classroom in which students work primarily alone, learning is achieved through repetition, and the subjects are strictly adhered to and are guided by a textbook. Some activities encouraged in constructivist classrooms are:

- Experimentation: students individually perform an experiment and then come together as a class to discuss the results.
- Research projects: students research a topic and can present their findings to the class.
- Field trips. This allows students to put the concepts and ideas discussed in class in a real-world context. Field trips would often be followed by class discussions.
- Films. These provide visual context and thus bring another sense into the learning experience.
- Class discussions. This technique is used in all of the methods described above. It is one of the most important distinctions of constructivist teaching methods.

Constructivist approaches can also be used in online learning. For example, tools such as discussion forums, wikis and blogs can enable learners to actively construct knowledge.

Because existing knowledge schemata are explicitly acknowledged as a starting point for new learning, constructivist approaches tend to validate individual and cultural differences and diversity.

Role of teachers

In the constructivist classroom, the teacher's role is to prompt and facilitate discussion. Thus, the teacher's main focus should be on guiding students by asking questions that will lead them to develop their own conclusions on the subject.

Challenges for Constructivist, Pre-service Teacher Education

As teacher educators, we cannot ignore the challenges. The reality of constructivist teacher education is that it functions in a university setting and this traditional context provides challenges for teacher educators and teachers (Rainer & Guyton, 1999; Beck & Kosnik, 2006). While studies reviewed did not directly address the factors that constrained their work, authors made recommendations based on their experience. Condon *et al*. (1993) found that "simply accommodating innovation in the existing institutional structure will not provide the long-term support necessary for lasting change." Two authors (Condon, *et al*., 1993; Chen, 2001) recommended areas that need to be challenged if this work is to continue, including, traditional teacher and student roles, rewards, resources, policies, and the history of isolation in higher education. Teacher educators who advocate for a different kind of preparation cannot overlook their own pedagogy, particularly related to authority in the classroom (Duran *et al*., 2004; Fosnot, 1996; Mayer -Smith & Mitchell, 1997); instructors must understand and be able to implement constructivist pedagogy. These authors' recommendations imply that if visions such as those advocated by constructivist educators are to become reality, we need to rethink the nature of teacher education efforts (e.g., to include the six mediatory experiences) as well as study the challenges inherent in change.

Paradigm shifts in education over recent decades

The paradigm shifts that we experienced in the 20th century are well known. Some of the prominent paradigm shifts that have taken place in education are discussed briefly.

• Reproductive learning vs productive learning

Learners' achievements were measured against their ability to reproduce subject content – in other words, how well they could memorise and reproduce the content that the teacher 'transferred' to them. With the emphasis on productive

learning, it is rather about the application of knowledge and skills, in other words, what the learners can do after completing the learning process. Achievement is measured against the productive contribution a learner can make, instead of what the learner can reproduce.

• Behaviourism vs constructivism

According to a behaviouristic view of learning, a learning result is indicated by a change in the behaviour of a learner (Skinner, 1938; Venezky & Osin, 1991). According to a constructivist view, learning is seen as the construction of meanings by the learner (Cunningham, 1991; Duffy & Jonassen, 1991) [10]. Neither of these views can be regarded as exclusively right or wrong. It is, however, important to know that constructivism is presently accepted as the most relevant view of learning and that education policies, education models and education practices focus on constructivism.

• Teacher-centred vs learner-centred

In the past, education activities focussed on the strong points, preferences and teaching style of the teacher. That which would work best for the teacher, determined the design of the learning environment and the nature of activities. Teacher-centeredness is also characterised by a view that the teacher is the primary source of knowledge for learners. In a learner-centred environment, the focus is on the strong points, preferences and learning style(s) of the learner(s). The learning environment is designed according to the needs and possibilities of the particular learner group.

• Teaching-centred vs learning-centred

[At this stage, it is important to indicate that the term education be seen as the macro term which includes the concepts teaching and learning (education = teaching + learning).] Education activities in the past, were planned and executed from a teaching perspective. A teacher would plan a teaching session (lecture) based on what the best teaching methods would be to transfer the concerned subject content to the learners. The focus was on how to teach. In the new paradigm, education activities are planned and executed from a learning perspective. The emphasis is now on the learning activity and learning process of the learner. So the focus is on how the learning, which should take place, can be optimised. "In general, there must be a conversion from a teaching to a learning culture." (Arnold in Peters, 1999)

• Teaching vs learning facilitation

Teaching or instruction, as an activity of the teacher, is seen as an activity that relates to the 'transfer of content' (an objectivist view) within a teaching-centred education paradigm. The presentation/delivery of a lecture or paper falls into this category. The principle of learning facilitation follows a learning-centred education paradigm. Learning facilitation has to do with the teacher's activities, which focus on optimising the learner's learning process. Just as the word indicates, the emphasis is on the facilitation of learning. Teachers cannot be regarded as the only source of knowledge and cannot focus on the traditional 'transfer of content' any longer. They need to focus on the facilitation of learning. "Instructional staff no longer are the fountainhead of information since the technology can provide students with access to an infinite amount of and array of data and information. The role of the instructor, therefore, changes to one of learning facilitator. The instructor assists students to access information, to synthesize and interpret it and to place it in a context – in short to transform information into knowledge." (Kershaw & Safford, 1998:294)

• Content-based vs outcomes-based

A content-driven approach to education is characterised by curriculation and education activities that focus on subject content. The emphasis is on the content that learners should master and a learner receives a qualification based on the nature, amount and level (difficulty) of subject content he/she has mastered. An outcomes-based approach to education focuses on the learning outcomes to be reached by the learners. A typical process for curricula in an outcomes-based model is characterised by the formulation and selection of learning outcomes that a learner should reach - that which the learner must be able to do on completion of the learning process. The selection of subject content is based on the relevance thereof to enable the learner to reach the learning outcomes.

• Content-based evaluation vs outcomes-based assessment

Content-based evaluation follows a reproductive view of learning where a learner's achievement is measured by the quantity and quality of content that are reproduced. On the contrary, outcomes-based assessment refers to a productive view of learning where a learner's achievement is measured by the mastery learning outcomes.

Implications of constructivism for teaching and learning

Central to the tenet of constructivism is that learning is an active process. Information may be imposed, but understanding cannot be, for it must come from within. Constructivism requires a teacher to act as a facilitator whose main function is to help students become active participants in their learning and make meaningful connections between prior knowledge, new knowledge,and the processes involved in learning. Brooks and Brooks (1993) [4] summarize a large segment of the literature ondescriptions of „constructivist teachers". They conceive of a constructivistteacher as someone who will:

- Encourage and accept student autonomy and initiative;
- Use a wide variety of materials, including raw data, primary sources, and interactive materials and encourage students to use them;
- Inquire about students" understandings of concepts before sharing his/her own understanding of those concepts;
- Encourage students to engage in dialogue with the teacher and with one another;
- Encourage student inquiry by asking thoughtful, open-ended questions and encourage students to ask questions to each other and seek elaboration of students" initial responses;
- Engage students in experiences that show contradictions to initial understandings and then encourage discussion;
- Provide time for students to construct relationships and create metaphors;
- Assess students" understanding through application and performance of open-structured tasks.

Hence, from a constructivist perspective, the primary responsibility of theteacher is to create and maintain a collaborative problem-solving environment,where students are allowed to construct their own knowledge, and the teacheracts as a facilitator and guide.

Conclusion

The focus of education needs to be shifted from placing content in students' knowledge building. If the focus of studying could be turned from filling one's mind to producing knowledge products, students wouldn't need to concentrate on memorization and cramming for examinations. These knowledge products could be in form of essays, term papers, project reports, research papers, videos, posters, slides, portfolios, or whatever products that students might create. In classroom instruction there is a need of integration of formal, theoretical, practical and self-regulative knowledge. However, in a traditional type of curriculum these different types of knowledge have been treated separately. One of the most important challenges to pedagogy is developing curricula and teaching methods so that true

integration of formal, theoretical knowledge and more informal, practical, and self-regulative knowledge may be achieved. The aspect of assessment cannot be left untouched while talking of constructivism as constructivist learning requires an entirely different approach to assessment, an approach that is qualitative in nature. Authentic assessment based on real-life tasks and performance assessment requiring students to complete certain learning assignments represent this type of assessment. The emphasis is on students' learning process and on their meaning making as much as (or even more than) on the final product.

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