

Educational Technology and Constructivist Paradigm

Muralikrishnan T. R.*

Introduction

The continuous transformation in the domain of higher education, as witnessed in the present information technology age, expects a kind of intervention as far as the practical and theoretical underpinnings are concerned regarding its philosophical and pedagogical inputs. New trends, especially with the advent of modern technological aids such as e-learning, open up a large scope for students to delve deep into the branch of knowledge that they have chosen. In this context it will be worth while to know how the concept of constructivism, with its innate bias to learner's ability, work in harmony with the new technology available. This paper proposes to discuss this constructivist-technology interface and the possible merits from its philosophical point of view.

Learner centered learning

Till three decades back researches mainly focused on the teaching strategies with the pupil at the receiving end. The theoretical framework constructed did give consideration to the student community but the 'active participation' as promised by the strategies never materialized fully. Later, theoreticians understood that one needed to understand how students thought or how there was a great need of assessing the thought processes. In order to make the learning process effective there must be an understanding of the learners' strategies. Meta-cognition became relevant in the discussion. As Weinstein and Mayer (1986) put it, the pupil's grasp of the material they are trying to learn has consistently been shown to be related to the extent of their use of strategies for monitoring their own understanding of the material. The teacher (now conveniently addressed as

'facilitator' in the learning process) must understand the various aspects of learner development such as cognitive and meta-cognitive skills, culture, personality, motivation and learning styles. At the advanced level, the thought processes need to be more disciplined and deliberate; tasks must be well set, problems should be more explicit and instructions should be properly given; the criteria for success and failure, then, become more overt. Here the crucial term 'self awareness' comes into play. Constructivism supports this owing to its characteristic commitment to learner's construction of knowledge. The teacher can only provide interventions to help children construct their own concepts.

Constructivist learning

Constructivism represents a shift in the paradigm i.e. from behaviorist to education based on cognitive theory. The contributions of Dewey, Montessori, Piaget, Bruner and Vygotsky have developed the knowledge base of this concept. Certain fundamental features as proposed by them are in general agreement:

- (a) Learning is not a passive receptive process but is instead an active meaning-making process required to solve meaningful problems.
- (b) New learning depends on learner's previous knowledge, which may sometimes interfere with the understanding of new information.
- (c) Learning implies the reorganization of prior conceptual schemes.
- (d) Learning is facilitated by social interaction.
- (e) Meaningful learning occurs within authentic learning tasks

*Lecturer, Selection Grade, Dept of English, MES College Marampally, Aluva, Kerala

Vygotsky stressed the fact that learning is social in nature. In the interactive process between the learner-teacher and learner-learner, information is effectively exchanged. New understanding is developed through such transfer process. Novak (1993) speaks of the concept of *human constructivism* which emphasizes connections between new concepts and those that are part of an existing framework of prior knowledge. The process is very much dynamic and no two human beings construct precisely the same meanings even when presented with identical events or objects. Knowledge, thus in constructivist learning, is physical, symbolical, social and theoretical. In this context a teaching learning process may be looked at from a constructivist perspective shoes salient features are as follows:

- a) The instructional strategy promotes the view that learners should participate in experiences that accommodate inquiry, discovery, problem solving, debate and discussion, scientific interpretation and establishment of the fact.
- b) Teachers should encourage students to think independently and give logical explanation. The sequencing of the content of study should develop from the responses given by students.
- c) Students are allowed to express their thoughts freely and to work independently within the time specified.
- d) Multiplicity of perspectives is encouraged.
- e) Activities are provided to encourage meta-cognition, self-analysis, self-regulation, self-awareness.
- f) Reproduction of prior knowledge is carefully avoided but knowledge construction is emphasized.
- g) Co-operative learning is favoured for presenting alternative view points.
- h) Errors point out not weakness but as aspects of deviant methods of previous knowledge construction.

- i) Performance based tests, portfolios, team projects are testing techniques which can be used in this paradigm.
- j) Scaffolding is nurtured for helping students to perform just beyond the limits of their ability

As it has been stated earlier, the paper shall look into the possibility of making use of these concepts in the contexts of the new emerging technology.

New Medium of Technology

The development of scientific tools has been a boost to the classroom teaching – learning situation. The electronic classroom has come to stay with the transfer of information through LCD becoming a common affair in the advanced institutes. Interactive class rooms through the medium of internet are encouraged in many e-learning programmes. Traditional written materials such as books and manuals are either supplemented or replaced by online web down loads, CD-ROMS, teleconferences, etc. Many reputed universities have open course ware material which can be accessed or downloaded by people from any part of the globe. In this context where are the teacher and the taught in the traditional sense of the term? As a populated and underdeveloped country, are we in a launch pad to go forward with this electronic classroom or e-classroom set up? With the limitations of infrastructure, funding, and trained man power we are not presently in a position to think of such a leap. But this does not stop one from saying that the new medium will open up the possibility of creating a student –friendly classroom from a constructivist angle.

Implications of Constructivism in Technology

The concepts of constructivism do work in harmony with the technological support available. A few instances are cited below:

1. In experiential learning process, the teaching of science can be conducted through simulation techniques which the students can identify from various fields. The concepts in acoustics such

as resonance column, the concepts in anatomy such as viscera of a heart, in linguistics the pronunciation of a foreign language phoneme, etc can be worked out by themselves using computers. The teachers needn't actually do it as such before them.

2. The problem solving ability of computers can be made use of in class room situations for supporting the students in their conceptual learning and development of logical thinking skills. This is already being made use of in program writing and the successful implementation of the same in computer applications.
3. Concept mapping is widely used as a constructivist learning model. This is used to generate ideas (such as brainstorming) and to design complex structures such as long texts, hyper texts, and large web sites. This helps in evolving flow charts for various complex programs. Being a visual tool computers are made use of in projecting intricate and complex structures.
4. Investigatory approach deals with observing, raising questions, measuring, hypothesizing, planning, interpreting, and communicating. In a bio-science department, technology helps us to identify the level of safe drinking water available in a local area and statistically analyze the result with the help of the new projecting devices for internal and external audiences
5. Creative writing helps in developing abilities of reporting, arguing, explaining, persuading, reflecting, coping and evaluating. Learners do make use of the new medium for triggering their creativity. The medium helps, for example, to set up a film

club in the institution for reviewing aesthetically world class works.

It may be noted that the constructivism as a philosophy enables the students to break free from the shackles of restraint laid down by the traditional systems. The technology which is now being introduced and utilized helps to support the learner to adopt these learner-centered approaches.

Conclusion

The need of the hour is to see how the implementation of constructivist approach can inspire the present learning processes and systems. It requires much effort and application from the institutions to adapt to new challenges. But the greatest challenge is with the teacher who has to transform from 'provider' to 'facilitator' and in these days it requires that he/she should be smart enough to acquire the latest technology to survive in the classroom and to encourage the students to surge ahead. The learners on the other hand should be independent thinking individuals and voracious readers rather than just 'download-cut-and-paste' assignment writers.

References

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