ISSN 2278-8808
An International Peer Reviewed
SCHOLARLY RESEARCH JOURNAL
FOR INTERDISCIPLINARY STUDIES

Computer Assisted Instruction and Constructivism

Dr. Yashpal D. Netragaonkar
Asst. Professor.
Abhinav College of Education,
Ambegaon, Pune. 411046
Maharashtra. Mob: 09881595917
E mail: dryashdnet@gmail.com

Abstract

Devoted paper deals with the comparisons of Computer Assisted Instruction learning practices programme and an epistemology of Constructivism. No doubt technology has made drastic changes in each and every aspects of Human life even though education sector is not excluded from it. The paper also explores concept of Constructivism and CAI "Constructivism is not a theory about teaching…it is a theory about knowledge and learning… the theory defines knowledge as temporary, developmental, socially and culturally mediated, and thus, nonobjective." The paper also focuses the light on characteristics, assumptions, and principals of Constructivism and CAI. CAI is the use of a computer as a medium of Instruction for Tutorial, drill and practice, simulation or games, CAI is used for both initial and remedial training and typically does not require that a computer be connected to a network or provide links to learning resources outsides of the course.

The Comparison of CAI and Constructivism is also incorporated very systematically at the end section of this paper.

Key Words: *Computer Assisted Instruction, Constructivism*

Introduction

No doubt technology has made drastic changes in each and every aspects of Human life even though education sector is not excluded from it. It has been observed that from previous six decade telecasting media absolutely brings up tremendous changes in Human life style of Indian population. In this context telecasting media was the first initiator in telecasting images and virtual, visionary, animated serials for children such as jungle book stories rhymes, poems etc. and different Indian as well as foreign cultural activities and programmes.

Telecasting media play a leading vital role in changing life style of Indian population. In 21st century numerous kind of media are available but among of them computer play a dynamic role from storing of huge amount of data from e-booking of tickets of airlines, railways, billing section, etc. such kind of data instantly produced by computers. 21st century generation is growing and developing very rapidly because of the Wi-Fi technological environment. Therefore in this Wi-Fi technological environment 21st century generation students are spending their valuable time in watching telecasted programmes, playing computer generated games, simulated events, chatting with friends in cybercafé, etc. than reading, writing, and performing bookish activities. These are the characteristics of 21st century generation. They have ample time to perform such activities. They have options for learning i.e. virtual learning, e-learning, computerized learning because they have already entered in a realistic world of instant access to knowledge where mind images are embodied and supplementary information is formally presented in text. At this instance students are passing through constructivist principles such as learning is an active process, learning needs language, students constructing meaning and understanding, it takes times to learn, one need knowledge to learn, computer generated games, animations, simulations are the motivating catalyst in learning process.

Theoretical Approach

Simply theory establishes cause-and-effect relationship between variables with the purpose of explaining and predicting phenomena. According to John Dewey, *"There was nothing more practical than a good theory."*

Concept of Constructivism

The meaning of constructivism varies according to one's perspective and position. Within educational contexts there are philosophical meanings of constructivism, as well as personal constructivism as described by Piaget (1967), social constructivism outlined by Vygtosky (1978), radical constructivism advocated by von Glasersfield (1995), constructivist epistemologies, and educational constructivism (Mathews, 1998). Social constructivism and educational constructivism (including theories of learning and pedagogy) have had the greatest impact on instruction and curriculum design because they seem to be the most conducive to integration into current educational approaches.

Defining Constructivism

"It is assumed that learners have to construct their own knowledge-- individually and collectively. Each learner has a tool kit of concepts and skills with which he or she must construct knowledge to solve problems presented by the environment. The role of the community-- other learners and teacher-- is to provide the setting, pose the challenges, and offer the support that will encourage mathematical construction." (Davis, Maher, Noddings, 1990, p. 3)

"Constructivism is not a theory about teaching…it is a theory about knowledge and learning… the theory defines knowledge as temporary, developmental, socially and culturally mediated, and thus, nonobjective." (Brooks & Brooks, 1993, p. vii)

"Knowledge, no matter how it be defined, is in the heads of persons, and that the thinking subject has no alternative but to construct what he or she knows on the basis of his or her own experience." (von Glasersfeld, 1995)

"The doctrine itself holds that 'language users must individually construct the meaning of words, phrases, sentences and texts.'" (Suchting, 1998, p. 61-62; von Glasersfeld, 1989, p. 132)

"Constructivists allege that it is we who constitute or construct, on the basis of our theorizing or experience, the allegedly unobservable items postulated in our theories." (Nola, 1998, p. 32)

"The central principles of this approach are that learners can only make sense of new situations in terms of their existing understanding. Learning involves an active process in which learners construct meaning by linking new ideas with their existing knowledge." (Naylor & Keogh, 1999, p.93)

Constructivists of different persuasion (hold a) commitment to the idea that the development of understanding requires active engagement on the part of the learner." (Jenkins, 2000, p.601)

Concept of Computer Assisted Instruction

CAI is the use of a computer as a medium of Instruction for Tutorial, drill and practice, simulation or games, CAI is used for both initial and remedial training and typically does not require that a computer be connected to a network or provide links to learning resources outsides of the course.

In Computer Assisted Instruction CAI; instructional activities related frame is prepared and it is used a primary vehicle for transforming content material into the programmed system. It is a teaching process in which teaching remedial material used. Computers are used in the presentation of content material, programmed into the system in which students are allowed to interact with it.

“Computer-assisted instruction” (CAI) refers to instruction or remediation presented on a computer. Many educational computer programs are available online and from computer stores and textbook companies. They enhance teacher instruction in several ways.

Computer programs are interactive and can illustrate a concept through attractive animation, sound, and demonstration. They allow students to progress at their own pace and work individually or problem solve in a group. Computers

provide immediate feedback, letting students know whether their answer is correct. If the answer is not correct, the program shows students how to correctly answer the question. Computers offer a different type of activity and a change of pace from teacher-led or group instruction.

Computer-assisted instruction improves instruction for students with disabilities because students receive immediate feedback and do not continue to practice the wrong skills. Computers capture the students' attention because the programs are interactive and engage the students' spirit of competitiveness to increase their scores. Also, computer-assisted instruction moves at the students' pace and usually does not move ahead until they have mastered the skill. Programs provide differentiated lessons to challenge students who are at risk, average, or gifted.

Assumptions of Constructivism

i) Knowledge is constructed from experiences.

ii) Learning is personal interpretation of world.

iii) Learning is an active process in which meaning is developed on the basis of experiences.

iv) Conceptual growth comes from personal negotiation of meaning the sharing of multiple perspectives and changing our personal interpretation and changing our representation through collaborative learning.

v) Learning should be situated in realistic settings testing should be integrated with task and not separate activity.

Assumptions of CAI

The basic assumption of CAI *(Sharma, R. & Chandra, S. S. 2003p. 343).* It assumes that a student can learn better under the following situations.

1) One can learn at one's own pace and time.

2) One can receive immediate and personalized feedback.

3) CAI can be used in all types of teaching-learning programme.

4) CAI can be arranged for a number of students simultaneously.

5) One can move from one frame to another frame.

General Characteristics of Constructivist Learner

Feel responsible for their learning, have developed awareness, autonomy, goals for learning, have developed initiative use of strategies, accepts the complexity of life, respectful to multiple perspective and world views, open minded, task orientated, process orientated, self controlling, realistic, scientific value generator, holistic, articulate, flexible, moderate, humanistic, social, self motivated, self reflective, indulging in to the experience.

Constructivist Principles

1) Learning is an active process, 2) people learn to learn by learn, 3)the crucial action of constructing meaning is mental, 4) learning involves language, 5)learning is social activity, 6)learning is contextual, 7)one needs knowledge to learn, 8)it takes times to learn, 9) motivation is key component in learning.

Principles of CAI

CAI supply concrete basis for conceptual thinking. It gives rise to meaningful association. If we glance at the principles of CAI and principles of programmed learning, it implicates that, "*CAI is developed on the basic principles of Programmed Learning*"[12] *(Sharma.S.2005.p.306-307).* Developed by B.F. Skinner.There are some important principles and values which will be developed if CAI programme used properly they are as.

1) **Principle** of selection **of difficult units** to student.
2) **Principle of breaking units in to small steps**. Students will be able to learn one small step at a time and sequentially all the steps by being active.
3) Principle of participating the students actively in the teaching learning process. **Active responding principle** useful in the development of CAI programme.
4) **Principle of immediate confirmation** the student learns best if he confirms his responses immediately it provides reinforcement to the learner.
5) Every response even approximately correct must be reinforced immediately. **Principle of Reinforcement.**

6) **Principle of Interactivity** useful in the development of programming, each student interacts and gives answer to questions and also ask queries.
7) CAI programme allow learning the students at their own pace. **Principle of Self-pacing.**
8) Avoid complexes sentences, two ideas in one sentence, passive voice sentences too as far as possible i.e. **Principle of Effective Communication.**
9) In the CAI programme the learner has to leave his responses for each frame on response sheet i.e. **Principle of student evaluation.**

Brief History of CAI

If we see the origin of a computer, we know that some technicians attempted to see, if a machine could be programmed to interact with a man. The first commercial computer was operative in 1951 in census bureau. "*The first Computer Assisted Instruction was made around 1961 when the University of Illine produced Programmed Logic for Automatic Teaching Operation (PLATO).*" (*Sharma, R & Chandra, S. S. 2003p. 342).* Hence, the use of computer in general education began from early sixties.

Historical figures that influenced Constructivism

Following are the Educationist who influenced and more focused on the constructivism.

1) Immanuel Kant (1724–1804)
2) John Dewey (1859–1952)
3) Maria Montessori (1870–1952)
4) Władysław Strzemiński (1893–1952)
5) Jean Piaget (1896–1980)
6) Lev Vygotsky (1896–1934)
7) Heinz von Foerster (1911–2002)
8) Jerome Bruner (1915-)
9) Herbert Simon (1916–2001)
10) Paul Watzlawick (1921–2007)

11) Ernst von Glasersfeld (1917-)

12) Edgar Morin (1921-)

Constructivism and CAI

Constructivism is an epistemology learning and learning and meaning making theory. It maintains that individuals or learners create or construct their own new understanding or knowledge and meaning from their past experiences. Constructivism refers to the idea that learners construct knowledge for themselves. Each learner individually constructs meaning; constructing meaning is learning there is no other kind.

In accordance with constructivism and CAI the students learn in context of what subject matter presented into the system and try to correlate their perception and experiences in the present situation. Here construction of knowledge take place means students are interpreting their personal views about what they learn this is the assumption of constructivism given by Merril, 1991, Smorgansbord, 1997. In CAI learners are actively participated in to the instructional system and this is the assumption of constructivism and principal of constructivism. Students understand and construct the knowledge through the content matter presented into the new environment. In this context learners or an individual organize their thoughts, experiences, ideas, information with programmed content matter into the system. Thus, the students are simultaneously students are passing through assimilation, accommodation and equilibrium process. According to Jean Piagets, "Humans cannot be assimilating the given information but they construct their own knowledge they are able to build their knowledge based on experiences and it enable to create mental models in their heads. (Jean Piagets 2001)

Comparison between Constructivism and Computer Assisted Instruction

Sr. No.	Constructivism	Computer Assisted Instruction
1.	Students learn in Group	Students learn in Group or individual
2.	Knowledge is Universal it changes	Knowledge is Universal it changes

	according to educational environment.	according to programme instructed into the system.
3.	Knowledge is constructed with the help of previous knowledge and ideas.	Knowledge is construction takes place according to previous knowledge and how content matter presented into the system.
4.	Role of teacher is multidimensional as organizer, facilator, instructor, teacher, and co-explorer.	Role of teacher in CAI is instructor.
5.	A student constructs their own knowledge and tries to correlate their perceptions and experiences in the light of new data.	A student constructs their own knowledge and tries to correlate it with subject matter programmed into the light of new system.
6.	Learning is evaluated with the help of observation, insight view, scale, testing tools	Learning is evaluated by examination.
7.	Dynamic interaction between task, instructor, and learner.	Dynamic interaction between task, and programmed material into the system.
8.	Learning is an active and social process.	Learning is an active process.
9.	Engaging and challenging learner environment is available.	Engage and active learner environment is available.
10.	Learner as a unique individual.	Learner as a unique individual.
11.	Constructivism is a theory of knowledge.	CAI is a programmed instruction.

Conclusion

Constructivism is an epistemology learning and learning and meaning making theory. Computer Assisted Instruction is computer mediated learning approach in which students are allowed to interact with programmed into the system. In this article researcher had try to compare Computer Assisted Instruction and Constructivism Epistemology. Conceptual background of CAI and Constructivism is also discussed.

References:

Sharma, S. (2005). Advanced Educational Technology**.** New Delhi: Anmol Publication Pvt. Ltd.

Sharma, Ramnath. & Chandra, S. S. (2003). Advanced Educational Technology. New Delhi: Atlantic Publishers & Distributors.