Constructivist approach for Teaching and Learning

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ABSTRACT

Constructivism is an approach to teaching and learning based on the premise that cognition (learning) is the result of "mental construction." In other words, students learn by fitting new information together with what they already know. Constructivists believe that learning is affected by the context in which an idea is taught as well as by students' beliefs and attitudes. Constructivism is a learning theory found in psychology which explains how people might acquire knowledge and learn. It therefore has direct application to education. The theory suggests that humans construct knowledge and meaning from their experiences.

The National Curriculum Framework (NCF) 2005 strongly supports the constructivist and learner-centered approach in school education. Milne & Taylor (1995), have suggested that (a) learning involves personal mental construction of knowledge by individuals, (b) learner subscribe to their conceptual structures, not because they are absolute, but because they are viable for them as individuals, and (c) knowledge construction is a social and cultural process mediated by language. Burrowes (2003) study provides substantiated evidence that teaching in a constructivist, active learning environment is more effective than traditional instruction in promoting academic achievement, increasing conceptual understanding, developing higher level thinking skills, and enhancing students interest. Fosnot (1996) argues that the primary goal of a constructivist approach to teacher education is to facilitate new ways of knowing. If understanding the teaching/learning process from a constructivist view is itself constructed, and if teachers tend to teach as they were taught, rather than as they were taught to teach. The nature of students' metacognitive knowledge and the quality of their learning strategies are seen to be critical factors in successful learning outcomes (Anthony, 1996).

Introduction:

Constructivism is a learning theory found in psychology which explains how people might acquire knowledge and learn. It therefore has direct application to education. The theory suggests that humans construct knowledge and meaning from their experiences. Constructivism is not a specific pedagogy. Piaget's theory of Constructivist learning has had wide ranging impact on learning theories and teaching methods in education and is an underlying theme of many education reform movements. Constructivism has

informed pedagogy and curriculum development, as well as being dominant idea in research. Cognitive science has become a research focus around the world since the early 1980s (Georghiades, 2004).

Guiding principles for constructivist classrooms

In a constructivist classroom, the teacher searches for students' understandings of concepts, and then structures opportunities for students to refine or revise these understandings by posing contradictions, presenting new information, asking questions, encouraging research, and/or engaging students in inquiries designed to challenge current concepts.

Researches on Constructivist approach for Teaching and Learning

According to Colburn (2000), constructivist philosophers propose that individuals structure their own life center of the constructivism lies the idea that the learner structures

the knowledge and applies it. At the by structuring proposes that human brain is not a flash disk or an empty container that waits for filling. The children don't wait for someone to fill their brains. They structure the knowledge actively in their brains and reconstruct it. With another words, constructivist learning is learning by individually and with social activities and as a result of these activities making conclusions (Brunning et. al., 1999). According to Driscoll (2000), constructivism learning theory is a philosophy which enhances students' logical and conceptual growth. The underlying concept within the constructivism learning theory is the role which experiences-or connections with the adjoining atmosphere-play in student education. The constructivism learning theory argues that people produce knowledge and form meaning based upon their experiences.

Two important notions orbit around the simple idea of constructed knowledge. The first is that learners construct new understandings using what they already know. There is no *tabula rasa* on which new knowledge is etched. Rather, learners come to learning situations with knowledge gained from previous experience, and that prior knowledge influences what new or modified knowledge they will construct from new learning experiences. The second notion is that learning is active rather than passive. Learners remain active throughout this process: they apply current understandings, note relevant elements in new learning experiences, judge the consistency of prior and emerging knowledge, and based on that judgment; they can modify knowledge (Phillips, 1995).

With regard constructivist approach to teacher education Richardson (1997) suggested there were two different forms of constructivist teacher education: (a) teaching teachers about constructivist approaches and (b) working with students in a constructivist way to help them understand their tacit beliefs and introduce new conceptions as possible alternatives those held. Fosnot (1996) argues that the primary goal of a constructivist approach to teacher education is to facilitate new ways of knowing. If understanding the

teaching/learning process from a constructivist view is itself constructed, and if teachers tend to teach as they were taught, rather than as they were taught to teach, then teacher education needs to begin with these traditional beliefs and subsequently challenge them through activity, reflection, and discourse in both coursework and field work through the duration of the program. Most importantly, participants need experiences as learners that confront traditional views of teaching and learning in order to enable them to construct a pedagogy that stands in contrast to older, more traditionally held views.

When we talk about traditional learning and constructivist learning environment Burrowes (2003) study provides substantiated evidence that teaching in a constructivist, active learning environment is more effective than traditional instruction in promoting academic achievement, increasing conceptual understanding, developing higher level thinking skills, and enhancing students interest in biology.

The case studies of two students detail contrasting passive and active learning behaviours illustrate that having students involved in activities such as discussions, question answering, and seatwork problems does not automatically guarantee successful knowledge construction. The nature of students' metacognitive knowledge and the quality of their learning strategies are seen to be critical factors in successful learning outcomes (Anthony, 1996). The study by Artzt & Armour (1992) suggested the importance of metacognitive processes in mathematical problem solving in a small-group setting. A continuous interplay of cognitive and metacognitive behaviors appears to be necessary for successful problem solving and maximum student involvement. Goos & Galbraith (1996) showed that analysis of verbal protocols from think aloud problem solving sessions showed that, although the students generally benefited from adopting complementary metacognitive roles, unhelpful social interactions sometimes impeded progress. Artzt & Armour-Thomas (1998) suggests that the metacognition of teachers plays a well-defined role in classroom practice. These findings provide useful insights for researchers and teacher educators in their pre-service and in-service mathematics programs. Metacognitive activities were involved in all phases of the solution process with key points in students' solutions identifiable in terms of the cognitive metacognitive framework of (Garofalo and Lester, 1985). Stillman & Galbraith (1998) revealed that all successful groups displayed a high number of key points where metacognitive decisions could influence cognitive action. Success was accompanied by a tendency to engage in a high number of organisational activities, regulation of execution activities and evaluation activities particularly evaluation of execution but fewer opportunities where metacognitive decisions could influence cognitive actions during orientation.

The researches on Constructivist Learning Model revealed that the most people learn only when they construct meaning for themselves. Such research must provide the basis for future science teacher education programmes. Without the research base provided by cognitive science and constructivist studies, improved models for science teacher education cannot be developed. (Bybee et al, 1989; Glaserfeld, 1987; Yager, 1991). Davidowitz & Rollnick (2003) investigated a case study of Four Second Year University Chemistry

Students. All students found flow diagrams extremely useful, all understood the Competency Tripod model but only two found it useful. Kroesbergen, Van Luit & Maas (2004) found that math performance of students in the explicit instruction condition improved significantly more than that of students in the constructivist condition. Geban (2003) found that students who used the constructivist principles-oriented instruction earned significantly higher scored than those taught by traditional instruction in terms of achievement. Brownlee, Purdie & Boulton-Lewis (2003) most students thought learning should be meaningful and preferred to use transformative learning approaches. However, students indicated a willingness to engage in reproductive approaches to learning if the content to be learned was uninteresting, workloads were high, or assessment was examination-focused. Jacobs (2004) showed that interviews with the children confirmed that they were exhibiting and showing growth in their metacognition. They were able to provide appropriate answers to questions that required them to talk about their thinking and identify strategies that helped them in their writing. The study provides a model that could be used in classrooms to help children in the development of their growing metacognition and writing in an authentic learning environment. Vukman (2005) studied the developmental differences in metacognition and their connections with cognitive development in adulthood. This study investigated that accuracy in metacognitive statements was however significantly better in the mature adult and the younger adult groups. Annevirta & Vauras (2006) studied the developmental changes of metacognitive skill in elementary school children. The results showed that children with initially high metacognition had better metacognitive skills in problem-solving tasks during the 1st 2 school years, whereas the self-guided behavior of children with lower metacognition resembled more the type of adult-dependent behavior typical of young children as late as the 2nd grade. However, there was no clear developmental relationship between metacognition and metacognitive skills. Case & Gunstone (2006) studied the metacognitive development: It is suggested that metacognitive development needs to be characterised in broader terms than the usual cognitive focus in order to more fully account for students' experiences of learning. Hurme, Palonen & Ja¨ rvela¨ (2006) studied the metacognition in joint discussions: an analysis of the patterns of interaction and the metacognitive content of the networked discussions in mathematics. The results of the study revealed that the metacognitive activity varied among participant. It was found that there is a relation between metacognitive activity and the features of interaction. The student pairs who monitored and evaluated the ongoing discussions had a strategically optimal position in the communication network.

Conclusion

The National Curriculum Framework (NCF) 2005 strongly supports the constructivist and learner-centered approach in school education. Burrowes (2003) study provides substantiated evidence that teaching in a constructivist, active learning environment is more effective than traditional instruction. Case & Gunstone (2006) suggested that metacognitive development needs to be characterised in broader terms than the usual cognitive focus in order to more fully account for students' experiences of learning. Jacobs (2004) showed

that interviews with the children confirmed that they were exhibiting and showing growth in their metacognition by using constructivist approach.

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