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Education and ICT through the Lenses of Constructivism

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ABSTRACT

This article reviews the notion and characteristics of constructivism as a learning theory and its contribution to education in general and teachers and students roles in learning environments. In addition, it examines how constructivism has influenced the relationship between ICT and education.

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Keywords

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Introduction

The Origin of Constructivism: Developments in Education

As stated by Kanuka and Anderson (1999) and Woolfolk (2006), following the behaviorist and cognitive learning theories which encouraged a structured learning context where teachers were only knowledge transmitters and students were passive receivers of information without any role in their learning process and meaning construction, a new learning theory was developed entitled as constructivism. Constructivism is an offshoot of rationalism which theorizes an instructional philosophy. It was mainly developed as the result of the thoughts and beliefs of Jean Piaget and L.S. Vygotsky (Woolfolk, 2006). Constructivism has been viewed differently by different scholars; however, as far as pedagogy is concerned, it theorizes that learning and acquisition of knowledge is an ongoing self-construction process through which reality is constructed rather than discovered which was mainly supported by Jean Piaget (Kivinen & Ristela, 2003; Smith & Ragan, 2005). In constructivism, learning is viewed as a process through which new knowledge is constructed by learners according to their previous knowledge and their current and ongoing experience (Solomon & Schrum, 2007; Ullrich et al., 2008). Furthermore, action and context are very important factors in constructivism since learners construct their own meaning in a learning context by doing meaningful activities and inventing their knowledge while they interact with the environment (Mason & Rennie, 2006; Driscoll, 2005). Therefore, another crucial element for constructivist teachers is empowering learners to determine and follow their desired learning objectives in an attempt to promote their learning performance. This learning condition increases self-regulation in learning as a favorable situation for constructivists. However, since novice learners may find it challenging to work independently and may require more guidance and assistance from the teachers, teachers and curriculum developers should analyze learners' required knowledge and skills before instruction (Driscoll, 2005).

Change of Roles in Constructivist Classroom

Yet, there are some challenges involved with constructivist instruction. The new learning situation can bring about anxiety,

lack of security and rejection of change because of the reconstruction of teachers and learners' roles by means of an innovative learning model. It is not difficult for students to play their passive roles simply receiving knowledge; however, they find it difficult to act as active learners constructing new knowledge and reflecting on their learning experiences (Cavana, 2009). In addition, teachers also encounter a challenging situation because of the need to modify their roles as the class authorities and take a new role of a facilitator. In constructivist instruction, learners are responsible for reaching their own objectives and managing their own learning with teachers' guidance to approach their zone of proximal development.

Constructivist teachers are no more in their moderator, manager and omniscient roles. On the contrary, they are eager to adopt a learner-centered approach and willing to integrate technology into their classroom instruction continuously reflecting on their teaching practices over the past years and act as collaborator and facilitator. They consider ample room for students' discussion and activity acknowledging that multiple correct methods may exist. Constructivist instruction cannot happen in traditional and cognitive learning contexts. According to Jonassen et al. (1999), in constructivist classroom, the focus of instruction is on ideas not facts, the learning process includes students and teachers interaction, construction of knowledge is the focus not its replication, discussion is encouraged in a complicated world in which multiple representations of knowledge exist, learning is determined by students' preferences, and authentic activities are emphasized in learning.

An elaboration of a classroom with a constructivist learning model is provided by Rice and Wilson (1999). They described that learning is made collaborative by constructivist teacher between the teacher and students; the material is made pertinent to the lives of students; the type of activities inspire critical thinking and problem solving; the learners construct their own knowledge; and the teacher act as a guide or facilitator. The constructivist learning theory highlights the focal role of learners in the curriculum suggesting the development of the curriculum based on the learners' needs and preferences (Woolfolk, 2006).

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This theory boosts personal development and helps learners discover their potentials and construct their learning.

Influenced by the beliefs of Piaget and Vygotsky, constructivist learning theory encourages the learning context where there is active and meaningful interaction between learners and mentors contributing to learning. Thus, there are no pre-determined purposes and structures during the instruction. Generally, the main principles of constructivism include active process of learning with learners' meaning construction, the necessity of prior knowledge for learning new knowledge, the concept of learning as meaning construction and learning to learn, the role of motivation, the importance of learning experience for effective learning, the idea of learning as a social activity and role of interaction, the role of language during learning, the existence of link between learning process and learning context, the ongoing and gradual nature of learning.

Constructivism and ICT

The notion of incorporating ICT into learning and teaching practices is rooted back to constructivist learning theory with an attempt to examine the impact of the computer on education in order to explain curriculum planning and recognize their link and shed light on research and practice. It is mentioned that the computer can empower students tackle problems and communicate with peers. Simultaneously, using computers affects how teachers teach as well. Acting as facilitators, instructors design activities, introduce tasks, answer questions, encourage discussion and concluding results. Students work alone or in groups on computer-based tasks, seek help or guidance when doing these tasks and describe their work to the teacher or peers. They are not expected to learn determined sets of knowledge or skills any more since they different technological tools are available for them while learning (Maier et al., 1998). ICT provides students chances for problem solving, sharing skills and resources with peers and teachers and to complete projects with much ease (Moursund, 1999).

However, over the last decades, research has revealed that although teachers have had positive attitudes toward technology and have used technology in technology-rich learning contexts, fewer teachers have made the transition from teacher-centeredness to student-centered instruction (Wolf, 1994; Palak & Walls, 2009).

As stated by Solvie and Kloek (2007), the introduction of learner-centered instruction as an alternative to teacher-oriented learning experiences revealed a constructivist learning model in which the combination of technology and education was highlighted more than before. However, there is a sophisticated link between technology and constructivist education because technology can work both for and against constructivist instruction. Judson (2006) found that constructivist teachers simply use technology in their teaching process as an effective learning instrument forming learner-centered classes. However, the way teachers view technology and its role in instruction is a crucial factor in integrating technology into the instruction. Therefore, in order to change the method of instruction toward a learner-centered one, teachers' beliefs need to be changed in the first place (Ertmer & Hruskocy, 1999; Park & Ertmer, 2007). If teachers believe that technology helps them improve their teaching skills, they are more likely to use technology and new methods in the classroom (Ertmer, 2005; Judson, 2006; Levin & Wadmany, 2006). Technology is frequently used by teachers who believe in learner-centered instruction (Becker, 1999; Judson, 2006).

Conclusion

In conclusion, it can be implied that not only constructivism brought about some crucial changes and revisions in learning

and education including instructional approaches and methods, the roles of teachers and learners, but it also influenced the way teachers and curriculum planners viewed the importance and role of ICT as a powerful tool in optimizing learning process as much as possible and changing for the better. In addition, constructivism promoted the use of ICT and a leaning-centered instruction through which students, with teachers' guidance, determine and construct their own learning as autonomous learners.

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