

Constructivist Learning Framework and Technological Application

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INTRODUCTION

Constructivists believe that knowledge can emerge as learners construct meaning from information they receive and from their participation in the learning activities. As a result, learners gain knowledge from their interaction with the learning environment and from interacting among themselves. Learners construct meaning as they engage in critical reflection and evaluation of learning materials in an effort to discover patterns or new dimensions of the emerging information. This implies that learners have the opportunity to develop the skill to absorb the information before them in a way that connects the previously acquired knowledge and the newly discovered information. Constructivist advocates support learning that focuses on the analysis, synthesis, and evaluation of the learning materials and the related information as a means of constructing new knowledge.

This approach of focusing on higher order knowledge may lead to the discovery of new knowledge while enriching the pre-existing knowledge base. Furthermore, this process allows learners to gain new insight concerning the body of knowledge being studied, and claim ownership of the knowledge gained. Ownership of knowledge implies that learners possess the ability to provide customized application of the newly acquired information. As a result, they may perceive new patterns, shapes, similarities, and abnormalities that equip them to move from the known to the unknown. Matusevich (1995) states that constructivists believe that learning is about constructing knowledge while actively engaging in the learning process rather than passively regurgitating predigested knowledge.

Jonassen (1991) asserts that “instruction should be anchored in some meaningful, real-world context” (p. 29). Technology can provide the tools and interactive environment that can engage the mind actively during the learning process.

BACKGROUND

Part of the active engagement in the learning process implies that learners are connected and interact with others such as teachers, peers, family members, or acquaintances to exchange ideas. Dewey (1933) maintains that learning is a social activity and condemns learning initiative that isolates learner from the social fabric and focuses on one-on-one relationship between learners and their learning materials. The essence of education is to prepare individuals for meaningful societal participation including gainful employment. Work by nature is a social activity which involves collaboration and interaction among workers within the work environment in order to move the workflow forward. Unfortunately, instructional planners underscore the importance of collaboration and interaction as necessary conditions for learning. Bruner (1986) rightly points out that learning involves sharing ideas. Cognitive theory which focuses on mental processing of information and behaviorism which primarily uses reinforcement to reward observable behavior as evidence of learning fails to address conditions that could lead to knowledge construction. Constructivist ideology recognizes that learning involves dynamic engagement in a rich learning environment where learners interact among themselves, reflect, and evaluate what they have learned.

Proper use of technology can provide rich environments where learners can explore, partake in problem solving activities, collaborate among themselves, contemplate, and examine the learned materials.

Generally, technology is perceived as a tool and skill to perform a given task. It (technology) has permeated every aspect of our social and economic life as well as our individual consciousness. To make progress is to be technologically savvy. In some cases, technology tends to be used to define our perception of ourselves and others. Ability to use various electronic gadgets is seen as a necessary part of life in this 21st century and being technology illiterate is becoming a disability in a technology-driven world. Businesses and industries are on the threshold of technological explosion. Hospitals advertise their healthcare success by emphasizing the advancement of their various healthcare technologies. American military myth and supremacy are based on technological advancement. Society has moved on with technology but education still lags behind. Technology integration in the field of education is still being implemented in a superficial, peripheral level; in most cases it is used to present instruction, organize instructional activities, or address low level knowledge (ability to recall).

Educators have been criticized for not using technology, specifically computer technology, to address higher cognitive attributes such as synthesis, analysis, and evaluation (Bloom, 1956). Strommen and Lincoln (1992) are critical of the educational system by asserting that “although the schools are embedded in our culture and reflect its values, the technological changes that have swept through society at large have left the educational system largely unchanged” (p. 467). Holm and Horn (2003) stress that it is important that teachers possess the necessary technological skills to be effective instructors and to meet the needs of the learners

TECHNOLOGY INTEGRATION

Communication technologies such as television, radio broadcasting, telephone, fax, and postal services have had impact on the educational system. However, in recent decades, computer technology and other electronic media have broadened the scope of learning. Successful technology integration requires a theoretical framework that will provide foundation knowledge. Constructivist learning principles have emerged as ideal founda-

tion knowledge for implementing technology-based instruction. According to Grant (2002), incorporating technology with constructivist instructional principles will help promote meaningful learning.

Constructivist theory is recognized as important in providing students with the framework to approach learning from inquiry and problem-based approach. According to Nanjappa and Grant (2003), knowledge can be constructed through “reflective thinking that requires careful deliberation” (p. 4). Reflective thinking does not occur in a vacuum; therefore, it presupposes that some kind of knowledge is already acquired. Otherwise, there is nothing to reflect upon. Reflective thinking is higher order thinking and the purpose is to help individuals gain full understanding or clear any misconception that may exist. Dewey (1933) explains that

We reflect in order that we may get hold of all the full and adequate significance of what happens. Nevertheless, something must be already understood, the mind must be in possession of some meaning which it has mastered, or else thinking is impossible. (p. 119)

Electronic Instructional Plan

An electronic instructional plan is a text that incorporates sound, video, movie, static images, motion clips, and animation. It also contains hyperlinks that can be used to navigate around documents. The hyperlinks can be used to navigate through various subject disciplines in the Web and through this process virtual learning environment can be created. One of the advantages of using an electronic instructional plan is that students can engage in online research to sharpen their focus on the topic being studied. Students are able to examine, analyze, and evaluate topics of interest from different perspectives as a result of the information acquired from online research.

One method of assisting students in knowledge construction is to enable them to develop analytical skills by completing activities that involve studying patterns and inconsistencies, including searching for assumptions, evidence, or hypotheses that are embedded within various structures of knowledge. This may include requiring students to integrate ideas as new perspectives emerge, and reflect on the new arising viewpoint in an effort to understand its attributes. Teachers may want to pose philosophical questions to students as a way of helping them to engage in cognitive probing. Cognitive probing is a situation where

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