

Introduction to the Evolution of Teaching and Learning Paradigms

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Summary. The increasing popularity of the move to e-learning or web-based education throughout the world has not only accompanied advances in information technology, but has brought about a recognition of the importance of the need for teachers to keep pace with changes in teaching and learning in areas of organisation, curriculum, infrastructure and pedagogy. Constructivism has been an underlying pedagogy that has influenced education since the middle of the twentieth century and continues to form an important foundation for e-learning. It continues to guide the move to help students acquire the higher level cognitive abilities of comprehension, application, analysis, evaluation and hypothesis creation. This chapter provides a brief overview of the changes in teaching and learning including the latest ideas, theories and technologies being applied in web-based education world-wide.

1 Introduction

Evolution and change in information technology and educational technologies are important forces driving developments in education [1]. These changes have significant impacts on educators and developers. Claus Pahl illustrated the impact of change through emphasising the interrelationship of organisation, curriculum, infrastructure and pedagogy in the construction of the teaching and learning environment (TLE). Advances in cognitive sciences and education usually precede the development of the conceptual frameworks for learning support so staff involved in teaching and learning need to keep pace with changes in all four areas of the TLE and be able to adapt to the changes and to manage the changes.

During the mid to late 1900s, Benjamin Bloom and his colleagues recognised that learning could be divided into three categories or domains (Bloom's taxonomy of learning behaviours); cognitive (knowledge), affective (attitude) and psychomotor (skills) [2–5]. For each of these domains there exists a hierarchy of learning behaviours starting from the ability of the student to acquire knowledge or recall information, ideas and principles, through to abilities to comprehend, apply, analyse, evaluate and finally create new structures, hypotheses, programs etc. Educators in the secondary (high school students) and tertiary (universities, colleges etc) sectors have had varying successes in helping students reach the higher levels of this hierarchy. There are still university courses where teaching and learning are largely teacher centred and reward knowledge acquisition and understanding with little opportunities for application and no opportunities for students to reach the higher levels of the cognitive processes. However, there has been an underlying pedagogy that has influenced education throughout the latter half of the twentieth century and guided the move to help students acquire these higher level cognitive abilities. This is constructivism.

Piaget recognised that education cannot succeed without recognising, using and extending the “authentic activity” with which a child is “endowed” [6]. He further acknowledged that schooling should be adapted to the child and in doing so educators should consider the psychological development of the child in the design of educational activities. Thus, Piaget was an early advocate of the constructivist pedagogy. In the constructivist view of learning, meaning that is constructed by an individual is dependent on the situation itself and the individual's purposes and active construction of meaning [7]. Constructivism recognises that prior experience has an influence on the way phenomena are perceived and interpreted. These authors recognised the importance of active construction of meaning on the part of the learner.

Hendry and King [8] have approached constructivism with a view to understanding the neurological processes that are occurring during learning. They view specific knowledge as specific spatio-temporal patterns of impulses and completion of a pattern of impulses knows, that is perceiving, ideating or reasoning. Along with Iran-Nejad [9] they interpret construction as the integration of patterns in a new form in the same region through synaptic growth. Simultaneous construction in various modality specific sensory areas was considered to be equivalent to Iran-Njad's [9] idea of dynamic self-regulation. Hence, to help young people construct knowledge the teacher must ascertain children's ideas evoked by various contexts [8, 10].