

Applying Constructivist Self-Regulating Learning Approach for ICT Students

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INTRODUCTION

Universities face the challenge to ensure that quality teaching meets the needs of the students and satisfies their learning requirements (Beller & Ehad, 1998). Day (1999) suggests that teachers should instill the concept of lifelong learning into their students and the best way to do this is to have commitment to and enthusiasm for this concept themselves.

To this end, it is important to understand students learning process and outcomes. In this article the constructivist self-regulating learning approach is recommended by the authors for higher education—especially for post-graduate students because it is a more realistic reflection of how work and research is done in the real world. On the other hand, the students' learning style and problem solving process are important to their learning outcomes. This research aims to understand the relationships between constructivist self-regulating learning approach to problem solving and student learning outcomes.

The overall objective of this research is to investigate the constructivist self-regulating learning approach in relation to student learning outcomes. In particular, we would like to address the following research question:

What are the impacts of the constructivist self-regulating learning approach to learning outcome(s)?

In this article, we use the interview method to examine the approach for advanced level ICT students in an Australian public university. The first section covers the literature and theories associated with the topic. The second section discusses the methodology for conducting the research. The third section describes findings and results. The article concludes with discussions, implications and recommendations.

BACKGROUND

Constructivist Learning

Constructivist learning has some basis in cognitive learning and is the result of the mental construction of a situation. Constructivism, in its most basic form, is piecing together new information using information already known to the student.

Learning models have historically been based on the metaphor of acquisition whilst recent models have introduced participation as the metaphorical basis (Sfard, 1998). The constructivist standpoint is that students have their own opinions and views and will derive their own understanding from a situation. Central to the constructivist methodology, are three principles (Milne & Taylor, 1995, p. 40):

1. Learning involves mental construction of knowledge by individuals, rather than absorption from external sources;
2. The “concept of absolute truth” is replaced with the “concept of viability”; and
3. Knowledge construction is a social and cultural process mediated by language.

According to Tetard and Patokrorpi (2005), the constructivist learning environment is associated with the following aspects:

- Organize a small assessment task to achieve overall learning objectives
- Ownership of learning and problem solving
- Task must closely relate to real life problems
- Allows different aspects or solutions to solve the assessment task/problem

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- The learning environment should be very similar to real life environment
- Allows interactive learning
- Guidance should be provided
- Building on the students' prior knowledge
- Opportunity for social interaction
- Communication with peers and others
- Allows alternative learning strategies
- **Volitional:** Stressing controlled actions to regulate emotions and environmental conditions.
- **Vygotskian:** Stressing inner speech, dialogue, and mediation acquired through a hierarchy of developmental levels.
- **Constructivist:** Stressing personal theories, discovery learning, and development of self-regulatory processes based on conceptual change.

The constructivist methodology encourages a teaching and learning approach that gives the students the opportunity to participate in a learning community where the instructor is not the only source of information and knowledge (Bruce, Weil, & Calhoun, 2004). Technology is introduced as a tool that supports the learning process as students seek knowledge and understanding.

Constructive Self-Regulating Learning

The constructivist pedagogy according to Howe and Berv (2000) incorporates two factors, the first being that teaching must start with the knowledge, attitudes, and interests of the student in mind. The second is that the teaching must be designed to allow students, through their own experience, to interact with the material in order to *construct* their own understanding. Other definitions of constructivism are described by Poplin (1998) as “[the] process whereby new meanings are created by the learner within the context of her or his current knowledge”. Zimmerman and Schunk (2001) provide seven theoretical views on self-regulated learning, each of which have their own concepts on “key processes, environmental conditions and acquired capacities.” These different views are directly quoted from Tillema and Kremer-Hayon (2002):

- **Operant:** Stressing self instruction, modeling and shaping of behaviour; emphasizing provision of relevant stimuli for learning
- **Phenomenological:** Stressing self-worth, subjective experiences, and development of a self-system emphasizing personal identity
- **Information processing:** Stressing transformation of information, and self-monitoring with relatively little attention to environmental conditions
- **Social cognitive:** Stressing self-observation and enactive experiences, through social learning; emphasizing self-efficacy in learning

Athanasou (1999) also indicates that there are several different theories of self-regulation. He, like Zimmerman and Schunk (2001) has broken these theories into different views. In his case three views, the operant or behaviorist which stresses the links between the environment and its reinforcers, the phenomenological or humanist which stresses the self and self-regulation and the social-cognitive models which attempt to bring the two previously stated theories together as well as stressing the cognitive aspects. Paris and Byrnes (1989) describe the constructivist approach to self-regulated learning by first describing the principles of a cognitive constructivist approach. They divide it into *six principles* of learning whereby people have:

1. An intrinsic motivation to seek information
2. A desire to develop an understanding that goes beyond the information given
3. Mental representations that change with a person's development
4. Levels of understanding that are progressively refined at time goes by
5. Developmental constraints on learning
6. Reflect and reconstruct to stimulate learning

These authors further suggest that the notion of theory does provide a framework for self-regulated learning and that this notion includes aspects such as formulating and testing hypotheses, acquiring new data, and solving problems.

Moon (1999) describes the constructivist view of learning as emphasizing the teachers role as a facilitator of learning and that the learner constructs the learner's own knowledge in a network fashion, much like “building bricks in a wall.” Moon (1999, p.106) describes the approach as “[stressing] the content and organization of the curriculum as being the basis for learning and implies that knowledge is built from ideas that the learner gradually assembles.” The constructivist approach stresses that the learner becomes more engaged

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