A holistic approach to activate and enhance prior knowledge of tertiary learners in the upcoming lectures of calculus

ABSTRACT

Learners' prior knowledge is essential for effective learning to take place. It interacts closely with phases of mathematical problem solving process. As the result of it, tertiary learners with appropriate prior knowledge are more receptive to understand abstract concepts, definitions and principles of University Calculus as well as their applications in modeling and solving the physical and engineering problems. This paper provides the instructor with a framework to implement pre-lecture instruction holistically so that learners' required prior knowledge is activated and strengthened before they attend the upcoming lectures. Based on human cognitive information processing model and experiential learning theory, the approach facilitates sensing the reviewed knowledge of University Calculus by adapting learner's learning preferences. Then, the knowledge is to be integrated with the learner's prior knowledge and past experience for meaningful learning to take place. It is further extended by drill and practice over its wider range of relevant applications. Consequently, a concept map of the knowledge is created and stored in the learners' long term memory. The concept map will be activated whenever the prior knowledge is required for new learning to occur. Ultimately, this approach facilitates learner's reflective, deep and meaningful learning in the upcoming lectures of University Calculus.

Keyword: Prior knowledge; Mathematical problem solving process; University calculus; Human cognitive information processing model; Brain compatibility theory; Experiential learning; Adaptive pre-lecture instruction