ABSTRACT
In recent years, the exploration of Context-Aware Learning has been mainly through the use of technology of sensors, wireless communication and mobile devices to proceed to the suitable learning. The existing researches of Context-Aware Learning are mostly of mobile learning, using sensor components such as GPS that can detect geographic locations and RFID that can identify objects, to perceive the learner's external conditions. Basically, the mentioned sensor components are all functioning to catch the perception of the learner's external conditions, and feed the perceived data into digital learning system for interactions. The relevant studies are all confined to how to integrate the external conditions of the learner's geographic location or the learner's identity into the interactive digital learning environment. Rarely explored and created are the digital learning environment that actively perceives the learner's internal conditions such as the physical and mental statuses and the learning capacity, to strengthen the existing Context-Aware Learning environment and to effectively improve individual or group learning interests and efficiency. The idea of this research was based on cognitive neuroscience; by collecting learners' brain waves with EEG sensors, Learning Energy Index (LEI) was established by using a brain-wave learning energy analysis program. LEI may provide learners the evidences of learning effects during online learning. This research analyzed and discussed all the different EEG properties during learners' diverse learning, and it also discussed the differences in EEG of traditional textbook-learning and that of multimedia-material learning. Additionally, this research also reviewed literature related to the ideas of if sports are advantageous for learning and if Game-based Learning is Positive Learning.

Keywords : Context-Aware Learning、EEG、Cognitive Neuroscience、Game–based Learning