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Comparing Brain Activation between Students who Use Digital Textbooks and Those who Use Conventional Paper Textbooks

Abstract

The purpose of this study is to compare the effects of digital textbooks and conventional paper textbooks on brain activation during problem solving among elementary-school students. Subjects included 54 6th grade students who used either digital textbooks or paper textbooks. We measured theta waves, alpha waves, beta waves, and gamma waves using PolyG-I (LAXTHA Inc.). We found significant effects of the textbook type for all brainwaves in the prefrontal lobes. Our results suggest that the use of digital textbooks will enhance the development of cognitive and thinking processes during learning.

Keywords: *brainwave, digital textbook*

Introduction

Developments in information technology are leading to the classroom use of digital textbooks in many countries including the United States, Australia, and Finland (Ministry of Education, Science, and Technology [MEST], 2011). Digital textbooks are expected to help overcome some of the limitations of paper textbooks. Such limitations include limited content, difficulty in keeping up with the most current information, and limited types of learning activities. Digital textbooks also hold a promise for enabling individualized, self-directed learning experiences.

Korea has been developing digital textbooks since 1997 under the direction of the MEST. At present in Korea, digital textbooks have been developed for a total of