An Evaluation of the Quality of Graphical Representations in Electronic Science Textbooks in Taiwan

Pei-I Chou,
National Sun Yat-sen University, Taiwan.

Abstract

The textbook is one of the most important resources for science teaching. Recently, graphic representations are increasing in science textbooks. However, few research studies in science education concerned textbooks; even fewer studies related to graphical representations in textbooks. Besides, using electronic textbooks is a growing educational trend in the digital age. It has the potential to improve students’ learning effects through multimedia design. We need to examine the quality of the new product thoroughly to help the e-textbook to maximize the potential before its widespread application in the classroom. In view of this, based on multimedia learning theories, this study revised the e-Graphical Analysis Protocol to develop a set of systematic criteria for evaluating electronic science textbooks in Taiwan. It included five major parts: text, static graphics, integration of graphic and text, multimedia elements and interface. A content analysis is applied to analyze the earth science parts from three digital versions of science textbooks which occupy more than 90% of the textbook market (90 whole pages from H version, 82 from K version and 82 from N version). The findings were as follows: the text structure is linear which occupies the whole layouts from left to right and top to bottom; text/reader interaction is passive transmission model; graphics occupy not less or more space than text in the majority of layouts; graphics are all represented in color; the graphic and text are well integrated in “spatial contiguity” and “semantic relations”. Almost every page provides hyperlinks to link to supplementary materials such as animation, music, video, commentary and so on. Interface message rendering structure and interface control are with basic functions but without an interactive learning platform and online feedback.

In a word, the current representation of e-textbooks in Taiwan is restricted to the PDF version of traditional paper textbooks. It could help students to transfer their use experiences from paper textbooks which they are familiar with to the new e-textbooks. However, there is still a long way to go for making the best use of the non-linear, open, interactive, integrative characteristics of multimedia learning for e-textbook design.

Key Words: science textbook, electronic textbook, textbook evaluation, multimedia cognitive learning