

## Improving Student Science and English Language Skills: A Study of the Effectiveness of BrainPOP

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**Abstract:** The purpose of this study was to explore the impact of a web-based animated instructional tool on academic achievement. This study investigated the following question: Do students in grades 3, 5 and 8 using BrainPOP as part of their instruction show larger gains in Language, Reading Comprehension, Vocabulary and Science skills than a comparable group of students who do not use BrainPOP? Additionally, the study explored the results by gender, ethnicity, and involvement in free or reduced lunch. Using a quasi-experimental design, this study compared growth in Science, Reading Comprehension, Language and Vocabulary. The findings indicate that students in classes using web-based animated instruction show greater academic achievement than a comparable group of students who did not use web-based animated instruction.

### Background and Purpose

The fundamental multimedia principle, words and pictures are better than words alone, has been well established through numerous experimental studies (Mayer, 2005). However, there are few studies comparing the academic achievement of multimedia users to non users in actual school settings. This study explores the impact of an animated instructional tool on achievement, comparing users to nonusers in a quasi-experimental design.

During the 2008-2009 school year, SEG Research conducted a multi-site study of students in grades 3, 5 and 8 to evaluate the effectiveness of BrainPOP, a web-based animated instructional tool. The findings indicate that students in classes using web-based animated instruction show greater academic achievement than a comparable group of students who did not use web-based animated instruction. Students using web-based animated instruction made significantly greater gains in Science, Reading Comprehension, Language, and Vocabulary skills during one school semester (January through June) than students in classes that did not use web-based animated instruction.

### Description of BrainPOP (Treatment)

The Treatment in this study was BrainPOP use. BrainPOP is a web-based animated instructional tool designed to support educators and engage students. BrainPOP is intended for use in both group and one-on-one settings and can be used in numerous ways, from introducing a new lesson to illustrating a complex subject.

BrainPOP comprises a collection of 3-6 minute animated movies used to introduce a new science concept or for review. The movies are accompanied by several tools that can be used to differentiate instruction and engage students' reading, writing, and communication skills. These include instructional Activity Pages, Vocabulary Pages and Quizzes that can be used to reinforce concepts, define new terminology, and to assess students. BrainPOP also includes graphic organizers that can be used to help scaffold student understanding while interacting with the movie as well as short, high-interest readings designed for guided and independent nonfiction reading. The vast majority (70%) of the teachers involved in the study used BrainPOP about 2-3 hours per week. Some teachers indicated greater use and 20% reported using BrainPOP about 1 hour or less per week.

### Review of Literature

BrainPOP is based on what is often referred to as the fundamental multimedia principle: Information is more effective when presented in words and pictures than words alone (Mayer, 2005). Research has shown that the brain processes information using two channels: visual and auditory. The brain can accommodate more information when it is presented both visually and aurally. By taking advantage of multimodal processing, we can dramatically