Using iPads to Create Virtual Models in Science

Foundations of Instructional Technology: IST 5003

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Over time it has been seen that using technology as a tool for instruction in the classroom increases student engagement and student learning across all content areas. Instructional technology has also shown that using technology in the classroom can help make abstract ideas more concrete. In respect to this aspect of learning, technology is especially helpful in specific subjects like science, which Ziman (1968) defined as a “system of ideas” (p.13) and a “compilation of abstract knowledge.” (p.13) The portable tablet, such as the iPad, is a form of technology that supports the creation of virtual models. By integrating iPads into science, the students will have the ability to make abstract knowledge more concrete by creating and manipulating virtual models.

The iPad as a Pedagogical Device

The iPad, according to Valstad (2010), has many pedagogical uses. The adoption of new technology, such as the iPad, is usually performed in two stages. The first stage is the replacement stage. In this stage, schools simply use the new technology to replace an existing resource. For example, the iPad can be used to read an e-book. This is by far the most popular choice amongst schools. The second stage is the transformation stage. In this stage, schools completely transform the way something was previously being taught or handled (Valstad, 2010). For example, the iPad has an application for purchase that can be used to create molecules. Another reason why iPads are effective in the classroom is because of how motivating and engaging they are for the students. Teachers are teaching to 21st century learners. These children are digital natives who are constantly surrounded by technology in their daily lives. “Technology is their native language and they expect to use it at school.” (Valstad, 2010, p.9)
The Benefit of Integrating Technology into Science

Integrating technology into science also has many benefits. Stieff and Wilensky (2003) state that helping students visualize the molecular world will help them see chemistry as relevant, concrete actions applicable to the outside world rather than abstractions. By integrating Connected Chemistry computer-based curricula into a high school chemistry class, the students were able to identify relationships through interactive simulations and through their inquiry-based learning, which the program encouraged. Inquiry-based learning encouraged critical thinking while discouraging rote memorization and the use of algorithms. Stieff and Wilensky (2003) stated that although daunting at first, they had the children typing in NetLogo language into a computer program. As a result, the computer-based learning environments resulted in deeper and more meaningful understanding of the subject being taught (Stieff and Wilensky, 2003).

The Benefit of Integrating iPads into Science Instruction

Since Connected Chemistry interactive simulations were shown to be an effective tool in teaching molecular chemistry, it is a good indicator that iPads may also be as effective in teaching science. iPads are not only engaging and motivating for 21st century learners, but they have the ability to transform the way science has been taught. Although science is primarily abstract knowledge, iPads allow for the student to create their own visual representations through pre-created applications. Similar to Connected Chemistry, the application Molecules allows the students to render three-dimensional molecules and manipulate them using their fingers. Like most iPad applications, the zoom and rotate feature are enabled. Students may also create their own custom molecule by typing in the
chemical formula into a box. Unlike Connected Chemistry, this application can be used for junior high and older elementary students as well. Teachers can download new molecules from a website and use it solely on the level of their students. Also, the iPad has many other pre-created applications that could be extremely beneficial to teaching many branches of science including chemistry, biology, astronomy, and many more.

By integrating a piece of technology like the iPad into a science classroom full of 21st century learners, not only does the motivation and engagement rise but the understanding and critical thinking do as well. The iPad is an effective tool across all ages and content area but not because of the technology alone. Teachers must learn how to use and integrate the technology properly in order to really transform the students learning. In order for teachers to use the technology properly, they must be adequately trained and need continuous support in order to most effectively use the technology into the classrooms (Brand, 1997). If technology is to be used by the students effectively, teachers must be willing to change and transform the way they’re teaching.
References


