

Computer simulations as a learning tool



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Computers simulations are being use as learning tools in classrooms settings. Specifically, technology teachers are now using computer simulations as a method of instruction. Though the years, computer simulations have been part of the development of physical, sports, natural and social sciences. In ordinary life, children, as wells as, adults have experienced computer simulations through computer games. Studies showed computer simulations can improve students' learning; researchers suggest that they can become an effective tool for students simulate or imitate real life situations in a programmed environment when learning is inaccessible due to cost or safety. Now, how a computer simulation enhances the learning process of the students.

Introduction

With the rapid grows of software program, computer use in education has become affordable. Nowadays, students have access to a computer on a daily basis, and some of them receive formal instruction of computer use as in any other subject. Traditional instruction offered little or no interaction between teachers and student and they started to get bored. As a result, it became an essential for teachers to maintain students engage while teaching; especially when the lesson being taught involves abstract concepts that might be too difficult or complex to understand. One of the main goals why computer simulations entered the classrooms was the necessity of creating an environment where students may use simulations to develop their thinking abilities and “ to enable them to make decisions wisely, and to solve a problem” The Effects of Inquiry- Based Computer Simulation with ... (n. d.) more efficiently.

Research Problem

The main outcomes of these studies suggested that computer simulations can help students' conceptual changes and improve their critical thinking. Students learning can be increase when teachers “ can focus students' attention on learning objectives when real-world environments are simplified, causality of events is clearly explained, and unnecessary cognitive tasks are reduced through a simulation” Using Computer Simulations to Enhance Science Teaching and ... (n. d.).

Literature Review

The effectiveness of cognitive learning increase by computer simulations has been supported by 31 researcher studies conducted in K-12 educational settings on students of sciences and mathematics. Zietsman and Hewson (1986) did a research on 74 high schools and freshmen college students. The research wanted to see how computer simulations done in a microcomputer can change conceptual change strategies. At the end of the research, the author reported that students had a more realistic understanding of the design of velocity. Consequently, science teaching enhanced by the use of conceptual changes strategies in conjunction of computer simulations are a valuable learning tool. According to Randy and Smetana (as cited in 2008), computer simulations can be “ interactive, authentic, meaningful learning opportunity” (p. 23).

In another study, “ Computer simulations as an inquiry tool” by Mintz, R. (1993), students were expose to computer simulations, as to determine how these projects improve inquiry work in the classroom. The actual project consisted on the study on an ecological system using a fish tank where

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teachers added a new variable each time. In the experiment, students were “asked to consider hypotheses, conduct experiment, and monitor and display data and draw conclusions “ Using Computer Simulations to Enhance Science Teaching and ... (n. d.). The results were “ that students were successful in designing, implementing and analyzing the results of three ecological problems, noting improvement even as “ inquiry tasks became increasingly complex. Students also began employing more” accurate and analytical strategies, rather than relying on trial and error” Using Computer Simulations to Enhance Science Teaching and ... (n. d.).

Technology teachers are using computer simulations as a method of instruction. A different researcher conducted to find how computer simulations help teaching problem solving in the content area instruction. The study selected two groups of students with health disabilities. One group was to receive instruction with traditional practices, and the other with teacher instruction plus computer simulation. The results were that the group using computer simulation showed a significant difference in problem solving skills. The experiment concluded “ teacher instruction combined with computer simulation can increase factual order and high order of thinking skills” Virtual Reality/Simulations with UDL National Center on ... (n. d.).

Computer simulations can improve teaching and learning

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Advantages

After more than 20 years of research about computer simulations programs in education, many advantages can be a reference. One of the advantages of computer simulations is that number a three-dimensional process by bringing to life intangibles events, and on the contrary textbooks only take a two-dimensional view. Another advantage, offered by computer simulations is the opportunity to clarify reality using games by modeling a problem and developing a belief in a collaborative and interactive environment.

Research Design

The research design used in these studies was descriptive research. The observation of the students was conducted in a familiar environment for the students, the classrooms, and as students engage in the investigation, difference in a student’s social, political and scientific issues emerged. Consequently, researchers started to ask questions throughout the simulations to focus student’s inquiry during the exploration. Studies in computer simulations vary depending on what type of simulations is been used. De Jong and Van Jooling, (1998) divide computer simulations into two main categories: simulations containing a conceptual model that holds principles, concepts, and facts related to the system being simulated; those

based on operational model include sequences of cognitive and non-cognitive operation that can be applied to the learning.

Limitations of this research

There are several limitations to the usage of computer simulations as an effective learning tool. According to the report by the National Center on Accessing the General Curriculum about computer simulations, most researches suggested “ that computer simulations can be effectively implemented across a broad range of grade levels” Virtual Reality/Simulations with UDL | National Center on ... (n. d.). Nevertheless, most of the studies only focus in middle grades, and elementary students were poorly represented. Among other limitations is he students’ prior experience manipulating computers in the classroom because there is no evidence showing the student’s computer training. In addition, teacher computer training and support have not been mentioned.

Implications for practice

Computer simulations are becoming a very useful tool to simulate environments. In the future, I can incorporate the finding in these researchers to go more in depth about the benefits that computer simulations offer, and as a future teacher, I will incorporate some of the web-based simulations in my lesson plans to see how my students respond to this new stimuli, and how simplifies the understanding of abstracts, intangibles or complex themes.

Conclusion

Although, more researches has to be done to prove their effectiveness in all areas of the teaching instruction. Nevertheless, most of the studies found they do more good than harm. Computer simulations help the students not to wonder, but rather than ask questions, test their own hypothesis and experience how things work.