Effectiveness of Computer in Teaching Chemistry

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Abstract

The aim of this study is to develop and then evaluate the effectiveness of Computer in teaching chemistry for higher education. Learners may be classified into three categories namely fast, average, slow learners. To make all learners learn the subjects on their own speed computer is very useful. That is the opportunity for educator and learners to create innovative ideas to learn chemistry. This research suggests that computer may give benefit to both educator and learners. There is, however, limited research about the application of computer is presently available in teaching chemistry for higher education. Here the researcher describes the use of computer in the teaching and learning of chemistry in higher education. Evaluation of learner's performance by quantitative and qualitative means suggests that computer has led to enhance learning for a variety of chemistry topics in this educational setting. As this is the first attempt in deploying computer in teaching chemistry concepts in higher education, educator is primarily employed to teach chemistry with computer. This paper highlights a personal experience and a case study of implementing computer and the effect of learner's performance in this study. Through hypotheses testing, higher education is clearly possible that employing computer in educational settings proves to have significant effect on learner's performance. So the implementation of learner centered approach is successfully done in computer method of teaching. In this research paper, researcher has tried to bring a definition of computer and the way of using different types of innovative techniques to teach chemistry in higher education.

Introduction

Computer use by any teacher is a function of his or her computer experience and expertise, availability of hardware and software, and perceived need. An excellent chemistry course may be taught without the use of a computer. However, the careful incorporation of computers into a chemistry course can and does add an important level of enhancement. Although not as conclusive as one might hope, studies do indicate that computer use in chemistry education can improve learning and positively influence students' attitudes and self-esteem. The importance of using computers in a chemistry class may not be limited to the ability of Computer to improve

learning. Rather, computer use adds another dimension to the teacher's repertoire of strategies, which may improve overall learning. Another important reason to include student computer use in a chemistry course is that most (if not all) students, especially those planning a career in chemistry, will be required to be computer literate. As students interact with computers in a variety of ways within their chemistry courses, their degree of computer awareness and literacy will increase.

Review of Literature

The following studies found positive effects associated with computer use in science education applications:

Indian Studies

Bobin Antony (2006) conducted a study on development of CAI package in IX standard computer science and its effectiveness. The major findings were the experimental groups obtained a higher mean then the control group. The sex wise comparison is insignificant. There is no significant association between the gain score and the hours of study of the control group students and there is no significant association between the gain score and the hours of study of the experimental group students.

Nirumala Sundaraj and Annaraja (2005) conducted a study on effectiveness of power point presentation in teaching zoology for higher secondary students. The major findings were there was significant difference between the pre-test and the post-test scores of the students. There was significant difference pre-test and post-test scores of the students in attainment of knowledge, understanding and skill objectives. That is experimental group students are better than the control group students.

Subramanian (2006) conducted a study on effectiveness of CAI for teaching triple column cash book at higher secondary level. The major findings were CAI package significantly improved the performance of students in learning accountancy of higher secondary school. Male students do not differ much from their female counter park in their academic achievements even after exposes to CAI.

Subasri (2006) conducted a study on accessibility of power point presentations among high school and higher secondary school teachers in classroom teaching. The major findings there is high significant relationship between the fundamental knowledge of computer among the teachers power point accessibility in class room teaching. Urban teachers are found to utilize power point presentations more effectively in class room teaching when compared teachers.

There is no significant difference between the high school and higher secondary school teachers in utilizing the power point presentation in class room teaching.

International Studies

Kelly and Mary (2008) conducted a study on the use of Multi-media technology to enhance self-determination skill and encourage student leadership in educational goal planning for post-secondary students with   asperser syndrome. The intervention provided students with an opportunity to play a much greater role in planning than many had traditionally played and also provided an engaging medium for team members to learn more about the student an his or her goals. Students were observed engaging in significantly more self-determined behaviors after the intervention but other measures of self-planning were inconclusive therefore it is important for teachers and parents to continue to build on the momentum of the intervention and provide ongoing opportunities to foster newly acquired skills and behaviors. The mixed results may also mean that more long term, multi-component approaches to promote self-determinations skills and participation in educational goal.

Shao and Wei (2006) conducted a study on animating autonomous pedestrians. The result indicated that the use of a computer-based Multi-media instructional module that integrated mind mapping of foreign culture reading as a treatment has a significant difference is student performance on cultural context knowledge, and had no significant difference in student performance on culture vocabulary knowledge when compared to the traditional instruction.

Chen and Rong-Ji (2006) conducted a study on power and reason: The construction of a mathematics teacher's pedagogical discourse and practices. The findings of the study can contribute to a better understanding of how a teacher's construction of his pedagogical conceptions and practice is influenced by the social embedded with in a particular network of power relations might be challenged.

Clerk and Danny (2005) conducted a study on the effected of using computer assisted instruction to assist high school geometry students achieve higher levels of success on the Florida Competency Achievement Test (FCAT). The major findings concluded that the factors associated with having a student centered schools environment incorporating the use of computer technology to evaluate student achievement with the assistance of a collaborative learning environment did play a significant role in the positive increase in academic achievement on standardized test scores.

Lee (2004) conducted a study on the effect of intrinsic and extrinsic load on learning with computer based simulation. The major findings were high intrinsic/extrinsic group has performed

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worse than other groups. There was significance difference between interaction effects of the instructional treatment conditions and individual differences.

Operational Definitions

Effectiveness

Effectiveness is the capability of producing a desired result. When something is deemed effective, it means it has an intended or expected outcome, or produces a deep, vivid impression. The word "effective" means creative, productive or effective.

Computer

Computer may be defined as the use of a computer as an integral part of an instructional system, the learner generally engaging in two-way interaction with the computer via terminal. Computer assisted instruction is a package developed by the investigator for the corresponding units in chemistry for higher secondary students.

Chemistry

Chemistry is a branch of science which deals with elements, compounds, their structures and properties. Teaching in Chemistry plays a very vital role at the higher secondary level.

Teaching

Teaching is an ability to express the subjects without any difficulty in simple easy and correct method of explaining the subjects.

Teaching of Chemistry–Aims

The practical aim of the study of teaching chemistry would be to acquaint the student with the rudiments of its day to day activities of knowing to use chemicals give him a grasp of its teaching and learning by doing; to enable him to express himself clearly; to make it possible for him to write correctly so that he can communicate his every day ideas to another without ambiguity, to compose business letters, to converse freely and fluently and to write a number of lines on a given topic correctly. Chemistry, being a well-developed science, in its importance among other sciences is a mirror of the day to day of life of the people living and experiencing that science of chemistry. The need and importance of teaching Chemistry in schools, therefore, is to inculcate in the student an ability to express his / her every day to day activity in enjoying

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and experience without any difficulty in simple easy and correct science of chemistry. In short the aim of teaching Chemistry is to give pupils a basic all round command of understanding Chemistry.

Importance of chemistry

Throughout the history of the human race, people have struggled to make sense of the world around them. Through the branch of science we call chemistry we have gained an understanding of the matter which makes up our world and of the interactions between particles on which it depends. The ancient Greek philosophers had their own ideas of the nature of matter, proposing atoms as the smallest indivisible particles. However, although these ideas seems to fit with modern models of matter, so many other Ancient Greek ideas were wrong that chemistry cannot truly be said to have started there. Alchemy was a mixture of scientific investigation and mystical quest, with strands of philosophy from Greece, China, Egypt and Arabia mixed in. The main aims of alchemy that emerged with time were the quest for the elixir of life (the drinking of which would endow the alchemist with immortality), and the search for the philosopher's stone, which would turn base metals into gold. Improbable as these ideas might seem today, the alchemists continued their quests for around 2000 years and achieved some remarkable successes, even if the elixir of life and the philosopher's stone never appeared. Towards the end of the eighteenth century, pioneering work by Antoine and Marie Lavoisier and by John Dalton on the chemistry of air and the atomic nature of matter paved the way for modern chemistry. During the nineteenth century chemists worked steadily towards an understanding of the relationships between the different chemical elements and the way they react together. A great body of work was built up from careful observation and experimentation until the relationship which we now represent as the periodic table emerged. This brought order to the chemical world, and from then on chemists have never looked back.

Modern society looks to chemists to produce, amongst many things, healing drugs, pesticides and fertilizers to ensure better crops and chemicals for the many synthetic materials produced in the 21st century. It also looks for an academic understanding of how matter works and how the environment might be protected from the source of pollutants. Fortunately, chemistry holds many of the answers. Following the progressing trend in chemistry, it enters into other branches of chemistry and answers for all those miracles that are found in all living organisms.

Conclusion

The use of Computer in the Chemistry classroom is still in its infancy. Its overall effectiveness needs to be enhanced by better hardware and software as well as greatly increased availability of

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each. More research is needed to discover the most effective strategies for their use. The rate at which computers will be used to enhance education in chemistry and in other fields depends mainly upon state and national monetary commitment, followed by the willingness of individual schools to provide good in service programs. This effectiveness of computer in teaching chemistry for higher secondary students fulfill the gaps of students' knowledge, understanding, application, skills of knowing chemistry in their day to day activities.

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