Analysis of Complications in Computer Assisted Education

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Abstract - Now Educational Institutions like Colleges and universities are trying to substitute instructional methods for teaching improvements with Computer Aided Education (CAE). Computers and the internet allow new methods of delivering instruction to students. Aided education courses using traditional instruction methods complemented with Computer Assisted Instructions (CAI). CAE methods in developing nations have received little attention. Technology is used in most educational institutions since 1990s, but still has some setbacks. The unlimited information provided to college students by computers have their own disadvantages and challenges in computer usage [1]. Students may find it difficult to access coursework, due to financial limitations [2]. Though students may cheat while using computer assistance, one of the gravest problems in developing nations is isolation from technology and research. This paper highlights the problems of Computer Assisted Education and probable solutions for the problems..

Keywords: Computer Assisted Instruction, Computer Aided Education, Spelling Skills, Educational Institutions, Learning Resources.

I. INTRODUCTION

(10pt, Caps, normal)

The Computer Assisted Instruction of 1960's was used to drill both tutors and students [3]. The present hardware can augment learning in many ways. CAE software used now, was developed by publishers. They supplemented teacher instructions with tutorials or generated problems algorithmically or provided concepts using multimedia. CAE has changed the students study outside their classrooms. Computer Assisted Instruction (CAI) allows students to work at their own pace and place. Students can receive feedback on assignments, thus revisiting topics till they master it [4]. They may have access to online tutoring, videos, guided practice problems and an individualized study plan. It also provides Teachers data on student progress [5]. According to the National Center for Educational Statistics (NCES) 2003, the number of courses and student enrollments in distance education courses has increased since 2001. A meta-analysis of 254 studies comparing outcomes in computer instructed and traditional classes found small positive changes in student attitudes toward computers and learning, a reduction in the amount of time needed for instruction and an increase in exam scores of 0.3 standard deviations [3]. Other studies comparing traditional instruction to Computer Aided Education students also concluded that there was no significant difference in the learning outcomes [6] [7] [8] [9] [10].

II. NEED FOR CAE

Many students start college-level education unprepared for a course [11] and need further preparation to successfully meet their career goals. Colleges and universities offer CAE services to prepare their students. Traditional teaching strategies producing low passing rates try for alternative instructional approaches. Computers and internet provide many choices in learning and teaching. Computer literacy in early education helps improve student achievements. Children have a passion and an enduring love affair with computers [12]. Students using computer as a writing instrument feel like adults or advanced professionals [13]. Computer knowledge is essential in the professional working places [13] and CAE provides opportunities for imagination. Students who do not master computers do not keep pace with their classmates [13]. Computers are good tools for learning and improve students' achievements. Computers accelerate student's development, mainly intellectual with a free environment for learning without tensions or pressures [14]. Students who don't use a computer at home may psychologically develop a sense of inferiority. Computers challenge traditional educational methods and values. Computer graphics and artificial intelligence indicate the directions of change. The best uses of computers are in homes, more than educational institutions [15]. One of the big contributions of the computer is the opportunity for students to experience the knowledge of their specific needs. Internet connects students with teachers, other educational institutions and a wide network of professionals around the globe [16]. There is no significant difference in the education performance of students in a CAE course according to Oppenheimer [17]. Success or failure in an education course determines students' choice of majors for meaningful jobs [18]. Typically, CAE courses have been taught with traditional lecturing methods, used for years in college courses [19] [20]. University educators are concerned that the pass rate in CAE courses are low [21] [10] [22]. Increased socialization has led teachers to explore ways to use

computers as tools to enhance student learning [23] [24]. Teachers find it easy to explain with colorful pictures and find more time to explain.

III. DISADVANTAGES OF COMPUTERS IN EDUCATION

•Technical Problems: Technical issues can cause major problems in online learning or classes with network access. When teachers use Computers while teaching, they may face problems like power failure, thus resorting to manual approaches. Computers with improper security settings in education become victims of identify theft [1].

•Spelling Skills: When students replace paper and pen with a computer for education, handwriting skills may suffer [1]. Adult learners benefit from increased brain activity when writing new information by hand, particularly [1]. Most computer word processing programs include a grammar checks making students rely more on the computer to correct spelling and grammatical errors. Students are less active while looking into computers and practice time is reduced. It is not possible to illustrate day to day events to students. Hence, Computer assistance in teaching may not suitable for all categories of students.

•Financial Problems: Students who do not own a computer have a disadvantage. Low-income college students [1] are less likely to have easy access to a computer and may not have learned basic computer skills than other students [1] learn at a young age, thus putting them at a disadvantage.

IV. CHALLENGES FACING COMPUTER EDUCATION IN EDUCATIONAL INSTITUTIONS

While ICT continues to advance in western and Asian countries, underdeveloped countries still experience a lag in its implementation. A recent study [25], observed, ICT facilities as a major challenge in under developed country's educational systems with a ratio of one computer per 150 students. Computer implementation in education has many challenges. Lack of qualified teachers to teach ICT in institutions is the main challenge. The demand for ICT learning is not met. Though more students wish to learn computing skills, there are less teachers to transfer the skills. Lack of computers is another challenge as Computers are still not very cheap. Many educational institutions face power shortage. Though educational institutions are donated with computers, they are not adequately equipped with maintenance and repair, hence its very common to see a computer lab full of broken down computers. The older generation feel computers require highly skilled personnel to operate them. Teacher's fear that they become irrelevant after the introduction of computers is another challenge. Lack of internet or slow connectivity is another challenge and some institutions may not afford these facilities continuously for lack of funds. Internet pornography and other anti-social behaviors is an emerging problem.

Table 1 shows the disadvantages on a scale of 1-5 where 5 is the highest, while Figure 4.1 depicts the Disadvantage Factors of computers in education.

TABLE 1. DISADVANTAGES OF COMPUTERS IN EDUCATION

Disadvantage	Scale
Poor learning resources	3.63
Alienating Learning Experience	3.08
Technical Problems	4.09
Inadequate Access to Computers	4.45

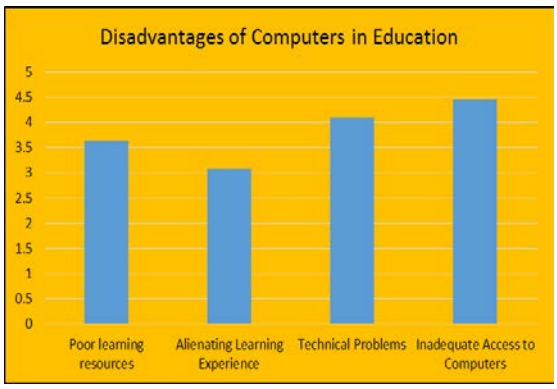

Fig. 4.1 Disadvantage Factors of computers in education

It can be seen from Fig.1 that major hurdles are inadequate access, Technical problems and poor learning resources.

V. SOLUTIONS

Support: Students quickly turn to Internet to answer questions. Spelling is no longer an issue as everything is autocorrected on the internet, thus reducing student's memory and brain-strength. Educational methods can develop ways of reinforcing knowledge instead of replacing them and be a launch pad for understanding.

Crash: Computer crash is a popular excuse and hours of work can sometimes get erased or does not copy correctly. Students struggle to complete work, especially when technology at home has to be familiarized. The problem with technology malfunctions is also seen with online textbooks. Some students have issues accessing textbooks at home due to low bandwidth. Educational institutions can have a stable, reliable cloud storage system to overcome the crash.

Old-timers: Teachers may not utilize technology when pushed to incorporate technology into their syllabi and

may not something new. Teachers need proper training in technology to incorporate and sometimes it isn't provided. Helpful training to teachers can improve their use of technology in the classroom which pulls them into technology oriented education and help overcome this problem.

Social Media: Expecting a student to avoid SNS is difficult. Younger students are in danger of losing focus, since even graduate students get distracted while being online. Social Media sites can be effectively used for collaboration between students and Teachers and thus be used productively.

Band-Aid: The idea that technology can treat all educational issues is not correct. Education Week report in 2007 found no difference in academic achievement of students who used technology. The Band-Aid thinking of introducing technology in educational institutions in a precise manner for education's problems may further aggravate the issues. The solution is in drawing a proper implementation line in teaching.

VI. EFFECTING PROPER LEARNING FOR STUDENTS

Student learning styles differ and an effective method depends on teacher and student understanding. Teachers can switch types of instruction while maximizing their classroom time. Change of teaching strategies and activities can keep students engaged.

Hands-on: Students who have a greater chance for retention as their brain is active. Students while listening activate one part of the brain, but in explaining connections are made to the brain. Hands-on activities in any subject gives students scope to function and learn better. Meaningful projects can encourage independent and creative student intellect.

Cooperative projects: Students working with one another learn the art of cooperation. Students with different skill sets, when paired share and exchange talents. Students develop decision-making and listen to others' opinions and suggestions.

Experimental learning: Students who apply classroom lessons to practical applications, get a rewarding experience. Such students feel productive and worthy with a sense of achievement. Participative activities and instructive homework can engage students better.

Direct training: Classroom teaching is effective even today. Teachers need to emphasize broader concepts directly. Direct training establishes order while minimizing distractions..

VII. MOTIVATIONS IN CAI

CAI can be useful when students have a beneficial effect on attitudes. The learner's ultimate goals in learning will remain the same. The factors for motivation in CAI is depicted in Table 2.

TABLE 2. FACTORS AFFECTING STUDENTS MOTIVATION IN CAI

Factor	% of Attitude Change
Advertisement	42
Student Recognition	33
Self Work Assignments	19
Concept of Growth	11
Adding to a Repository	23

It can be found that advertisement and student recognition are the major factors in influencing changes in students attitude towards CAI. Self work and growth prospects score very low in changing attitudes in CAI

VIII. CONCLUSION

Computer is a virtual space where student thoughts can be inserted. Computers in education need the development of a model which can exercise pure formal lessons. Computers software demands a higher brain activity and can be used for students around 17 years of age or above. Hardware can be taught far before [26]. Abstract reasoning affects other parts making it imperative to teach computers to students after they develop mental abilities. Computer knowledge too early may create insensitive and amoral adults. Despite challenges in CAE and CAI, institutions are implementing strategies to address these paradoxes. This paper has analyzed various issues in CAE and CAI while suggesting solution to the issues.

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