# A SURVEY OF FACTORS INFLUENCING TEACHERS USE OF COMPUTER-BASED TECHNOLOGY

**GAGA THOMAS ALI**
**Department of Computer Science,**
**Bingham University, Karu.**

**&**

**DAUDA AUDU DANGIWA,**
**Department of Clinical and Pharmacy Practice,**
**University of Jos.**

**Abstract**
*The objective of this study is to indentify on the use of computer-based technology in schools by teachers and student in classroom learning. Current literature is extensive on computers based technology's influence on student, but there are only a few studies which have looked at the influence that computer-based technology has on education (teachers and students). This is a study of factors which influence teacher['s use of computer-based technology; it is based on inconsistency in previous studies, area not addressed in previous surveys and dramatic changes in computer-based technology and internet access using web browser since the previous surveys on computer-based technology were performed. A survey was conducted on teachers. This survey found out that computer access in the classroom influences the frequency of the use of some instructional activities, for example lack of internet access and obsolete computer equipment result in a negative influence to the teacher's use of computer based technology in the classroom. Teachers also express a desire for a continuous type of training program for the use of computers.*

## Introduction

Educators have debated on the use and value of technology as an instructional tool since the beginning of the twentieth century. Technology is an accepted part of our society, but the educational community has not embraced technology in the same way (Barron and Orwig,2003). The most recent of these technologies are computer-based.

With computer-based technology's entrance into the classroom, the accolades for using computers for instruction and learning, and with the steady decline in the price of computers, there has been a steady growth in the number of computer purchased for classroom use. Quality Education Data (QED), a data marketing company which has tracked educational technology data since 1981, reports that the current student computer ratio is a nine to one (9:1). However, relatively few teachers are using computers as reflected in the question by Cuban 2003.

Today, computers and telecommunications are a fact of life as basic as electricity. They have altered the daily work of large businesses and industries. Yet why is it that with all the talk of school reform and information technologies over the last decades, computers are used far less on a daily basis in classroom than in other organization. Recent research indicates that there are a few teachers who are described as exemplary in their use of computer for instruction and learning.These teachers reported changes in their teaching practice, including: presenting more complex materials to students, giving students more individual attention, allowing student to work more independently, and becoming more of a coach and facilitator in the classroom. Nevertheless, a substantial number of teachers still report little or no use of computers for

instructional purpose from the same study in which many students report using computers less than two hours a week.

Some research has focused on technology's implications for students. However, as the report by the Office of Technology Assessment (OTA, 1995) states, "There is almost no hard data on the impact of technology on teachers".

Based on previous research areas which need to be addressed in future research include:

i. How is computer-based technology being infused by exemplary in teaching practices.
ii. What are the instructional uses of different types of computers?
iii. What are the trends in locating, computer for instruction (for example, laboratory and classroom).
iv. Does the type of computer access influence the frequency and manner of teacher and students use of computer-based technology?

Productivity Software (Word Processing, Spreadsheets and Database).

Sheingold and Hadley (2000) state that text-processing tools, particularly word processors, were used by more than 90% of surveyed. Means, (Blando, Olson, Morocco, Zorfass (2003) stated the most frequent use of computer-based tools in U.S education today was word processing software. Word processing programs have been used successfully in grammar classes to improve writing composition, spelling and reading skills (Oakland country schools, 2001). In addition to English teachers choice and uses of word processor (Sheingold and Hadley, 2002) report that the word processor is the most popular application for science and social studies teachers, because of the versatility of word processors they can be used to access all areas of the curriculum.

From the Sheingold and Hadley study (2002), it is clear that spreadsheets assist teachers in classroom management and as analytical tools. Student's grade can be recorded and updated easily. Class project, attendance and daily participation can be easily recorded and updated as well. Spreadsheet, allow students to perform analytical functions easily and teachers are able to present realistic simulations to students. Databases are used to access information in an easy and rapid manner. There are numerous electronic databases with voluminous amount of information. Teachers and students no longer have to manually look through card catalogs.

They can query the databases and retrieve the information databases, encyclopedias and other reference works on CD-ROM also allows the teacher to provide a mean for interactive browsing (OTA, 1995). Word processing, spreadsheet and database software have been the key to attracting teachers to use computer-based technology in the classroom.

**Research Hypothesis**
**Ho:** Type of laboratory and classroom that influence on the frequency with which teacher use computer-based technology for instruction.
**H1:** How the availability of internet access influences teacher's use in computer-based technology for instructional materials.

There are several studies concerning the rise of computer-based technology for instruction conducted and reported in the last seven years indicates:

1. Training and support is needed if teachers are going to successfully use computer-based technology in their instruction (Honey and Henriquez, 2003, Becker 2004).
2. There is inadequate financial support (OTA 1998, Sheingold and Hadley, 2000).
3. Teachers lack the time to develop lessons and explain which use the computer does (Sheingold and Hadley, 2000).
4. Accessibility, scheduling and availability (for example not enough computers or peripherals) are problems for teachers wishing to use computer-based technology (Sheingold and Hadley 2000).
5. Many (almost 1/2 ) teachers do not use computer for teaching even when they were available.
a. Computer technologies have changed and are changing (for example increase in the number and use of D-ROM technology and internet access).

b.   Recent report of public-school teacher access and use of computer resources is contradictory with earlier research.

c.   Teachers need training to be confident and proficient users of computer-based technology.

d.   There are dramatic changes in telecommunications.

The perception that technology will support improved forms of learning that comes from cognitive psychology. Blando, Olson, (2003), concluded that advance skills of comprehensions, reasoning and experimentation are acquired through the learners, teachers who had regular access to computer technology in their classroom over several years time experienced significant change in their instruction, but not that had engaged deeply held beliefs about schooling (Dwyer, Ringstaff and Sandholtz, 2000).

Instructional philosophy is another barrier. Most teachers teach as they were taught, the teachers is viewed as the dispenser of knowledge and the student is the recipient of that knowledge. Studies (Dwyer, Ringstaff and Sandholtz, 2000) have showed that technology allows the student to take an active role in the learning process and the teacher to act more as coach or facilitator. Each of these dimensions brought deeply held beliefs about traditional schooling into conflict with what teachers witnessed to their classroom.

Other factors which have negatively influenced the use of computer-based technology are:

a.   Challenges to the teacher's philosophy of teaching and learning.

b.   The amount of time required to learn how to use computer-based technology.

c.   The lack of positive model (Sheingold and Hadley, 2000).

When using computer-based technologies, students are encouraged the think and be creative and find alternate solutions to problems. This shift to a "student-centered" classroom, were there is collaboration, discussion and excitement, sometimes seems chaotic to the teacher. It is this shift which causes many teachers to retain how they are teaching and how learning should take place.

Such factors cause many teachers to need react negatively to computer-based technology. One for example is shown in recent research (Dwyer, Ringstaff and Sandholtz 2000) on the Apple Classroom of Tomorrow (ACOT). This study reported that when using technology, some teachers would facilitate between traditional method used previously "Teachers-centered" and "student-center" approaches. This facilitation according to (Dwyer, Ringstaff and Sandholtz, 2000); is due to the teachers believe and perception about how instruction and learning should occur. The conflict was in the mind of the teacher as he/she wrestled with how learning should occur for example collaborative learning groups, which using computers grew noisy as they became excited over what they were finding and discussed these findings. From the teachers point of view the noise indicate that there wasn't any learning occurring.

This teaches tended to refer back to the traditional lecture mode of instruction which resulted to student resistance to the traditional. Butzin (2002) suggested that if teachers looked carefully at this behavior, they would find it actually served as a useful learning activity. Teachers who stayed with ACOT program and continued to use computer changed their teaching style to a "student-centered classroom". Those teachers become more innovative in the implementation of computer-based technologies into the instructional process and became more comfortable in using computer-based technology in the classrooms. They began to expect more from their students and were able to engage students in higher order objectives, computers allows student to work without constant direction from their teachers. This allows the teachers more time to individualize, instruction. Secondly, teachers are able to see students apply what they have been taught by using computers as tools to accomplish difficult task to solve difficult problems and to produce more work in a shorter period of time. Thirdly, teachers are then able to cover the materials because they are able to cover the materials in a shorter amount or period of time. Fourthly, teachers are able to make a subject more interesting by offering students a variety of ways in which they may accomplish their work (for example word processors, spreadsheets, data bases, etc). Time is the greatest barrier to using Computer-based technology (OTA, 1995). Teachers are not provided with the time or training to learn hardware and software operation (Becker 2004). Teachers also do not have the time to develop lesson's note using computer-based technology. Access is also another problem. Teachers find it difficult to schedule access to computer for classes. Although the number of computers have grown in schools, these computers are frequently located in computer labs and scheduling access is difficult if not impossible, (Becker 2004).

**Data Analysis**
All returned surveys were examined for completeness and accuracy. The data collected was in the form of nominal data. Nominal data is data reported as frequencies for example as opposed to ordinal data (on a continuum) as interval data (period of-time), or ratio data (having a true zero point). The first research was tested and analyzed using chi-square as the appropriate statistical methods. Chi-square is a test used with frequency data and requires that the data be classified according to categories for example. Chi-square was used to determine if there is a significant relationship between the type of access, the instructional activities employed and the frequency of used.

**Drill and Practice**
For access and frequency of use the chi-square was significant ($x^2(6$, n=157) = 47,445, p<,0.05> for the use of computer-based technology for drill and practice. Sixty-six teachers (42%) responded that the computer-based technology used for drill and practice was in their classroom. One hundred and eleven teachers (71%) indicated that computer-based technology was used weekly or less than a week for drill and practice across all type of access. Thirty-seven percent of the teachers reporting the use of computer based technology for drill and practice has access in their classroom. Twenty-seven percent reported multiple type of across to computer-based technology. Sheingold and Hadley (2000) reported between less than 30% to more than 40% of the teacher used computers for drills. Teachers who used computer-based technology were 239 (89%). The significant chi-square score ($x^2(6$,n=157)=47.445, p<0.05) for drill and practice shows that there is a relationship between access and frequency of use for drill and practice.

Summary of Significant Chi-Square Test for Drill and Practice.
Rows: Frequency of use columns: Computer Access.

| | Media Center | Multiple access | Lab | Class-room | Row margin |
|---|---|---|---|---|---|
| Weekly % of access | 2.7 | 27.93 | 17.12 | 52.25 | 100.00 |
| % of frequency of use | 30 | 67.39 | 57.58 | 85.29 | 70.7 |
| % of chi-square | 1.91 | 19.75 | 12.1 | 36.94 | 70.7 |
| Frequency | 3 | 31 | 19 | 58 | 111 |
| Expected frequency | 7.07 | 32.52 | 23.33 | 48.08 | 111 |
| Weekly % of Access | - | 42.86 | 28.57 | 28.57 | 100.00 |
| % of frequency | - | 26.09 | 24.24 | 11.76 | 17.83 |
| % of chi-square | - | 7.64 | 5.1 | 5.1 | 17.83 |
| Frequency | 0 | 12 | 8 | 8 | 28 |
| Expected frequency | 1.78 | 82 | 5.89 | 12.13 | 28 |
| Never % of Access | 38.89 | 16.67 | 33.33 | 11.11 | 100.00 |
| % of Frequency of use | 70 | 6.52 | 18.18 | 2.94 | 11.46% |
| % of chi-square | 4.46 | 1.91 | 3.82 | 1.27 | 11.46 |
| Frequency | 7 | 3 | 6 | 2 | 18 |
| Expected frequency | 1.15 | 5.27 | 3.78 | 7.8 | 18 |
| Column margin % of Access | 6.37 | 29.3 | 25.02 | 43.31 | 100.00 |
| % of frequency of use | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| % of chi-square | 6.37 | 29.3 | 21.02 | 43.31 | 100.00 |
| Frequency | 10 | 46 | 33 | 68 | 157 |
| Expected frequency | 10 | 46 | 33 | 68 | 157 |

Chi-square = 47,445, DF = 6, P-value = 0,000 3 cells with expected count less than 5.0

**Information Access via CD-ROMs**

For access and frequency of use the chi-square was significant ($x^2$(6, n=149) = 15.915, p<0.05) for the use of computers for information access via CD-FOMs. Fourteen (9%) of the teachers responding indicated that they had multiple access to computer for this instructional activity. This is the only instruction activity showing a significant relationship between access and frequency of use where multiple access had the greatest significance. Thirty-four teachers (23%) also indicated that they use computer-based technology weekly or less than a week for information access via CD-ROMs across all types of access. Twenty three teachers (154%) who use computer-based technology for enrichment activities had multiple access. Classroom access was the second largest response with 18 teachers (12%) combined frequency of uses for computer-based technology for enrichment activities totaled 64 teacher (43%). Most of the new software being designed today cannot run on either of these types of machine. Surveys have not yet collected data on the number of school computers equipped with CD-ROM or how much they are being used CD-ROM equipped computers tend to be placed in the school library or media center to make them accessible to a larger number of students and teachers.

The significant chi-square $x^2$, (6, n=149) = 15.915, p<0.05) for information access via CD-ROMS show that there is a relationship between access and frequency of use for information access via CD-ROMS.

**Conclusions**
In conclusion to the study, computer-based technology should be enforce and made available in schools (primary, secondary and university schools) to enable an effective use of computer-based technology among teachers and students inside and outside the classroom environment.

**Implications of the Study**
The findings of this study have implications which affect the efficient use of computer-based technology by teachers in classrooms. The non-availability of Internet access in classrooms and the insufficient time allocated for periodic learning of computer in schools affects the effective and efficient use of computer-based technology in schools by teachers and students.

**Recommendations**
Recommendations from International Society for Technology in Education (ISTE) for National Accreditation Standard for Educational Technology, on how all teachers should be able to perform the following tasks are:-
1. Operate a computer system in order to use software successfully
2. Evaluate and use computers and other related technologies to support the instructional process.
3. Apply current instructional principles research and appropriate assessment practice to the use of computers and related technologies.
4. Explore, evaluate and use computer-based technology materials.
5. Demonstrate knowledge of uses of computer for problem-solving of data collection information management, communication presentation and decision making.

**References**

Albright, M. J., & Graf, D. L. (Eds), (2002) Teaching in the Information Age: the Role of Educational Technology. San Francisco: Jessey-Bass Publisher.

Baker, E. L. Gearhart, M. & Herman, J. L. (2000). Assessment: Apple Classrooms of Tomorrow (ACOT) Evaluation Study, First-and Second-Year Findings.

Barksdale, J. M. (2006), New Teachers: Unplugged why Schools of Educations are still sending you staff you'll have to train in Technology. Electronic Learning, 15 (5), 38-45.

Barron A. E & Orwig, G. W. (2003), New Technologies for Education Englewood, Co. Libraries Unlimited.

Becker, H. J. (2004), How Exemplary Computer-using Teachers Differ from Other Teachers. Implications for Realizing the Potential of Computers in Schools, Journal of Research on Computing in Education. 26, (3), 291-321.

Butzin, S. (2002), Integating Technology into the Classroom: Lessons from the Project Child Experience. Computers in Education. 6, 51-54.

Chin, S. a. (2003) A Study of the Perceptions of the Mid-west Urban Elementary Teacher's use of Instructional Technology and the Implications for in Service Training Unpublished Doctoral Dissertation, Kansas State University, Manhattan, ks.

Cuban, L. (2003) Teachers and Machines: New York, Teachers College Press.