

Computer Aided Teaching and Learning System

Khaing Myat Mon

Department of Information Technology
West Yangon Technological University
Myanmar

Zo Nun Khuma

Department of Information Technology
West Yangon Technological University
Myanmar

Dr. Cho Cho Myint

Department of Information Technology
West Yangon Technological University
Myanmar

Abstract: With rising number of students, more flexible methods of teaching are required both for traditional higher and further education courses as well as more novel distance learning, hence the need for the improvement of learning system. Fortunately, the recent advancement of computer system has provided a ready-made infrastructure for supporting the attempts to deal with these issues. This system provides the computer aided teaching and learning system. The purpose of this system is to teach and enable a person to learn with self-teaching techniques. Moreover, the users can self-test whether they understand the lessons or not. The administrator in this system can edit the lecture notes, delete the less effective portion, add or update or delete the exam questions and answers and change the time limitation for the exam. This system is developed by using C# Programming Language and Microsoft Access for the database.

Keywords: Aided, Variance , Neural Network, Homogeneity

1. INTRODUCTION

An interesting finding is that students with learning difficulties sometimes significantly improve their learning using CAL compared to stronger students. The more senses through which the observers receive the information, the easier it is to remember. People remember 20% of what they hear, 40% of what they see and hear, and 75% of what they see, hear and do. The fact that the computer can exercise various the senses and the present information in a variety of media can enhance the learning process. Computers may help the reticent student who is afraid of making mistakes in a classroom situation. Students using computer aided teaching and learning (CAT/L) system have performed moderately better than the controlled group. Computer Aided Learning (CAL) has been a term of increasing significance during the last decade and can also be referred to as Computer Based Instruction (CBI), Computer Assisted Learning (CAL), or Computer Aided Instruction (CAI). For the purpose of this review, CAL can be simply defined as the learning procedures and environments facilitated through computers. However, the keyword for understanding CAL is interaction. Computers can facilitate interaction during the learning process on multiple levels.[1] On one level CALs have interaction of the student/user with the content and the learning material (for example with an interactive patient on a CD-ROM). On another level, computers can host interaction of the student/user with the tutor, peer interaction or interaction between members of whole “virtual” learning communities. Computers’ facilitation of interaction between humans, however, has only emerged during the last decade, as explosive technological progress and the Internet allowed reliable and inexpensive communication. Computer mediated human-human interaction is a whole new area in CAL, which presents the special methodological considerations and requires the separate study.

CAT/L encompasses a broad range of computer technologies that supplement the classroom learning environment and can dramatically increase a student’s access to information. CAT/L programs, which can include directed drills, practice exercises, and communication between students and teachers, can adapt to the abilities and preferences of individual students and increase the amount of personalized instruction a student receives. One advantage of answering questions in a computer system is that feedback can be provided immediately: the student knows if his answer is right or wrong. Therefore, students benefit from the immediate

feedback provided by computers and most of them appreciate the self-paced learning environment. At its best, CAT/L engages the students’ interest, motivates them to learn, and increases their personal responsibility for learning.

Russell and Haney [7] observed that two of the most prominent movements in education over the last decade or so are the introduction of computers into schools and the increasing use of authentic assessments. A key assumption of the authentic assessment movement is that instead of simply relying on multiple choice tests, assessments should be based on the responses students generate for open-ended real world tasks. At the state level, the most commonly employed kind of non-multiple-choice test has been the writing test in which students write their answers longhand.[3] At the same time, many test developers have explored the use of computer administered tests, but this form of testing has been limited almost exclusively to multiple-choice tests. Relatively little attention has been paid to the use of computers to administer tests which require students to generate responses to open-ended items.

Educators also use standardized tests as a measure as a methodology for human subject psychological assessments testing and skills-based testing. Weisband and Keisler [6] conducted a meta-analysis that gives support to the main hypothesis that computer administration elicits more self-disclosure than traditional forms of administration do. In recent years, the disclosure effect has declined significantly due, perhaps, to increasing public knowledge of computers, increasing public computer literacy, or even people’s reduced awe of the computer.[5] Their indirect analysis, however (for example, comparing students to other adults), did not support explanations related to public knowledge of computers. Two major changes came starting in the mid-1990s. [2] One was the dramatic increase in commercial multimedia for language learning as CD-ROMs became standard in home computers. The other was the development of the World Wide Web. Because of the web and increased access to the Internet in general, the past five or six years have seen a major shift toward tool uses, and many newcomers to CAI define the field almost entirely in those terms.

2. PROPOSED SYSTEM

This system is designed to use as learning tool for the students. This learning system is built for the user and the administrator. Each user has specific allowance in using the system. When this system is run by the user, he/she can learn

the lectures or sit for online- examination system. Moreover, the administrator using password can edit the lecture or exam questions. The system flow is as shown in Fig. 1. Administrator can edit lessons and add more lessons and questions not only one topic but also other topics. The guest users answer multiple choice questions to test how they learnt.

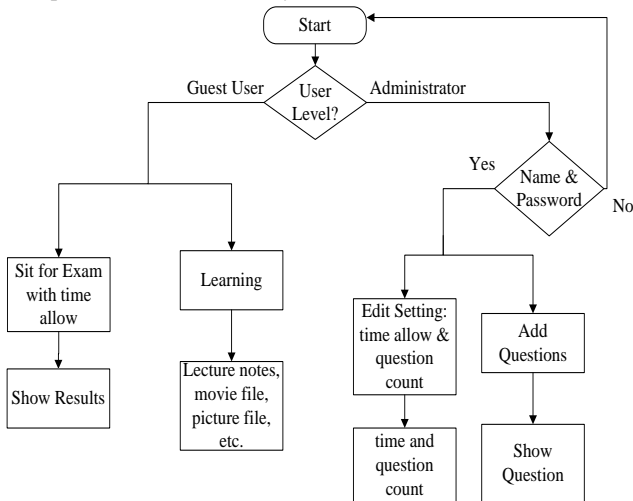


Figure 1. Overflow Diagram for the CAT/L System

3. COMPUTER AIDED TEACHING SYSTEM

The Teaching methods are the ways in which information to be learned is presented and it effects on students evaluated. Methods vary in the medium of delivery (teacher, books, film, television, teaching machines), in the explicitness of the program (structured or open), in how the teacher operates (lecture, discuss, tutors), in the ways in which student progress is monitored (immediate questions, delayed quizzes, appraisal of products), and in the organization of instructional time and space (grouping, structure, amount of choice). Until recently most reviews of teaching methods concluded that as long as the relevant content is covered, one method is as good as another. Between 1973 and 1978, however, a number of studies showed that some. When the student performance of reading and arithmetic on normative tests is used as the criterion, better gains are leader of instructional activities chooses materials, paces the instruction rapidly, requires the frequent student responses, and uses teacher-directed, rather than individual or self-directed, activities [4]. Computers are an integral part of this paradigm shift, as technology, particularly information technology is increasingly integrated into the educational process and looked at as an element in the valorization of knowledge. In education, computers play a fundamental role in both the instruction and the learning process. Information technology plays a significant role as an aid to instruction in the development and presentation of course contents. The use of information technology offers wider and richer sources of content material and easier ways of manipulating, packaging and presenting the material. There are developing criteria-dimensions and criteria inside the dimensions for choosing usable media for science learning and teaching, and to generate from this an interactive and adaptable teacher-training module. Therefore, literature, recent research results, and examples of media have been reviewed and analyzed. The usable media (textbooks, web pages, databases, web encyclopaedias, educational multimedia etc.) should be special for teaching science, as learning depends on the quality of the media. The pedagogical orientation of the teachers also affects the usability of the media. Other factors such as previous in-

service training influence the media usability. “Usable media” is complex as concept, being hard to analyze without considering the users of the media and the educational context. According to “How People learn: Brain, Mind, Experience, and School” meaningful learning engages students in tackling the topic to be learnt in such a way that they create meaningful and understandable knowledge structures on the basis of a goal of learning. It is possible to present an outline of use of “usable media” in learning and based on “Multimedia learning”.

Teachers are introduced to action research methods when using CAT in classrooms. Material for teachers who want to evaluate the effective use of CAT in their class will be developed, together with a good practice example for self-evaluation. Teachers usually evaluate the learning outcomes of their students by oral or written tests. In doing that, they fail to learn about the problems students face when learning science, their misconceptions, and the ways they collaborate with each other. The aim is to help teachers to evaluate their own teaching by action research methods. How action research can be used in a teacher-training course is a secondary aim.

4. COMPUTER ASSISTED LEARNING

The purpose of CAL is identical to the purpose of traditional, instructor-led learning: to transfer knowledge and skills. In many ways, delivering instruction via computer technologies is similar to delivering it face-to-face. Good instruction fulfills the desired learning outcomes, whether instructor-led or technology-based. When properly designed, however, CAL provides benefits for both the organization and the participant. They are summarized in the following figure 2.

In general, research shows that when CAL is implemented correctly, the results in the following categories are as good as or better than traditional instructor-led approaches: Participant Achievement: In a comparison of the grades, test scores, retention and job performance of individuals who learn through computer-assisted methods with those of learners taught in instructor-led classes, the most consistent finding is that there is no significant difference between the achievement of participants, regardless of the content, participant educational level or media used.

Learning Time: One of the advantages of CAL is reduced learning time. Studies have shown that learners are able to learn 30 percent faster VIA technology than in traditional classrooms. Other studies show a 20–40 percent decrease in learning times. Reasons for the decrease include the ability of the participant to progress at her/his own pace and the standardization of training content. Research has shown that training retention is also enhanced, due to the multi-sensory nature of the training and the ability to retake instruction or use the materials as reference.

Cost-Effectiveness: CAL can be extremely cost-effective when providing instruction to large, geographically dispersed audiences. Reductions in the cost per participant, which include travel and off-the-job time and expenses; learning times; and overhead expenses of training all factors into the cost-effectiveness formula.

Primary Benefits to the Organization	Primary Benefits to the Learner
Increases instructional effectiveness	Improves access to instruction
Improves access to instruction	Allows learner to choose a convenient time and place for learning
Improves return on investment (ROI)	Meets a wide variety of learning styles
Reduces training time and costs	Provides immediate feedback
Allows consistent, standardized presentation of material	Enables learner to move through training materials at a speed that meets individual learning needs
Simplifies updating of materials	Allows participants with varying degrees of knowledge and skills to access instruction in a comfortable, non-threatening manner

Figure. 2 Benefits of Computer-Assisted Learning

5. CONTROLLING USER LEVELS

In this teaching and learning system, there are two levels of users: the administrator and the guest user.

5.1.1 Administrator

This type of user needs the password to enter the system because he/she controls the time allowed for examination and question counts. Moreover, he/she can add multiple choice question and possible answers for the suitable topic.

5.1.2 Guest User

The user is allowed to take the test by the administrator. They do not need password to enter the system. They can learn the lessons, the lecture movies and picture file for the subject. Moreover, they can answer multiple choice questions whether they understand the lesson or not.

6. IMPLEMENTATION

This teaching and learning system is developed on the PC and compatible. The CAT/L system is implemented with C# programming language. When the user starts the system, the cover form or main dialog will appear as shown in Fig. 4.2.

In this dialog, the user can clearly see the five processes: Setting, Add New Questions, Start Answer, Learning and Exit.

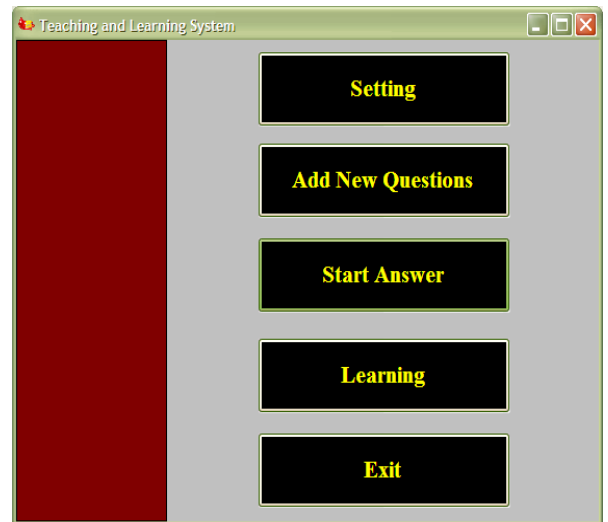


Figure. 3. Main Dialog for Computer-Aided Teaching and Learning System

6.1.1 Setting

This process belongs to the administrator. He/she can edit the time allowed for the examination for the guest users. In addition, he/she can change the question count for the exam. The administrator's password filling dialog is shown in Fig. 4

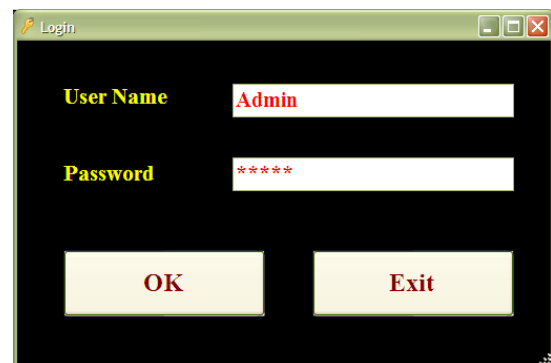


Figure. 4. Admin Dialog

If the username and password are correct, the system will allow to edit the time allowed and the question count for the exam as shown in Fig. 5.

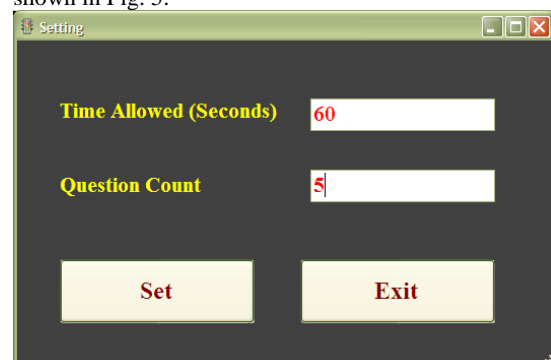


Figure. 5. Setting Dialog

6.1.2 Add New Questions

This system allows the administrator to add the multiple choice questions and their possible answers if the username and password are correct as shown in Fig. 6.

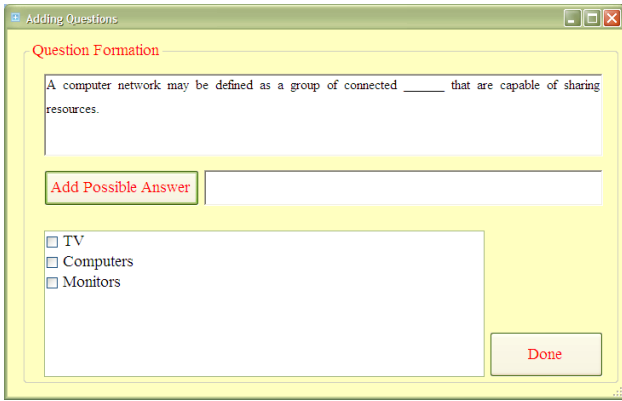


Figure 6. Adding Questions Dialog

6.1.3. Start Questions

When the users click "Start" button, the question will be shown in randomly to answer. The user selects the possible answer on this dialog. When the user finishes answering, this system will show the message box that the user marks and the percentage for the time as shown in fig. 7. Moreover, there is time limitation to answer the questions. The question count is also limited by the administrator. If the question count is five for sixty seconds, the system will allow sixty seconds to answer five questions. The time will be counted when the user presses "Start" button. The system will terminate this process and show the result when the time is sixty seconds. Moreover, this system does not take care whether the user finishes answering all questions or not. When the system is time up, it will count the correct answer of the user. Then, this system will show the available mark, total mark and percentage as shown in Fig. 8.

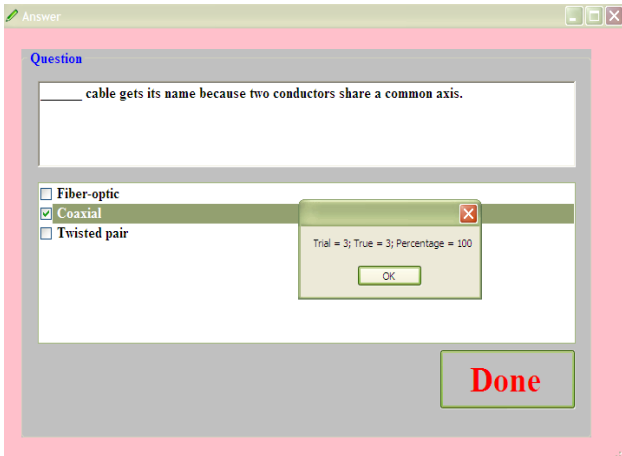


Figure 7. Score Message Box

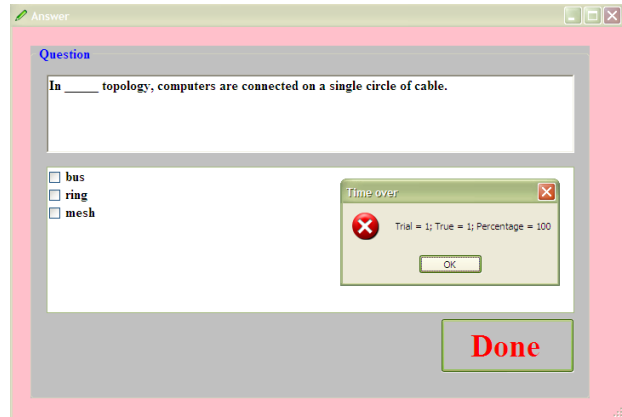


Figure 8. Time Over Message Box

6.1.4. Learning

First, the people who want to give lecture notes or lecture movies or pictures or sound files must place these files at the computer. There are so many file types used in the lecture. Texts and graphics audio, video, and animation all make up the form and functional elements of CAT/L materials. The term's hypertext as shown in Figure 9, hypermedia, and interactive multimedia have each been used interchangeably to describe CAT/L delivery. Regardless of the term, the concept has best been understood as the merging of formally separate media in a manner that has allowed associations or links between the various elements. The flexible nature of CAT/L materials has been highlighted as one of its prime advantages over traditional learning materials.

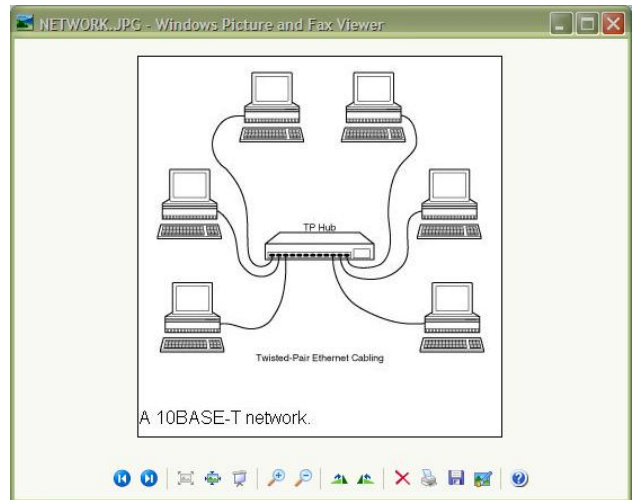


Figure 9. Graphic File used in CAT/L

7. CONCLUSION

CAT/L system is intended to be interactive and non-passive from the student's perspective. Students may be continually asked to type or speak responses into the computer and to navigate nonlinearly based upon discretionary controls (buttons, hot words, and menus) or challenge controls that navigate by depending on the type of response (e.g., the answer to a question) given by the student. CAT/L materials may be placed on campus network servers or distributed in CDs and floppy discs such that students may access them outside the classrooms. These materials may be sophisticated simulations or even virtual realities that are in many ways better than real-life experiences because simulations may be repeated over and over

at the student's own learning place and may take place in future and past settings for which there are no current opportunities for real world experiences.

Using this system, the teacher does not need to teach repeatedly, the student can easily learn the lessons repeatedly when he/she does not understand them. Moreover, this system can be used by the user who wants to apply any subjects.

8. ACKNOWLEDGMENTS

The author wishes to express her deep gratitude to Dr. Kyi Soe, Rector, West Yangon Technological University, for his encouragement and invaluable permission for carrying out the research work. The author is deeply grateful to Dr. Cho Cho Myint, Professor and Head, Department of Information Technology, West Yangon Technological University, for her idea, patience, kindness and suggestion.. The author is also thankful to all teachers for their guidance. Finally, the author is especially grateful to her parents for their support and continuous encouragement to complete and succeed this paper.

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