UNIVERSITY OF CAPE COAST

THE EFFECT OF COMPUTER-BASED INSTRUCTION ON LEARNING LAW OF CONTRACT IN ASUTIFI DISTRICT SENIOR HIGH SCHOOLS

AKUDUGU HUDU AYARIGA

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By

AKUDUGU HUDU AYARIGA

Dissertation submitted to the Centre for Continuing Education of the Faculty of Education, University of Cape Coast, in partial fulfilment of the requirements for award of Master of Education Degree in Information Technology

JULY 2010

DECLARATION

Candidate's Declaration

I hereby declare that this dissertation is the result of my own original research and that no part of it has been presented for another degree in this university or elsewhere.

Candidate's Signature:…… Date:……

Name: Akudugu Hudu Ayariga

Supervisor's Declaration

I hereby declare that the preparation and presentation of the dissertation was supervised in accordance with the guidelines on supervision of dissertation work laid down by the University of Cape Coast.

Supervisor's Signature:…… Date:……...……

Name: Dr. Jonathan A. Fletcher

ABSTRACT

Computer-Based Instruction (CBI) is now considered the technological phenomenon to revolutionize education and training. Today, the Internet and computer technology are reported to have significantly altered the education landscape by way of enhancing students' learning and academic performance.

The study examined the effect of Computer-Based Instruction on learning Law of Contract, in the Asutifi District Senior High Schools. The study involved 80 students, 40 students each from two schools and targeted only form two Business Management students.

The method used for the study was a quasi–experimental pre-test, post-test control group design, which consisted of two groups, namely the Experimental Group (Students who use the CBI) and Control Groups (Students who were taught through the traditional method of instruction).

The researcher used statistical package for social science (SPSS) to analyse the data. The key finding was that the use of software approach in the teaching of the Law of Contract enhanced the achievement of students to a greater extent than it did with the use of traditional methods of instruction.

The main conclusion reached was that; there was a significant difference in post-test mean scores in favour of students in the Experimental group. It was recommended that there is a need to introduce CBI in the teaching of Business Management throughout the country and that this should be used for other subjects as well.

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DEDICATION

To my family.

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CHAPTER ONE

INTRODUCTION

Background to the Study

Advances in computer technology have caught the attention of many educators and researchers. Today in many educational and training settings, interactive computer programs are used to teach young students and adults computer literacy skills. However, little research has been found in the literature investigating its effect on students' achievement.

Business Management tutors have the duty to providing their students with the analytical skills they will need for effective problem solving. As a tutor in the subject, the researcher has deemed it necessary to experiment a tutorial Computer-Based Instruction (CBI) to see its effect on students achievement, as compared to the "traditional" Method of Instruction which comprises mainly question and answer with board illustrations.

The Association for Education Communications and Technology (1977) defined Computer-Based Instruction (CBI) as a method of instruction in which the computer is used to instruct the student and where the computer contains the instruction which is designed to teach, guide, and test the student until a desired level of proficiency is attained. There has been a dramatic increase in the capabilities of computers, along with reduced cost, that has influenced an increase in the various forms of computer-delivered instruction. This increase has

been seen in education as well as in other disciplines. Throughout the 1980's and 1990's computers have been generally heralded as being an effective teaching methodology. However, this "heralding" may still lack adequate research. In their focus on the status of research on the efficacy of CBI, Christmann, Lucking and Badgett (1997), suggested the need for further research by arguing that, "despite the accolades heralding CBI as the effective teaching methodology, there is still no documented evidence verifying its perceived superiority" (p. 92). While the researcher of this current study also feel that more research is needed concerning the effect of computers in education, the research attempts to adequately investigate the effect of CBI as an effective mode of instruction in the education environment. In this dissertation, the researcher attempts to experiment a tutorial Computer-based instruction to see how effective it will be, in terms of helping business students improve their performance in examination, as far as Law of Contract is concerned. Because of the flexible and varied presentation capabilities, CBI is considered as an effective alternative to traditional classroom method. CBI uses computer software as the primary source of learning for a student. This software is usually in the form of tutorials that present the material by means of audio, video, illustrations and quizzes. Through these, media instruction is demonstrated to the students. The tutorials and learning resources are typically accessible only on a computer in a fixed location as opposed to over a network where students can access the tutorials anywhere. CBI materials are usually in the form of a CD-ROM or other permanent file system that is unalterable. Updates to the course curriculum can take more effort because the instructor or tutorial designer has to go back and redesign the tutorial before

another CD-ROM can be produced.

According to Fletcher (2001), Olson and Wisher (2002), CBI can be a great instructional resource to teachers and students, if implemented correctly, and that CBI can reduce the cost of instruction by a third. It can either reduce the time of instruction by a third or increase the quality of instruction by a third. This successful implementation of CBI is called “The Rule of Thirds”. This depends, however, on how well the CBI tutorials and learning aids are designed. If it takes a lot of time and effort to develop and maintain the tutorials, it might not be worth the benefits. Burgess (2003) is also of the view that many instructors who develop CBI may not be familiar enough with instructional design to design it effectively for the students.

It has been documented that CBI can be effective in educating students. A study by Kulik & Kulik (1991) evaluated 254 separate studies on the effectiveness of CBI in the classroom. These studies covered CBI in all grades of study from elementary school to college-aged students. These studies included an experimental group using the CBI and a control group that used classroom instruction. Examination scores were analyzed to determine the effect of the CBI compared to classroom instruction. It was determined that CBI had a positive effect on the learning of all students in the experimental group. This shows that instruction can have a positive effect on students’ achievement when implemented by means of a computer.

Statement of the Problem

CBI is new to our present educational system, in view of that, little has been done to introduce it in Business Management. Many tutors and students alike in

the subject area do not know how to use it.

Previous studies have shown CBI to be more effective at the elementary level and preschool level where repetitive, drill-type instruction prevails. However, for instruction that aims to foster higher order thinking and problem solving skills, individual studies that examined such effectiveness produced mixed results and the overall effectiveness of such CBI is unclear. On the one hand, CBI has great potential for improving instruction, but on the other hand, it can provide poor instruction at great cost. Such concern has prompted the researcher to study CBI in Learning Law of Contract, in terms of its effect on students' achievement. Furthermore, to provide a contemporary view of the overall effectiveness of CBI in Senior High Schools, studies that used these newer computer technologies need to be quantitatively examined.

Purpose of the Study

The study was to examine the effect of Computer-Based Instruction on students' Learning Law of Contract, in the Asutifi District Senior High Schools. The objective of introducing CBI into the course was to promote independent learning among students and to prepare them for lifelong learning.

It is the researcher's hope that, if found effective, the method would be adopted by Ghana education service (GES), stakeholders, for that matter teachers who are the implementers/facilitators of the education process.

Research Question

The question the researcher sought to answer was:

1. Will the use of CBI lead to better achievement of students in Computer-Based Instruction as against students who go through the traditional (non-computer based) methods of instruction?

Hypotheses

To undertake a systematic study to identify the effect of CBI on students' achievement, the following null (H_o)and alternative (H_1) hypotheses served as a guide to the study:

1. $H_{0:}$ The use of CBI will not significantly affect students' achievement in learning Law of Contract.
2. H_1: The use of CBI will significantly affect students' achievement in learning Law of Contract.

Significance of the Study

An effective Computer-Based Instruction for Senior High School (SHS) has the potential for making significant contributions to influence and guide students, scholars and learning professionals in Business Management. As technology changes, and as knowledge-based organizations become of greater importance in the global economy, a theory of effective computer-based instruction for SHS will have major impact on teaching and learning in senior high schools.

This study attempted to demonstrate the effect of Computer Based Instruction on the learning of law of contract, in Business Management.

There has not been any research into the problem within the chosen District. This study was the first of its kind, and would therefore bring to light the effect of CBI on students' achievement in this area of study.

It would provide school administrators and policy makers a report that will be a very useful document. This means that, issues raised in the study will help policy makers to formulate and implement policies concerning the use of tutorial CBI in Senior High Schools.

Finally, it is also important to note that, the findings of this research, would

serve as a valuable document to all who would undertake further research work on the problem.

Delimitations of the Study

Time and financial constraints made it impossible for the researcher to conduct the study in all the Senior High Schools in the District. Out of the four Senior High Schools in the District, only two schools were used. Due to time constrains, the researcher could not also look at students attitudes toward computers, though this would have added another dimension to the study.

Specifically, the study was confined to form two Business Management students in Acherensua Senior High School (ACHISCO), and OLA Girls Senior High School (OLA), in the Asutifi District of Brong Ahafo Region.

The study was also delimited to the effect of CBI on learning Law of Contract.

Limitation of the Study

One major limitation was that the students were more than the computers available, compelling some students to pair. This sometimes hindered concentration.

Another limitation was power outages, which disrupted class from time to time. Some computers also had problem in running the software. All these could affect the accuracy of the findings of the study. However, efforts were made to minimize the effects of the above sources of limitation by responding quickly to any unforeseen problems that arose.

Definition of Terms

Tutorial — A book or program that provides special instruction on how to complete a task in a software program.

CBI — (computer based instruction). The use of computer software as the primary source of learning for a student.

Traditional (non-computer based) methods –the old method of instruction that involves the physical interaction between the teacher and students.

Software — A combination of programs, routines and languages that control computer hardware.

Tutorial-based Learning— learning that is based on using tutorials to teach concepts about a specific task.

Drill and practice: The computer provides the student with exercises that reinforce the learning of specific skills taught in the classroom, and supplies immediate feedback on the correctness of the response.

Organisation of the Rest of the Study

The study is divided into five chapters. Chapter one presents the background of the study, statement of the problem, purpose of the study, research hypothesis, and significance of the study. Other issues included in this chapter are limitation, delimitation and definition of terms. Chapter two reviews the literature relevant to the study. The third chapter discusses the research design, data collection instrument, data collection procedure and data analysis plan. The fourth chapter presents data analysis and findings of the study. The fifth and last chapter, summarizes the study, draws conclusion and makes recommendations.

CHAPTER TWO

REVIEW OF RELATED LITERATURE

This chapter reviews related literature on the effect of CBI on students learning. It highlights the history, overview of tutorial CBI, CBI design, external support, research on CBI, motivation and CBI, merits of CBI, and learning environment. It also looked at learner control, behavioural learning theory, and constructivism learning theories, cognitive learning theory, and CBI theory building, categories of CBI software, integrated learning systems, types of authoring CBI software and summary.

History of CBI

CBI started in the 1950s and 1960s, mainly in the USA. Pioneers such as Suppes (Stanford University), set standards for subsequent instructional soft ware. After systematically analyzing courses in arithmetic and other subjects, Suppes designed a highly structured computer system featuring learner feedback, lesson branching, and student record keeping. During the mid 1970s, a particularly widespread and influential source of CBI known as “Plato system” was developed at the University of Illinois. The system included hundreds of tutorial and drill-and practice programs. Like other systems of the time, “Plato systems” were available on mainframe computers. The early CBI programs were rudimentary by today's standards,

with mainly text-based interfaces. Bitzer (1965) was one of the first to realise the importance of graphics and sound in the teaching process. Initially, CBI programs simply tried to teach a particular topic without a basis on any particular educational philosophy.

The Time-Shared Interactive Computer Controlled Information Television (TICCIT) - (Merrill, 1980) at the Brigham Young University was based on a specific instructional framework that dictated the actual hardware. The Logo Project Papert was probably the first CBI system that was based on a specific learning approach (the experimental, discovery learning approach).

Early applications of CBI in classrooms from the 1960s were designed to automate forms of tutorial learning commonly referred to as CAI. These systems were designed to teach by providing information of procedural knowledge and requiring the student to practice in a reinforced environment. In the 1970s CBI research focused on experimental studies where learners used CBI to acquire specific skills such as word recognition or facts finding.

Since about 1975, some meta- analysis has systematically examined the effects of technology in students' achievement. Niemiec and Walberg (as cited in Waxman, Connett & Grey, 2002) summarised the finding on 13 qualitative research syntheses conducted between 1975 and 1987 and determined that the average effect size was 0.42, indicating that the average student who received CAI scored at the 66^{th} percentile of the control-group distribution.

Christmann, Lucking and Badgett (1997) employed a meta-analytic technique to compare the academic achievement of secondary students. They

selected studies that were correlative, quasi-experimental, and found that CAI had greater effect in the 1980s than it did through 1995. Kulik (cited in Butzin, 2001) conducted one of the most comprehensive meta-analyses on CAI. He aggregated data from more than 500 individual students of CAI and concluded that students usually learn more in less time when they receive CAI.

Overview of Tutorial Computer-Based Instruction

Tutorials aim to address two components of instruction, namely the presentation of skills and the guidance through the initial use of the information. Some tutorials do not guide the learners through the information, they simply present the information. Tutorials are used in almost every subject area from the humanities to the social, economic and physical sciences as they are appropriate for presenting factual information, for learning rules and principles, or for learning problem-solving strategies. Typical tutorials begin with an introduction section which informs the learner of the purpose and nature of the lesson. After that a cycle begins. Information is presented and elaborated. A question is asked and the learner must answer. The program judges the response to assess the learner's comprehension, and the learner is given feedback to improve comprehension and future performance. At the end of each iteration, the program makes a sequencing decision to determine what information should be treated during the next iteration. The cycle continues until the lesson is terminated by either the learner or the program. At the closing, a summary may be given. Although not all tutorials follow exactly the same route, most effective tutorials include these or similar components.

CBI Design

CBI design is defined as the programming of content and lesson design that considers the individual differences of the learner to achieve the learning goal level delivered by computer. Critical for promoting achievement in CBI are features that provide opportunities for problem solving, corrective feedback, elaboration, visual and graphic cues, control of the routine by the learner, and appropriate wait time between input and response (Lewis, 1990).

This unit of the model makes CBI different from other forms of individualized instruction. CBI design is comprised of four components: instructional control, instructional support, screen design, and practice strategy. Instructional control can be program controlled where the program guides the learner; learner controlled where the learner determines the options; or adaptive controlled that is a combination of program and learner controlled where control is based on the learner's responses. CBI that is adaptive or intelligent to student's responses and rate of learning is twice effective. Gibbons and Fairweather (2000) believed that this instructional approach is a potent effectiveness factor in CBI. Numerous researchers have found that learner control in CBI positively influences retention of information and increases test performance (Hansen, Ross & Morrison, 1989). Several researchers have found positive achievement results from giving learners control over elements of their instruction such as amount of contextual support (Shaw, 1992), amount of information and practice (Hannafin & Sullivan, 1995), amount of review (Kinzie, Sullivan, & Berdel, 1988), and sequencing of the instruction.

Gray (1989) concluded that CBI for single class sessions and directed at students with little background in the subject matter will be effective with minimum user control over the sequencing of instructional content. Supporting the learner during the CBI learning process is important to the learning outcome of CBI. Weiss (1985) noted that the more a CBI program must "stand alone," through lack of instructional support, the greater the burden on the instructional content to be clear, and on documentation and guides to explain how to use the CBI program. Instructional support enhances the understanding of the content of instruction by specific examples, glossary, procedures, help, hints, feedback, and coaching. When learners perceive instruction to be difficult, they seek out more instructional support such as elaborate feedback (Tobias, 1982).

Feedback is one form of instructional support that influences the learning process by motivating the learner and/or by providing additional information about the task (Sales and Williams, 1988; Steinberg, 1991). Feedback is the evaluative or corrective information about an action, choice or inquiry that the learner has made within the instructional program. Clariana (1993) found that the more information provided by feedback, the better the performance. Feedback has to be valued by the learner to be motivating. Feedback can motivate students by encouraging them when learning is difficult (Steinberg, 1991). Kulhavy and Stock (1989) referred to feedback as a unit of information with two components, verification and elaboration. Pridemore and Klein (1991) found that students who received elaboration feedback during instruction performed better than students who received verification feedback, and suggested that different feedback messages be

provided based on the student responses. Verification feedback could be provided to students when their initial response is correct and elaborate feedback provided when an initial response is incorrect.

Screen design research indicates that displaying information at a consistent location or relevant to graphical information facilitates learning. The enriched screen-control capabilities of computers provide displays that more clearly represent information in meaningful contexts. Good screen design can have an important motivating role because it maintains the attention and interest of the student. Spatial location aids learning by providing encoding links to existing information. Location as a cue is only helpful by its association with the content (Foss & Harwood, 1975), for it works as a mediator between content and visual material. Layout has been shown to enhance transfer of information providing a second choice for the learner in arrangement of content through location.

Aspillaga (1991) added that CBI designers can improve learning by integrating instructional visuals designed using information-processing learning theories, and including screen design strategies to enhance the transfer of information. He again added that CBI designers should continue to create innovative visuals that help students remember facts, relationships, grasp the overall concepts of the lesson, and that Computer presentation of text can facilitate learning by providing focus.

Gillingham's (1988) review of research suggested three aspects of structure and organization that affect learning and remembering. They are superordination, topic-relatedness, and cohesion. A superordinate sentence

explicitly states the main idea of the accompanying text. Research indicates that students learn the top-level or superordinate ideas of text first and filter out peripheral information (Steinberg, (1991). Students are less likely to forget superordinate information (Meyer, 1977; 1985). Research with technical prose also reveals the importance of stating the main idea, and stating it first.

Topic relatedness refers to the idea that text is expected to be on a single topic. This is particularly important in technical prose (Steinberg, 1991). Cohesion is the connectedness of prose. Prose is most readily learned and remembered when writers follow some sort of plan and signal this plan to the reader. The implication for CBI is that it is counterproductive to display text one sentence at a time because it may interfere with understanding the relatedness of the text.

Graphics represent important capabilities for CBI in terms of encouraging intuition or insight about the relationship between concepts (Kearsley & Hillelsohn, 1982). Graphics have value in illustrating processes students cannot see and increasing active participation in the instruction (Trollip, 1979). Reder, Charney and Morgan (1986) found that elaborated text was advantageous for learning complex procedural skills. Also, Ross, Morrison, and O'Dell (1988) found that low-density presentations reduced lesson length and reading time without adversely affecting learning of important facts and concepts.

The appropriate amount of information and practice to include in CBI varies by the difficulty of the subject-matter and individual learner characteristics. When faced with the decision of determining the amount of

practice to include in CBI, a greater amount of practice should be provided if higher student achievement is an important goal of the instruction (Schnackenberg,, Sullivan, Leder,, & Jones 1998).

Fitts and Posner (1967) identified the stages of skill learning as: cognitive stage, associative stage, and autonomous stage. Cognitive stage of skill learning begins with an instructional or overview phase in which the learner receives or studies information or instruction about the skill. The learner typically gives a verbal description of how the skill is performed and states the basic facts associated with the skill. In the associative stage of skill learning, the learner attempts to perform the skill based on the knowledge acquired in the cognitive stage. In this stage the errors or inadequacies are corrected. In the autonomous stage of skill acquisition, the performance of the skill becomes automatic and rapid. Not all skills reach the autonomous stage. Automaticity is a necessity for more complexes, higher level skill (Smith & Ragan, 1993).

Salisbury (1988) provided the following overview of the three stages of skill acquisition and the important role of practice in the learning process. Practice during the cognitive stage usually involves the learning of factual information, which is a prerequisite to performing the final skill. During the associative stage, practice assists the learner in performing the skill smoothly and accurately. The learner may have to use considerable of mental concentration to perform the skill. During the autonomous stage, practice allows the learner to perform the skill without much mental concentration so that the learner's attention capacity is available to devote to other aspects of the task. Many skills must be performed at the autonomous stage to be useful.

Schnackenberg, et al.. (1998) found that students who practiced more in their instructional program scored higher on the post-test than those that had a lesser amount of practice.

Students preferred more practice and information in abstract or hypothetical learning situations than students working through a program in a real instructional setting. Marcoulides (1990) found that students who are "spoon-fed" sets of rules for choosing and using statistical procedures without hands-on practice in concrete examples tended to misapply or forget the rules. Students need hands-on examples to help visualize the operational procedures.

External Support

External support is defined as providing for the needs of the learner with support external to the CBI program but is required to promote the learning outcome of CBI. External support should provide appropriate computer equipment, technical support, time for the learner to participate in CBI, and support from peers, supervisors, facilitator, management, friends, and family. Tough (1979) repeatedly highlighted the strong reliance on external resources, both human and material, in the conduct of learning projects and noted that students would like to have more assistance in their learning pursuits.

The necessity of considering the learning environment and its support systems has been widely recognized in education and instructional design (Tessmer& Wedman, 1990). Environment analysis may be recognized as important to the success of an instructional project, but it is rarely completed as a major stage or factor in the instructional design process. Instruction may embody the proper outcomes and strategies but lack the means to be

thoroughly or successfully utilized in its intended environments. Tessmer and Wedman (1990) suggested two factors that should be considered in the environmental analysis: physical and use factors. Each of these two factors is further divided into instructional environment and support environment. The physical factors of the instructional environment are facilities, instructional lifespan, and equipment. In the case of the psychomotor domain, the instructional environment must provide for development of the motor skills. The use factors of the instructional environment are patterns of use, reasons for use, student-user characteristics, and administrator characteristics. The support environment is the system in which the instructional environment is embedded, the system that administers, facilitates, and supports instructional activities. The physical factors of the support environment are site distribution, management and coordination. These factors are part of the instructional strategy design. The use factors of the support environment are production services, storage and delivery services, dissemination considerations, and support resources.

Research in external support is limited, but several researchers found it important in accomplishment of the learning outcome of CBI. Peters and O'Connor (1980) and Peters, O'Connor, and Eulberg (1985) reported that situational constraints interfere with or restrict an individual's performance. Mathieu, Martineau, , & Tannenbaum (1993). Found that trainees' foreknowledge of constraints reduces their motivation to perform well in instruction. Jawahar (2002) referred to these situational constraints as complexity of training, time, and software user friendliness that restrict the range of individual performance. Mathieu and Martineau (1998) referred to

the situational constraints as adequacy of tools, equipment, materials, supplies, financial, budgetary support, and time availability. If there are severe constraints in a given setting, performance is less a function of individual differences and more a function of situational factors, and less predictable from measures of theoretically-relevant individual differences. Stephenson (1991) found that the instructor/facilitator interaction with the student increased his or her achievement and Jawahar (2002) found that the perception of the situational constraints negatively influenced end user performance.

Research on Computer-Based Instruction

Most of the early research studies on CBI compared computer-based instruction with instructor-led instruction. The studies tended to focus on the computer as the independent variable and thus assumed that the computer itself was somehow affecting the learning process (Thompson, Simonson, & Hargrave, 1993). Traditional achievement measures were outcome measures. Typical dependent variables include final test scores and scores on standardized achievement tests. In many studies, there are no controls for either the curriculum content or the teaching methods. Often, different teachers are used for the CBI and traditional classroom instruction groups and no control was made for the teacher effect (Thompson, et al.1993).

Some research tends to focus on computer environments that have the potential to improve student problem solving and information handling skills. Recent research and development efforts in CBI point toward radically changing the roles of teachers and students in schools. Computer environments are beginning to enable more active and individualized learning

on the part of students and to encourage teachers to serve as facilitators of this learning rather than as deliverers of knowledge. These potential changes in teaching and learning, based on cognitive theory, could cause radical re-structuring of schools.

The evidence supports the position that technology based teaching and learning have positive effect on students. People can learn using media and because of the improved instructional strategies and the enhanced materials, facilitated by media, they may learn more effectively and in some cases, more efficiently. Educational technology can facilitate the teaching and learning process and potentially make education richer and more stimulating by creating environments and presenting content not possible otherwise (Clark, 1983). Some areas of research conducted in CBI and found in this literature review are: meta-analyses of CBI support for learners, learner control, motivation and CBI, context of learning, cooperative learning and CBI, learning environment, and hypermedia learning environments.

In analyzing five meta-analyses conducted by Kulik, Kulik, and Cohen (1980); Kulik, Kulik and Shwalb (1986); Kulik and Kulik (1986); Khalili and Shashaani (1994); and Liao (1998), CBI positively affected student achievement when compared to traditional classroom instruction (Lowe, 2002). Clark (1983) suggested that the positive effect of CBI might be the uncontrolled effects of instructional method or content differences between treatments that were compared. Many educators believe instructional methodology is the construct behind student achievement. Unless a research design can hold all the variables constant except CBI when compared to traditional classroom instruction, these results have limited validity.

Clark (1985) suggests that, when computer or computer attributes are found to influence student achievement, other variables may actually be influencing the outcome. In each of the five meta-analyses listed above, effect size was positive for achievement as an outcome for CBI over conventional instruction. When CBI and traditional classroom instruction are delivered by the same person, the learning advantage for CBI is reduced to insignificant levels (Clark, 1985). Salomon, Perkins, & Globerson (1991) pointed out that "no important impact can be expected when the same old activity is carried out with a technology that makes it a bit faster or easier, the activity itself has to change" (p. 8). Roblyer (cited in Thompson et al., 1993) compared later studies to those meta analyses conducted by Kulik et al (1980). Roblyer found that attitudes toward school and content areas were significant and positive. She suggested that improving students' self-image and self-confidence through computer use was a variable that needed further study. Additional findings of Roblyer were:

1. Computer applications were more effective for teaching mathematics than reading and language skills

2. The greatest effects were found in the science studies, although few. The computer applications for teaching cognitive skills such as problem-solving and critical thinking yielded about the same effects as for reading and mathematics

3. Specific computer application types such as drill and practice, tutorial, and simulation were difficult to analyze because of their relation to specific subject matter

4. High positive effects were found in studies that used simulations for unstructured work.

Roblyer concludes “the effectiveness of various types of CBI applications varied according to the content area and the skill being taught” (p. 48). Contrary to earlier results, Roblyer found that the effects of computer use were highest at the college level and lowest at the secondary level. She also found differences in effects of males and females to be inconclusive and suggested further study. The studies that focus on effects of specific attributes and uses of the computer on specific learner outcomes are difficult to combine and analyze. The majority of the cognitive dependent variables in the studies reviewed by Kulik et al (1980) and Roblyer (1988) used standardized achievement measures.

During the past decade, a quiet revolution has taken place in various subject classrooms across the world. Computers and videodiscs have gained new ground as legitimate instructional tools, establishing themselves as valuable supplements to traditional learning methods such as lectures and textbooks.

Motivation and CBI

Kinzie (1990) suggested that two motivational constructs, intrinsic and continuing motivation, are important for maintaining the participation necessary to flourish in CBI environments. Intrinsic motivation describes the state that exists when individuals participate in an activity for the gratification generated by the activity itself. Continuing motivation is evident when

students choose to return to a lesson without the presence of external motivators (Seymour, Sullivan, Story & Mosley, 1987).

Keller and Suzuki (1988) adapted and elaborated a motivational model for CBI design. An ARC is an acronym that represents four categories of the models: attention, relevance, confidence, and satisfaction. They identified three key factors: motivational objectives, learner characteristics, and learner expectations. The setting of motivational objectives is important in designing and evaluating CBI (Hannafin, Hannafin, Hooper, Rieber, & Kini, 1996). A careful analysis of learner characteristics can help designers assess the motivational strategies needed. Malone and Lepper (1987) developed the taxonomy of intrinsic motivation based on a survey of computer game preferences among elementary school children. They classified motivation into four categories: challenge, control, curiosity, and fantasy. Few would argue with the proposition that ensuring initial motivation, maintaining interest during instruction, and encouraging continuing interest in the subject under study are as critical to the success of CBI as to any form of instruction.

Merits of CBI

The capability that sets CBI apart from instruction with other media is its ability to make “real” time decision regarding the material to be presented. “Real-time decisions are those made possible by programming the computer to make immediate decisions about the sequence and difficulty of stimuli to be presented based on students response. The greater storage capacity of the computer enables it to further individualise these decisions by incorporating a history of the student and previous responses in the program. The computer can retain responses to stimuli in its memory bank, making it possible to

reconstruct the actual learning sequence of any given student. The instruction is able to obtain a printout of the computer record of the student.

Another advantage of CBI over other media is in the area of instructional logics with its variety and flexibilities. The computer has the capability of handling programs for drill and practices, tutor and test, simulation, problem solving, games or learner control. Furthermore, an advantage of CBI over other media is the ease with which it can be changed. In the area of the computer game, the program can repeat the rules of the games after the player is asked if he would like to play again. Thus as noted by Lowe (2002) the computer program is easy to modify because CBI instructions are stored in the computer rather than prompted in hard copy.

Questions and answers may be quickly added, changed, or deleted by typing a single command at a computer and it is terminated. Unlike programmed books, real time modification can take place in computer programs. The program may be written to restrict itself so that each student receives an entirely different sequence of instructional events based upon his previous responses. CBI provides students with material directly relevant to their discipline. Second, it is also competency-based, a familiar format for most students in allied disciplines.

The level of interaction between the learner and the computer is important. Increased levels of interaction should permit greater learning. For example, many educational programs are converting to a Windows interface because they assume that this interface is more “user-friendly” for the student. But it is not the technology itself that makes a CBI program an effective tool; it is the ability of the learner to interact with the learning situation. This is the

measure of the effectiveness of any learning tool. Thus, two factors are important to remember: First, learner training in the technology can be as important as the technology itself; and second, anything a computer can do, a human can arguably do. Unless the computer is more efficient than the alternative learning method, it lacks value as a learning tool.

Tutorials are one of the most common types of computer-assisted instruction. In their simplest form, tutorials are “page-turners” similar to textbooks, interspersed with predetermined questions and responses. More complicated tutorials offer analysis of the response to a question, branching and parallel sequencing of text, supplementary and remedial work and allow students to structure the work to meet their needs, other than being specifically sequenced. The one-to-one tutoring and feedback provided by a tutorial can make it an excellent tool for improving student knowledge (cognitive domain).

Typical CBI software provides multiple-choice questions or problems to students, offer immediate feedback, notes incorrect responses, summarises students’ performance, and generates exercises for worksheets and tests. Furthermore, CBI presents tasks for which there is one correct answer. It can evaluate simple numeric or very simple alphabetic responses. Much CBI software presents information in a simple curriculum area and uses brief exercises that can easily be accommodated within the typical 30 or 40-minutes academic period for Ghanaian Senior High Schools.

Learning Environment

CBI can enhance students learning because it has the potential to increase flexibility, provide access to expertise, and facilitate discussion

among learners who cannot meet face to face, reduce feelings of isolation often experienced by non-traditional learners, increase learner autonomy; and support and promote constructivist and collaborative learning, (Burge 1994; Cahoon, 1998; Eastmond, 1998; and Field, 1997).Using technology effectively makes teachers understand what students want in the learning environment. Learning environments can be structured, based on the suggestions below by Field (1997), to ensure that they support learning.

1. Create a place where learners can collect important ideas, express themselves, and feel some security that they are going in the right direction.
2. Provide fast and productive access to help when it is needed.
3. Provide a learning environment that promotes both independent and interdependent activities with cognitive as well as psychosocial support because students generally have two basic intrinsic motivating drives of autonomy and affiliation,
4. Ensure that the learning tools are intuitive and essential for the immediate task.

Eastmond (1998) in his report on learning through online instruction found that learners engage in knowledge construction, collaborative learning, reflection, and interactivity. He also points out “that none of these elements are inherent in the technology, but must be fostered by the course design, instructor engagement and student behaviour” (p. 37). “The spotlight should first fall on the conditions, dynamics, and outcomes of learner activity, in ways that promote learner self-esteem and their competence as proactive learners”.

Current computing environments allow for a wide range of generative learning strategies to be incorporated into courseware. Generative learning models suggest that meaningful learning results when the learner actively and consciously relates prior knowledge to new material and creates understandings based on these relationships (Wittrock, 1974, 1978; Wetzel, 1993). The role of instruction is to support activities and strategies that learners may use to generate meaning, and even supply mechanisms for the learner if they are unable to do their own. Generative learning requires learners to be proactive and mindful as they search for meaning by continually relating new information to what they already know. Generative activities include paraphrasing, summarizing, outlining, analytic reasoning, and mental imagery (Hannafin et al., 1996).

Learner Control

According to Friend and Cole (1990), learner control refers to the extent to which the learner has control over their learning experience by affecting the content, sequence, or pace of material. The absence of learner control is characterized by program control in which the instructional software controls most or all of the decisions in CBI.

A purported advantage of CBI is that, it typically provides the learner with more control than Classroom Instruction (CI) (Welsh, Wanberg, Brown, & Simmering 2003). However, research also shows the effect of learner control on actual learning is negligible.

Demerits of CBI

Several researchers found problems with CBI. Wadsworth and Frazier (1982) reported on results of a study designed to examine student

achievement, learning efficiency in terms of time, and attrition rates among students in adult basic education programs. The researchers concluded that the CBI methods contributed to a high dropout rate in the group utilizing CBI, in comparison to the group using traditional methods. The attrition rate among CBI learners was 31 percent, as compared to 27 percent in the traditional group.

The Authors offered few conclusions due to what they thought was a lack of control over the study and the lack of appropriate use of the PLATO system. They did recommend that faculty and administrators planning to use CBI programs should anticipate the need to allocate time to train staff and to develop or select appropriate software for the curriculum and to pay careful attention to hardware acquisition. Another study which did not support use of CBI was reported by Caldwell (1980). The research intended to examine the effects of Control Data's Basic Skills Learning System (BSLS), as compared to traditional individualized instruction with students. Caldwell also studied the related issues of motivation, by comparing voluntary participants to students who were paid by federal Comprehensive Educational Training Act (CETA) program funds to seek the General Education Diploma. Both of Caldwell's BSLS subgroups had attrition rates of over 50 percent, as did the individualized, self-paced subgroups. He found that the computer-based instructional program seemed to have no significant effect on the acquisition of basic skills for either the CETA or non-CETA participants. Caldwell concluded, in general, that poor program administration was one of the most significant problems. The dropout rate in Caldwell's study was so high that

analysis of the results was tainted. His study results revealed a need for a better planned empirical study.

Behavioural Learning Theory and CBI

Behavioural learning theory was developed by Watson in the early decades of the twentieth century and loosely encompasses the work of Thorndike, Tolman, Guthrie, Hull, and Skinner (Ormrod, 1995). Skinner's theory of operant conditioning had a tremendous influence on the development of the early CBI systems (Shlechter (1991). The basic learning principles of Skinner's theory are personalized instruction, controlled operant, immediate feedback, linear sequence of learning, and instructional prompts (Shlechter (1991). Another approach to instruction, devised by Crowder (1962) and involving the use of a branching sequence in CBI for training Navy personnel was the basis for adaptive sequencing.

There are three basic assumptions about the behavioural learning process: (1) behaviour rather than internal thought processes is the focus, (2) environment shapes behaviour, and (3) the principle of contiguity and reinforcement are central to explain the learning process (Grippin & Peters, 1983). Several educational practices can be traced to the behavioral type of learning. The systematic design of instruction, behavioral objectives, and notions of the instructor's accountability, programmed instruction, CBI, and competency-based education are all solidly grounded in behavioral learning theory. Adult technical and skills training also draws from behaviorism.

The concept of behavioural objectives continues to serve as a method for defining the content of instruction. Wells and Hagman (1989) have

demonstrated that objectives have a positive effect on learning at the individual level. In the 1960's and 1970's, as behaviouristic learning theory was peaking in its influence on training research and practice, learning theorists were becoming less satisfied with behavioural conceptions of learning and memory and increasingly interested in the study of internal knowledge structures and cognitive processes that underlie task performance (Bosco & Morrison, 2000).

Cognitive Learning Theory and CBI

A break from behaviourism occurred with the importation of the notion of insight learning in the gestalt theories of Wertheimer, Kiffka, and Kohler (Moore & Fitz, 1993). These theorists took issue with the proposition that all learning consisted of the simple connection of responses to stimuli. They insisted that experience is always structured and that we react to a complex pattern of stimuli. The learner perceives stimuli in organized wholes, not in disconnected parts. The learner organizes his/her perceptual field according to four laws: (1) the law of proximity, (2) the law of similarity and familiarity, (3) the law of closure, and (4) the law of continuation. Gestalt psychology is classified within the family of field theories where the total pattern or field, stimuli, or events determine learning.

Perception, insight and meaning are key contributions to cognitivism from Gestalt learning theorists (Merriam & Caffarella, (1999). A major difference between Gestaltists and behaviourists is the locus of control over the learning activity. For Gestaltists it lies with the individual learner and for behaviourists it lies with the environment. The shift to the individual and the

learner's mental processes is characteristic of cognitivist-oriented learning theories.

Most contemporary cognitive psychologists hold that learning consists of individual constructions of knowledge. Learning is a personal event that results from sustained and meaningful engagement with one's environment, Bruner (1961, 1985, and 1986). This view also holds that learning cannot be viewed apart from the social and cultural contexts in which it occurs (Prawat & Floden, 1994).

Lewin (1951) Developed what he referred to as a field theory. According to his theory, each individual exists in a life space in which many forces are operating in the environment. Behaviour is the product of the interplay of those forces; the direction and relative strength of which can be portrayed by the geometry of vectors. Learning occurs as a result of a change in cognitive structures produced by changes in two types of forces: change in the structure of the cognitive field itself, or change in the internal needs or motivation of the individual. Lewin saw success as more potent motivating force than reward and gave attention to the concepts of ego-involvement and level of aspiration as forces affecting success. He felt that the urge for self-actualization is the driving force motivating all human behaviour.

Piaget and Bruner focused on the cognition and theory of instruction, which had an impact on learning theories. Piaget (1972) conceptualized behaviour of the human organism as starting with the organization of sensory-motor reactions and becoming more intelligent as coordination between reactions to objects becomes progressively more interrelated and complex. A

basic assumption of Piaget's theory is that a different type of assimilation and accommodation occurs at each stage of development. A person must wait until the final stage of development, the formal operational stage, to develop the cognitive structures necessary for dealing with abstract environmental relationship (Shlechter, 1991).

Thinking becomes possible after language develops and a new mental organization is created. Piaget's theory of cognitive development influenced many CBI designers. Papert (1980), who helped design the LOGO system (a programming language for children), was greatly influenced by Piaget's theory. While basically agreeing with Piaget about the assimilation and accommodation process, Papert argues that cognitive development can be expedited by providing the student more formal operational experiences. A student can acquire these needed experiences by programming a computer with the LOGO authoring language (Papert, 1980).

Using and combining different commands to form a coherent computer graphic and debugging a program are examples of formal operational experiences. The cognitive influence became more prevalent as computer technology became more sophisticated (Shlechter, 1991).

Bednar, Cunningham, Duffy, & Perry (1995) were interested in the structuring and sequencing of knowledge and translating this into a theory of instruction. He did, however, have a basic theory about the act of learning which he viewed as involving three almost simultaneous processes: acquisition of new information, transformation or manipulating knowledge to make it fit new tasks, and evaluation to see if information is adequate to the task.

Three features cited by Gardner generally associated with cognitive science that apply to CBI are: (1) cognitive science is explicitly multi-disciplinary, drawing especially upon the disciplines of psychology, linguistics, anthropology, philosophy, neuroscience, and artificial intelligence; (2) a central issue for this discipline is cognitive representation, its form, structure, and embodiment at various levels; and (3) the faith that the computer will prove central to the solution of problems of cognitive science, both in the conduct of research to investigate various cognitive representations and in providing viable models of the thought process itself (Bednar, et a., 1995) Bednar et al. refer to knowledge as some entity existing independent of the mind of individuals and which is transferred "inside." Consistent with this view of knowledge, the goal of instruction, from both the behavioural and cognitive information processing perspectives, is to communicate or transfer knowledge to learners in the most efficient, effective manner possible. Knowledge can be completely characterized using the techniques of semantic analysis. While behaviourist applications focus on the design of learning environments that optimize knowledge transfer, cognitive information processing stresses efficient processing strategies (Bednar et al., 1995).

Bosco and Morrison (2000) reported that cognitive theory is now the dominant theoretical viewpoint in research on learning and memory resulting in two notable trends: (1) the greater use of mental constructs to define task requirements, through the cognitive task analysis method, and (2) the greater willingness to devise training interventions for mentally demanding tasks.

Contemporary approaches to computer-based learning are more often rooted in cognitive learning theories. They focus not on the product

technology of the computer but on the idea technologies afforded by the computer (Hooper & Rieber, 1995).

Research on the effects of the computer on cognition attempts to determine if cognitive residue results as a consequence of the interaction between the individual and computer, such as an increase in general problem-solving ability. Research with technology focuses on how human processing changes in distinct, qualitative ways when an individual is engaged in an intellectual activity using the computer as a tool.

Constructivism Learning Theory and CBI

The historical roots of constructivism are most heavily grounded in developmental psychology and social learning theories. A constructivist maintains that learning is a process of constructing meaning. Meaning is made by the individual and is dependent on the individual's previous and current knowledge structure. Learning also involves providing experiences that induce cognitive conflict, and hence, encourages learners to develop new knowledge schemes that are better adapted to experience. To a constructivist, learning must be situated in a rich context, reflective of real world contexts, for this constructive process to occur and transfer to environments beyond the training classroom (Bednar et al., 1995).

How effective or instrumental the learner's knowledge structure is in facilitating thinking in the content field is the measure of learning. The learner must construct an understanding or viewpoint; the content cannot be pre specified. While a core knowledge domain may be specified, the student is encouraged to search for other relevant knowledge domains that may be relevant to the issue. It is clear that knowledge domains are not readily

separated in the world; information from many sources bears on the analysis of any issue. A central or core body of information must be defined; however, the boundaries of what may be relevant cannot be defined (Bednar et al., 1995).

The constructivist view does not accept the assumption that types of learning can be identified independent of the content and the context of learning. It is not possible to isolate units of information or make a priori assumption of how the information will be used. Instead of dividing up the knowledge domain based on a logical analysis of dependencies, the constructivist view turns toward a consideration of what real people in a particular knowledge domain and real life context typically do (Brown, Collins, & Duguid, 1989; Resnick, 1987).

The overarching goal of such an approach is to move the learner into thinking in the knowledge domain as an expert user of that domain might think. The goal should be to portray tasks and not to define the structure of learning required for achieving a task. It is the process of constructing a perspective or understanding that is essential to learning; no meaningful construction is possible if all relevant information is pre-specified.

Idea technologies tend to emphasize constructivist orientations to learning. (Papert 1981, 1993; Schwartz, Yerushalmy & Wilson, 1993). The effects of technology on learning can best be understood when classified as "effects of" versus "with" the computer on cognition (Salomon, Perkins & Globerson, 1991).

Computer-Based Instruction Theory Building

It is only within the last decade that framework development for CBI has become a part of the literature. Prior to this time, researchers' studies compared CBI to traditional classroom instruction or analyzed the constructs mentioned earlier to determine the variables that influenced learning by means of the computer. It was not until researchers began to analyze these studies through meta-analysis and reviewed theses meta-analyses that researchers of CBI began to realize that there were confounding variables that could render the research invalid.

The continuing progress made by cognitive psychologists in research on how we learn and the better understanding of the constructivism approach to learning have provided researchers an opportunity to consider combining learning theories in developing their frameworks for CBI. The literature on development of frameworks or models for CBI is limited. The articles that were found to include a framework for CBI (Johnson & Aragon, 2002; Kemper & Murphy, 1990; Steinberg, 1991) concluded that a synthesis of the learning theories is part of their framework. These researchers have begun to develop frameworks that provide a strategy for future empirical research. However, it is this researcher's opinion that these frameworks do not represent all the critical components that are needed to develop a theory of effective CBI for students.

Johnson and Aragon (2002) developed a framework for instructional strategies for use in the computer learning environment. Clark (1999) reviewed numerous studies comparing traditional classroom instruction with CBI and found no significant differences. The obvious conclusion was that the

technology used to support instruction has little impact on the learner's attainment of educational outcomes. CBI draws on learning theories, instructional models, practical experience and technology. For understanding how these domains contribute to CBI, Steinberg developed a six-component framework for CBI. Four components were derived from learning theories and instruction models: target population, goals, task, and instruction. Two of the components, computer application and environmental implementation, reflect research and experience with CBI.

Steinberg synthesizes theories of Bransford and Gagné in developing her framework. Bransford's theory explores learning, remembering, and understanding from a process perspective. His framework consists of four components: learner characteristics, criterial task, nature of materials to be learned, and nature of learning activities. Bransford emphasizes that the most significant idea underlying this framework is the interaction among components. Gagné conceptualizes learning in terms of categories of skills and capabilities and the conditions under which they are learned. Gagné groups the diverse outcomes of learning into five categories: intellectual skills, verbal information, cognitive strategies, motor skills, and attitudes. Elements both within each person and in the surrounding environment affect learning. Each type of learning outcome occurs under its own set of internal and external conditions. Gagné's theory suggest that both attributes of the learner and events in the environment contribute to learning, and each type of learning outcome has its own set of internal and external conditions. From Steinberg's synthesis of Bransford's and Gagné's theories, she concluded that four components are central to learning, regardless of the theoretical perspective:

target population (who is learning), goals (what they are supposed to learn), task (the materials and skills involved), and instruction (the externally planned activities). When one looks at the target population, there are many individual differences. The many characteristics of learners affect their ability to learn and to acquire new knowledge.

An individual's subject-specific knowledge and general knowledge both affect comprehension. A general characteristic of all human beings is that they have a limited capacity to process information. Too much information presented simultaneously is not likely to be learned and remembered. Goals, the second component, are the expected outcomes of instruction. Goals in CBI may be lesson or computer determined. CBI goals include demonstrating knowledge or skill, engaging in a simulated experience such as decision making, learning how to learn, or influencing attitudes. The third component of Steinberg's model is task. The skills and processes involved in a task vary with the subject matter and the nature of the materials. Each subject matter domain has its own subject-specific skills but it also has some skills in common with other domains. Learning verbal material involves different skills than visual. A single set of materials may be more or less complex, and require different skills depending on the task.

Instruction is the fourth component of Steinberg's model. Some Instruc tional models evolve from common wisdom and experience successfully teaching a given subject. Other models are based on psychological theories of learning or on a combination of experience and theory. Computers are excellent vehicles for implementing well-established models of instruction. CBI can support models of instruction that are not possible in other modes.

Computer application means first and foremost the application of sound instructional principles. Appropriately utilized, the computer is a superb instructional tool. The computer is an appropriate instructional medium if the lesson it presents is effective, efficient, and acceptable to the intended learners (Steinberg, 1986). The sixth component in the framework relates to the environment in which CBI is implemented. A match between the anticipated and the actual conditions in which learning takes place is essential.

Each of these six components is necessary, but the crucial aspect of the framework for CBI is that learning is significantly affected by the interaction of these components. For example, a computer can be used to implement many models of instruction but if the computer application is poor or if the model is inappropriate for the target population, there will probably be little or no learning. The critical idea of this framework of CBI is that the components interact to affect learning and they do not act independently.

Categories of CBI Software

According to Alessi and Trollip (2001) there are four main categories of CBI software. These include 'Drill-and Practice', Flexible Practice', 'Simulation', and 'Multimedia'. The 'Drill-and-Practice', category is largely machine-determined and provides instruction in a manner dictated entirely by the software author and the machine itself. For example the computer displays series of chords which become a stimulus to which the student is asked to respond by indication the chord types or perhaps their functions. If the student answers correctly, the software might provide a new set of chords that is more challenging. If any of the responses are incorrect, the software might branch

off to an easier set. This category of software provides an efficient and direct means of inspiring specific skills. Key characteristics typically include: stimulus/response approach with rewards or penalties, simple to complex tasks focusing on one set of skills, and branching to additional drills based on success or failure.

Software in the category of “Flexible Practice” has the purpose of skill development, as it adds features that allow flexibility of use for an instructor and for the student seeking-improvement. Furthermore, this category is student and teacher-centered in that it provides choices that permit individuals to have a hand in engineering their own learning. For instance, students might use their own understanding of weaknesses in chord identification to establish a special set of drills.

Flexible Practice software typically provides menus and dialog because that lets students choose the settings for series of exercises that best suit their needs. In a similar way, teachers can use these features to create tailor-made curriculum for an individual or class. Key characteristics typically include: Stimulus/response items, but with flexible settings for performance, comprehensive approach with multiple tasks, intelligent branching tailored to individual needs, flexibility for student and teacher in designing learning environment.

The most recent category of CBI to emerge is simulation, though simulation software has been around for a number of years in other disciplines, particularly science and mathematics education. Perhaps the most famous example of simulation software comes from the social sciences in the form of games, for example ‘SimCity’ and ‘SimEarth’. On these games, the

software provides choices in the initial design, maintenance, and growth of an imaginary urban or global environment. Other application software for example, 'Earpo' takes a similar approach. Rather than focus on specific skill development in the form of drills, simulation software takes a more holistic approach (Alessi & Trollip, 2001).

Multimedia software is a unique merger of learning resources. Text information can be augmented with graphics, including drawing, photographs, animation, and motion video. The kind of application has attracted the attention of many educators because of its capacity to integrate large amounts of aural, visual and written information into one application. All these categories of CBI software are accompanied by audio and video stimulus which helps to enhance memory and eliminate boredom in teaching and learning.

Furthermore, one can deduce that CBI software has one major characteristic which is its ability to be interactive. For example, it offers immediate feedback, notes incorrect responses and tests. This characteristic is noted with all the four categories of CBI which are 'Drill-and-Practice', 'Flexible Practice', 'Simulation' and 'multimedia'. It has been established that there are four main categories of CBI software being used in the Western countries to enhance both teaching and learning. However, in Ghana none of the four categories of CBI is being used to enhance teaching and learning in the Senior High Schools (SHS). In view of that, the researcher has designed his software in such a manner that some features of the four categories of CBI are associated with it. For example, it offers immediate feedback response. Due to its interactive nature and with the inclusion of pictures and texts, the

software serves as a good example of CBI. It is therefore the hope of the researcher that this study will sensitise the Ministry of Education to introduce CBI in the Senior High Schools.

Integrated Learning Systems

Nonetheless, a new trend in integrated learning systems is represented by ‘classworks’ developed by computers Networking specialists. ‘Classworks’ offer the school access to whatever variety of third-party software the teacher selects along with all the instructional management features associated with integrated learning systems (ILS). CBI in general, is widely used in the United States of America. Unfortunately such is not the case in Ghana.

The literature search for this study has established that integrated learning systems are packages of networked hardware and software used for educators. Such systems provide instructional content as well as assessment and management tools. Two examples of an integrated learning system are, “the success maker” and ‘Waterford early ready programmes’ by a company known as Computer Curriculum Corporation. Furthermore, integrated learning system provides situation where students work individually and at their own pace through series of exercises that are designed to give the practice in a targeted skill. This has not been introduced in any institution in Ghana. The researcher hopes that the Ministry of Education will introduce such a system in our educational set up with the view to enhancing both teaching and learning, not only in Business Management, but other subject areas.

Types of Authoring CBI Software

The application software was an example of authoring CBI software. It was an icon authoring software. There are six categories of authoring software. These are document, slide, icon, card, time and CD audio time. Document-based software used text as the central focus but also allows integration of images and sounds to illustrate a point. Because video files are supported by utilities that are added to the operating system and not to the application itself, one can include a movie inside most documents, including word processing files. Document based multimedia has the advantages of being easy to use and form an educational perspective. It can easily be used in classes or individual by distributing files through computer networks (Collins, 1990).

The slide-based software of the screen-by-screen designs where the author works with text, graphics and sound to create a set of visual in an orderly manner are sometimes referred to as presentation software because they are used in a linear fashion to support activities like class presentations, instructional tutorials, or group talks. Icon-based software, on the other hand, uses icons that represent screen constructions such as text and graphic, whereas animation icons that are connected to the display makes the object move icon-based application software interactivity, which makes it best for educational settings where step-by-step guidance is important.

The card-based software is one of the most popular multimedia categories. Excellent examples include Apples HyperCard, and Asymetrix's tool book. Apples HyperCard was the first multimedia authoring software designed for a wide computer audience, and is partly responsible for the rise of

multimedia as a major software category in personal computing. With regards to card-based software, buttons for navigation and for accomplishing tasks can be placed on cards. Graphic images can also be placed on cards in any location and sounds can be easily assessed. An important feature of the category is the use of a programming language or script. Buttons, fields, cards and card backgrounds can all have scripts associated with them. This allows for hyperlinks thus leading the user to various aspects of the software. For instance, a transparent button over a “hot” word can easily be scripted to send the user to new location in the stack. The type of software provides a quick way to integrate many media. It can be used effectively in teaching and for presentation to groups (Collins, 1990).

Time-based system use rather different approach to multimedia development. Instead of construction screens or cards using objects directly on the screen, objects such as graphics, text, buttons, movies, and other media are defined separately and called into action on the bases of a time grid. One of the kinds of software is Macromedia Director. With regards to the example, the stage is the screen; the grid is the score window, containing the numbered references to the cast characters such as text, graphics and sound as they appear in time. The numbers appear in layers or channels in the order that the developer wants to appear on the stage or screen. The software provides routine for animation objects and comes with tools for the creation of custom graphics. Time-based software offers intention combination of powerful interactivity with scripting and precise control over the timing of events. This makes the software useful for large number of multimedia applications; it is also very useful in a teaching environment or in the content of live

performance, because timing can be so precisely controlled. Links between audio, and video elements are strongly supported.

Summary

From the literature review, there is conflicting evidence on the degree to which CBI can promote learning, whiles the Behaviorist support CBI, the constructivist are on the opposing side. Even though these two schools of thought have divergent views, it appears that when used appropriately, CBI could facilitate learning by creating more time for concept exploration and enrichment. In addition, CBI allows students to take control over their learning.

Research has demonstrated that traditional method of teaching dovetailed with CBI achieves remarkable results. CBI encompasses both human and nonhuman resources; it includes not only electronic communication media, but a systematic designs implementation, and evolution of the entire process of learning and teaching.

However, it must be noted that CBI design is complementary to the work of the teacher. It does not displace him or her assessing the impact of ne w technologies in the teaching note that technologies open vast new possibilities both to the teacher and to his/her students.

CHAPTER THREE

METHODOLOGY

This chapter describes the research methodology employed in the study. It covers the research design, population, sample and sampling procedure, instruments, data collection and data analysis procedures.

Research Design

A quasi–experimental pre-test, post-test control group design was used for this study, which consisted of two groups, namely the Experimental Group (Students who used the CBI) and Control Groups (Students who went through the traditional method of instruction). This design was chosen because it controls many threats to validity, such as history, maturation and regression (Campbell & Stanley 1966).

Initially both groups were pre-tested, after which only the treatment group received a treatment, whilst the control group was taught using the traditional method. Both groups were taught for four weeks, after which they were then tested again to estimate the 'impact' of the four-week teaching.

The pre-test scores of the groups were not equivalent as such the t-independent sample test was used statistically to analyse the data to examine the significance of their mean deference. Similarly, the post-test scores were

also compared using the t-independent test to analyse the significance of their mean deference.

Population

The target population for the study was all year two Business students in the Asutifi District. The reasons for selecting year 2 students are that the students offer Business Management and the topic for the study (Law of Contract) is taught in the second year.

Sample and sampling procedure

Purposive sampling was used in the study, since the study targeted only Business Students in the District. Schools purposively sampled for the research study were OLA Girls Senior High School and Acherensua (ACHISCO) Senior High School, both in the Asutifi District in the Brong Ahafo Region of Ghana. The sample size was made up of 80 students, 40 students each from both schools. There are four Senior High schools in the District, namely Hwidiem Senior High School (mixed), OLA Girls Senior High School (only girls), Acherensua Senior High School (mixed) and Gyanfi Kumanini Senior High Technical School (mixed).

OLA and ACHISCO were chosen due to the fact that they have enough and good Computers to facilitate the study. OLA had one Business class, made up of 40 students, but that of ACHISCO had two separate Business class (Business ‘A’ and ‘B’). Business ‘A’ was made up of 40 students whiles that of Business ‘B’ were made up of 56. Business ‘A’ was

chosen to make the number proportional. The study targeted only form two Business Management students, who would eventually write the SHS WASSE examination by the West African Examination Council. Another reason is that the topic for the study (Law of contract) is normally treated in the second year.

The assignment of the classes into Experimental or Control groups was arrived at based on the outcome of the pre-test. The school that obtained the lower mean mark was chosen as the Experimental group, while the one with high mean mark was chosen as the Control group.

Instruments

The instruments used for the study were teacher made objective test for both the pre-test and post-test. The pre-test was made up of 20 objective questions, from topics that had been treated already, eg Management Process, Communication and Forms of Business Ownership; Students were to answer all questions within 30 minutes. The pre-test was administered in the middle of first term (18th October 2010), to show a starting point as to where each of the students were in terms of their knowledge, and to determine which school would be used as the control group and which to use as the experimental group. The class that had the lower of the mean scores of the two groups was taken as the experimental group and the class that had the higher mean score was taken as the control group.

The class with the low scores were taken as the experimental group because CBI would provide a learning environment that would promotes both independent and interdependent activities with cognitive as well as psychosocial support, the computer can retain responses to stimuli in its

memory bank, making it possible to reconstruct the actual learning sequence of any given student (Collins & Earle 1990),

Unlike the pre-test questions, the post-test questions were based on the topic used to develop the sessions covered by the software (Law of Contract). The hypothesis underlying the design was that "the use of Computer-Based Instruction will not significantly affect students' achievement". To somewhat remove experimental bias, the two classes - one in each school - made up of 80 students altogether were taught by the same teacher.

To ensure the reliability of the instruments, both the software and the post-test instruments were tested in a pilot study. This was to ensure that the software developed, and the post-test were very reliable for the purpose. Any problems found in the software as well as the post-test instrument were addressed accordingly. Results of the pilot study were that, some buttons were inactive. It was also identified that the software could not 'run' without the installation of VB-6. Students also had problems in using the software. The researcher took time teach students on how to use the software. The anomalies were also corrected by the researcher.

With regard to validity of instruments for the study, the post-test items were submitted to lecturers of measurement and evaluation who have expert knowledge in validation of research instruments to scrutinize in terms of content. Apart from submitting for validation, the point biserial correlation as a statistical method was applied between the scores on each item and the score on the total test. With this method, test items that were not consistent with the total score were removed. (Darlington, 1990).

The software was piloted at a neutral school (Hwidiem SHS) to help identify problems that students were likely to encounter. During the piloting phase, students were asked to indicate questions which seemed confusing to them. This information was used to modify the initial instrument to produce the final instrument. (Pre-test, Post-test and Software).

Software Design

The software was developed on Microsoft PowerPoint using a slideshow format. PowerPoint was chosen as the software to use for the tutorial because it is easy to create slides with, which is the format for the tutorials. It is also easy to show the steps the students need to follow. Arrows and buttons were placed to show where the students should move their mouse to and click to enable commands in the software, showing them exactly how to navigate through the various menus.

Students in the (experimental group were taken through how to use the software, especially how to use the buttons, exit and how to answer questions and check their performance. Students were given four weeks to go through the software.

To lessen the possibility that a halo effect might cause the treatment group to outperform the control group, all students in the study were told they were part of a special project. To help prevent any perceived additional attention given to students using the CBI, the researcher explained to all subjects that they were playing an important part in research that would help business students in the country. To remove experimental bias, the two Groups (Control and Experimental) in both Schools were taught by the researcher (Clifford & Walster, 1973).

Data Collection Procedure

There were two data collection components to the study- Pre-test, Post-test multiple choice items. The differences in performance between the Control Group (students taught by traditional method of instruction) and Experimental Group (students who used the CBI) in the pre-test were to establish a statistical equivalence of the control and treatment groups. The two groups (Experimental – E and Control – C) were both post-tested, after the treatment group had gone through the use of the software and the control group had been taken through the traditional instruction based lessons.

After the pre-test, the software was installed into the computers of the experimental group, and students guided on how to use it. Whilst the experimental group was going through the software, the researcher started teaching the control group using the traditional method. Both groups started the lessons same day.

The experimental group was visited twice a week by the researcher to correct and guide them where necessary. The data collection started on the 10th May 2010 and finished on 4th June 2010, (four weeks). The data was collected by the researcher himself.

Data Analyses Procedure

The researcher used statistical package for social science (SPSS) to analyse the data. First, descriptive statistics was used to give an overall picture of the distributions of the pre- and post-test scores. The descriptive statistics tool used included frequency distribution, bar charts and box plots.

For the analysis of the differences between the methods of instruction, inferential statistics was used and the variables identified were:

Independent variable – type of instruction

Dependent variable – achievement on the post-test

The differences in performance between the two groups in the pre-test – post-test was used to establish statistical equivalence of both control and treatment groups. Leven's Test for Equality of Variance on the Scores of the two groups was used to compare the two groups. This was to compare the variances of the scores from the groups in order to decide whether or the use of a parametric test would be appropriate. Specifically, the t-test of independence was used because although the groups were different and the parametric assumptions were met after conducting the Level test.

The results of this analysis are described in the following chapter.

CHAPTER FOUR

RESULTS AND DISCUSSION

This chapter presents analysis and results of the pre-test and post-test scores of both Experimental and Control groups. The purpose of the study was to examine the effect of Computer-Based Instruction on students' Learning of Law of Contract, in the Asutifi District Senior High Schools. A quasi–experimental pre-test, post-test control group design was used for this study.

Analysis of Results

There were two data collection components to the study- Pre-test and Post-test multiple choice items. Each group was made up of forty students.
The post-test scores were used as the dependent variable, while the instructional method was used as the independent variable. The pre-test scores were used as a covariate and held constant to control for any differences between groups.

For results to be significant on any of the statistical tests used to analyze data in this study, the .05 level of significance was chosen. The t value found in the analysis of the difference between means was used to determine whether the null hypotheses concerning differences between post-test scores, and differences between the scores while controlling for pre-test scores, were to be accepted or rejected.

The tables in this chapter give classifications with regards to how the students responded after using the software or going through the traditional method of instruction;

Table 1 as well as figure 1 (on page 54) shows the scores and percentages obtained by ACHISCO (Experimental group). The table shows the detailed summary statistics for the ACHISCO.

Table 1: Pretest scores for ACHISCO (Experimental).

Scores	Frequency	Percent
7.00	1	2.5
8.00	2	5.0
9.00	2	5.0
10.00	4	10.0
11.00	11	27.5
12.00	6	15.0
13.00	6	15.0
14.00	1	2.5
15.00	3	7.5
16.00	3	7.5
18.00	1	2.5
Total	**40**	**100.0**

It can be seen from Table 1 that the lowest score for the control group was 7 and the highest score was 18.

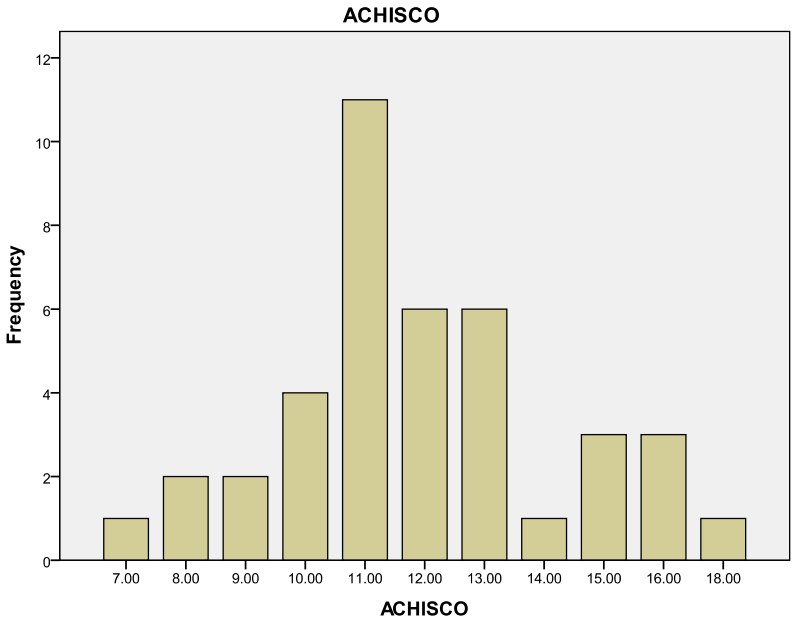

Figure 1: Bar chart showing the frequencies for ACHISCO.

The distribution of the pre-test scores for ACHISCO suggests that the performance of the students was fairly normally distributed. This is an important condition for the use of the t-test of independence to investigate differences between the two groups (i.e. control and experimental groups).

Table 2 shows the scores and percentages obtained by OLA (Control Group).

Table 2: Pre-test scores for OLA (Control).

Scores	Frequency	Percent
10.00	4	10.0
11.00	1	2.5
12.00	4	10.0
13.00	4	10.0
14.00	9	22.5
15.00	9	22.5
16.00	4	10.0
17.00	3	7.5
18.00	1	2.5
19.00	1	2.5
Total	**40**	**100.0**

It can be seen from Table 2 that the lowest score for the control group was 10 and the highest score was 19.

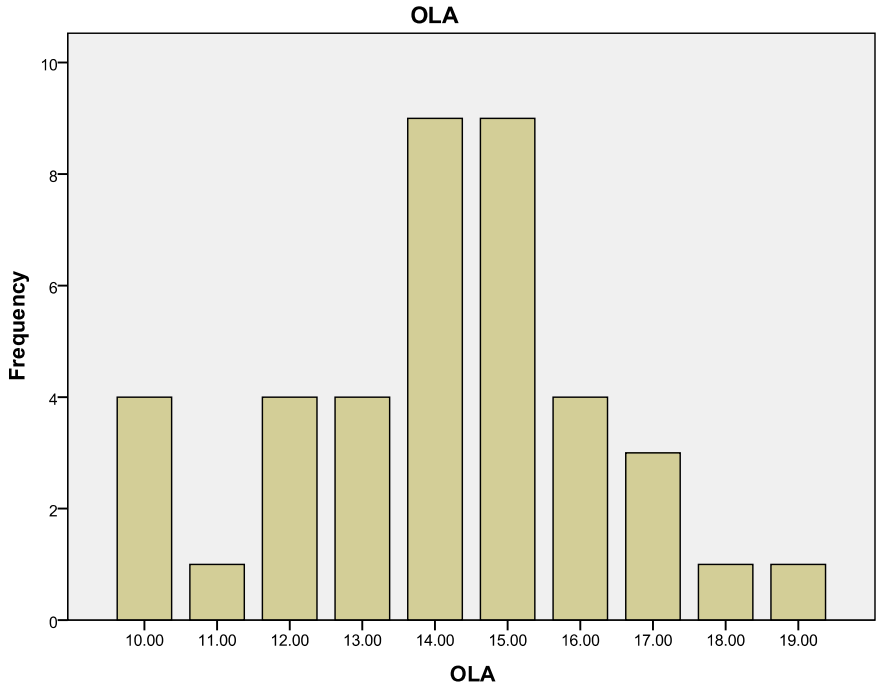

Figure 2: Bar chart showing the frequencies for OLA.

Again, by inspection, it can be seen that the distribution is fairly normal as explained below using the pre-test averages. Here to an important condition for the use of t-test is met.

Table 3 presents the mean scores and standard deviations of both ACHISCO and OLA. The mean scores and standard deviations were used to determine the group that would use the software or go through the traditional method of teaching. OLA students had a mean score of 14.1000 while ACHISCO had a mean score of 11.925. The standard deviations were similar; (ACHISCO - 2.39002, and OLA - 2.18151) suggesting that the variations in the scores within the groups were fairly similar. This meant that the mean score suggested OLA students did better in the Pre-test. Hence, OLA became the control group and ACHISCO the experimental group.

Table 3: Mean and standard deviation of Experimental and Control Groups.

Groups	Mean	N	Std. Deviation
Experimental	11.9250	40	2.39002
Control	14.1000	40	2.18151
Total	**13.0125**	**80**	**2.52328**

Tables 4 and 5 show the three averages – mean mode and median for ACHISCO and OLA respectively.

Table 4: Mean Median and Mode of ACHISCO (pre-test).

N	40
Mean	11.9250
Median	11.5000
Mode	11.00

Table 5: Mean Median and Mode of OLA (pre-test)

N	40
Mean	14.1000
Median	14.0000
Mode	14.00

The mean, Median, Mode, scores of ACHISCO were 11.9250, 11.5000 and 1 1.00 respectively whiles that of OLA were 14.1000, 14.0000, and 14.00.

For both groups, the three averages are nearly the same, suggesting that the scores were fairly normally distributed. As explained earlier, this permitted the use of the t-test for testing the hypothesis.

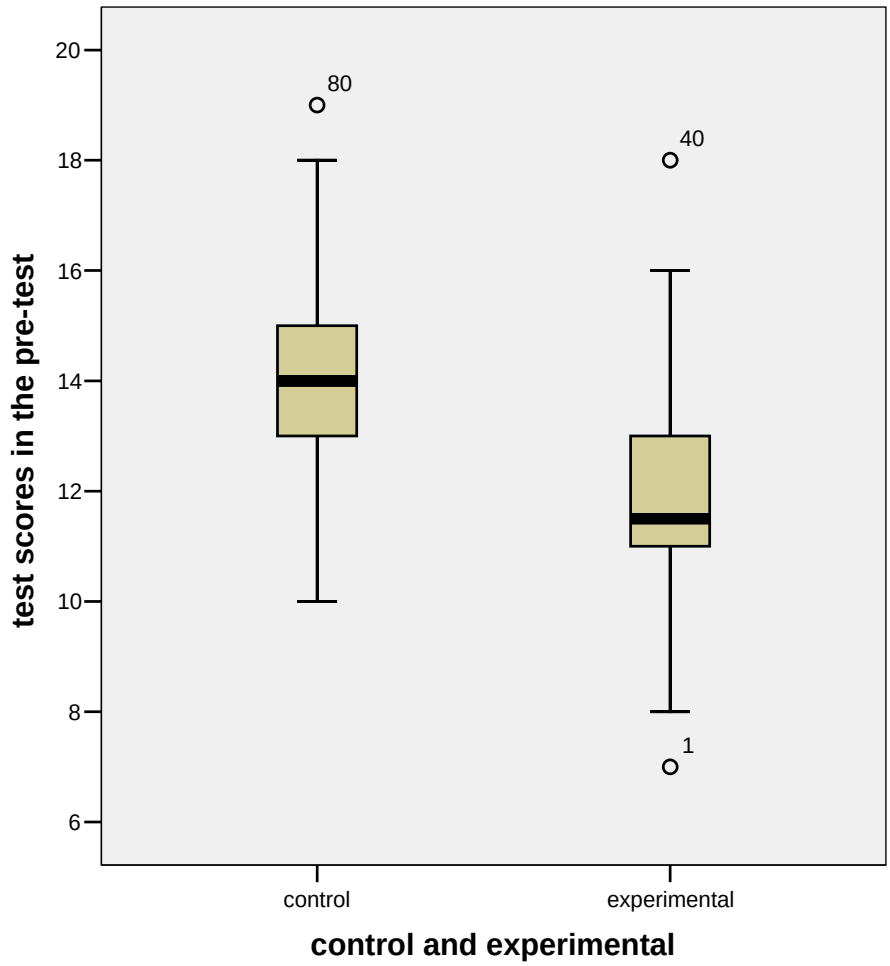

Figure 3: The box plot shows the pre-test scores for both groups.

That is the plots using the lower quartile the median and the upper quartile. So looking at the graphs the control group had a lower quartile value of about 13, a median of about 14 and upper quartile of about 15 indicating that the control group performed better in the pre-test than the experimental group which had a lower quartile of about 11, median of about11.5 and upper quartile of about 13.

Post-test scores and percentages obtained by the experimental group are given in Tables 6, 7 and figure 3 and 4 shows the groups' post test scores presented in a frequency distribution tables. Regarding Table 6, out of the 20 objective questions, the scores were as indicated in Tables 6, 7 being the lowest score and 18 as the highest.

Table 6: Post-test scores of Experimental group (ACHISCO).

Scores	Frequency	Percent
7.00	1	2.5
10.00	1	2.5
11.00	1	2.5
12.00	1	2.5
13.00	1	2.5
14.00	8	20.0
15.00	5	12.5
16.00	12	30.0
17.00	6	15.0
18.00	4	10.0
Total	**40**	**100.0**

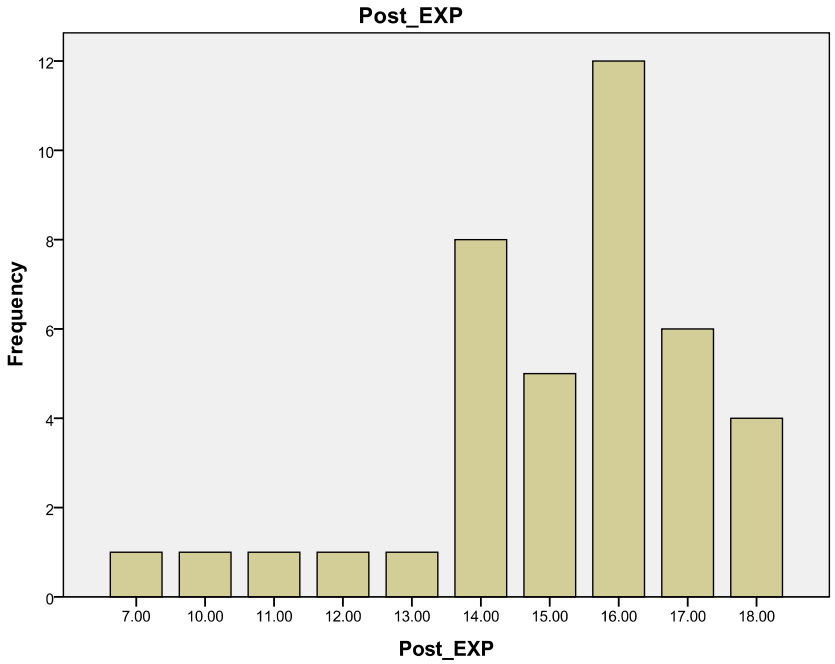

Figure 4: Bar chart showing the Post-test scores for the Experimental group.

The chart shows that the distribution of the post-test scores was negatively skewed with the mode being greater than the mean and the median, suggesting that the experimental group did well on the post-test. Even so, apart from the five low scores, the remaining scores (14-18) were fairly normally distributed.

Regarding Table 7, out of the 20 objective questions, the scores were as indicated in table7, 7 being the lowest score and 18 being the highest score.

Table 7: Post test scores for Control Group (OLA).

	Scores	Frequency	Percent
	9.00	1	2.5
	10.00	11	27.5
	11.00	6	15.0
	12.00	4	10.0
	13.00	4	10.0
	14.00	7	17.5
	15.00	5	12.5
	16.00	2	5.0
	Total	**40**	**100.0**

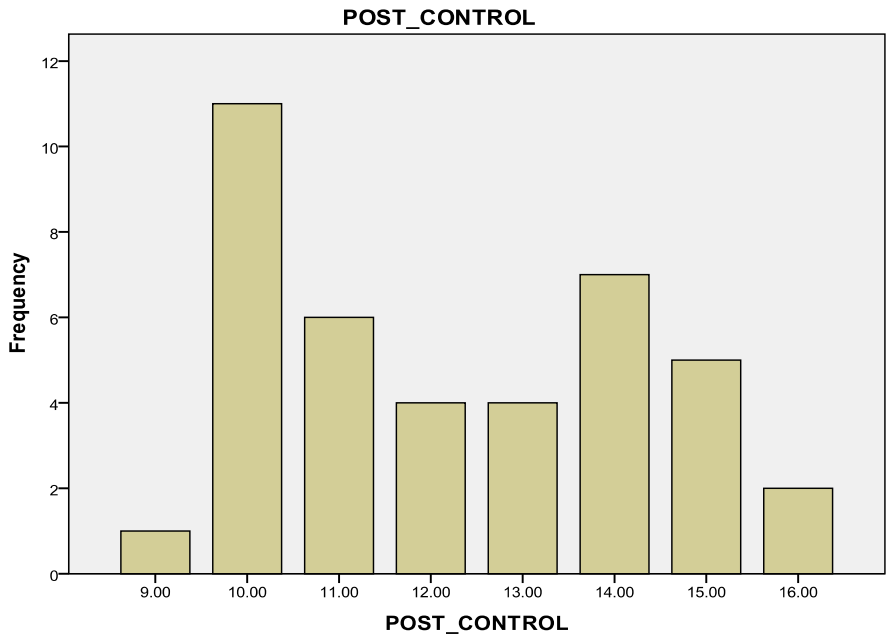

Figure 5: Bar chart showing the Post-test scores for the Control Group.

Here, the bar chart shows that the mode was greater than the mean. The near positive skew suggests that the control group did not do well on the post test although they outperformed the experimental group in the pre-test. Here too, scores from 11 to 16 were fairly normally distributed and will not significantly violate the use of the t-test for investigating the main hypothesis.

Table 8 shows the means, standard deviation and standard errors of the mean for both groups. The mean for the experimental group were 15.1500, standard deviation 2.24808 and standard error of mean 0.35545 respectively, whiles the control were; mean 12.2500, standard deviation 2.06000 and standard error of mean 0.32571 respectively.

The analysis of the means showed that on post-test scores, students in the Experimental group, using the software had a mean score of 15.1500, which was 2.9 higher than the mean score of 12.2500 for the students in the Control group, using only traditional methods of Instruction.

Table 8: **Mean Standard Deviation and Standard Errors of the Mean for both groups.**

	Mean	N	Std.Deviation	Std.Error of mean
Experimental	15.1500	40	2.24808	.35545
Control	12.2500	40	2.06000	32571
Total	**13.7000**	**80**	**2.59210**	**.28981**

Tables 9 and 10 show the three averages – mean mode and median for the Experimental and Control groups respectively.

Table 9: Mean, Median and Mode of Experimental Group (Post-test)

N	40
Mean	15.1500
Median	16.0000
Mode	16.00

Table 10: Mean Median and Mode of Control Group (Post-test).

N	40
Mean	12.2500
Median	12.0000
Mode	10.00

The mean, Median, Mode, scores of the Experimental group were 15.1500, 16.0000 and 16.00 respectively, whiles that of the control group were 12.2500, 12.0000, and 10.00.

For both groups, the three averages were not the same. This permitted the use of the t-test for testing the hypothesis.

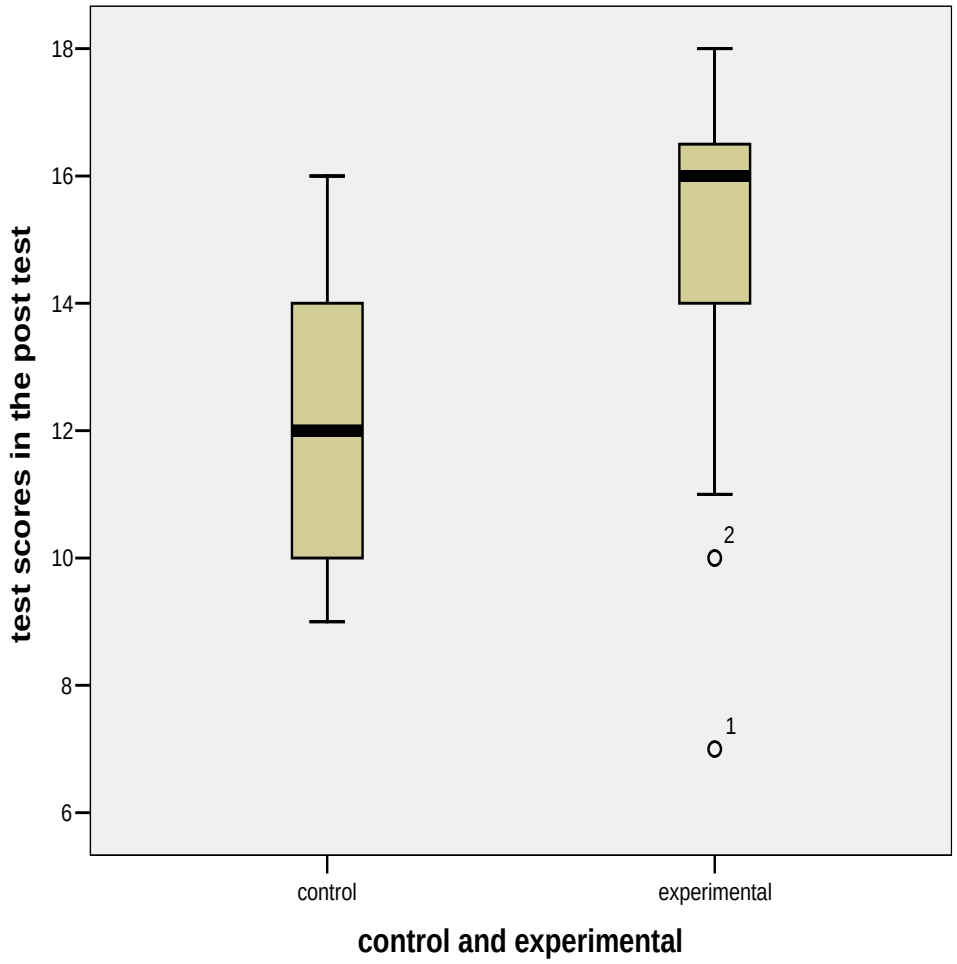

Figure 6: This box plots shows the post –test scores for both groups.

That is the plots using the lower quartile the median and the upper quartile. So looking at the graphs the experimental group had a lower quartile value of about 14, a median of about 16 and upper quartile of about 16.5 indicating that the experimental group performed better in the post-test than the control group which had a lower quartile of about 10, median of about12 and upper quartile of about 14.

Table 11: Leven's Test for Equality of Variance on the Scores of the Two Groups

	F- value	p-value
Equal variance assumed	0.460	0.500

Table 11 shows the relevant statistics needed to test the main hypothesis of the study.

Since the Levene's test for equal variance was not significant (F= 0.460 less than the table value of 1.69 and p =0.500, greater than alpha value of 0.05) it can be concluded that the variances for the two groups are the same and therefore the corresponding t-value was taken.

Table 12: Independent Samples t- test on Groups Mean Scores

Group	Mean	Mean difference	Std. deviation	t-value	p-value
Control	12.250	2.900	2.060	6.015	0.000
Experimental	15.00		2.248		

Table 12 also shows the results of the t-test of independence done to investigate the difference between the two means.

The results in table 12 show that the t-value calculated was 6.015 with a probability of a type 1 error being 0.000. The statistical results of table 12 suggested that the null hypothesis for this study be rejected. The conclusion was therefore that there was a significant difference in post-test mean scores in

favour of students in the Experimental group. This confirmed the results displayed in both the bar charts and the box plots.

Discussion

Analysis of the data revealed that Computer-Based instruction was significantly more effective than Traditional-Method of Instruction. Students in the Experimental Group using CBI did achieve significantly higher post-test scores than those in the Control Group who went through the traditional method of teaching. An important factor that contributed to the positive impact of the CBI is that, it provides a learning environment that promotes both independent and interdependent activities with cognitive as well as psychosocial support.

The researcher is of the view that the experimental group performed better in the post-test due to the fact that they were using a computer to study on their own, instead of an instructor. Students were also tested, after going through a topic, for quick feedback was provided. They were also provided with a general question that covered the whole study.

Another possible reason might be due to the students' motivation toward the subject matter to be learned.

Unlike the traditional method of instruction where student were taught for a period of 40 minutes, with the CBI students could go over and over again until they understood a topic before going to the next topic.

Many studies (e. g. Collins & Earle, 1990) have it that CBI provide a learning environment that promotes both independent and interdependent activities with cognitive as well as psychosocial support because students

generally have two basic intrinsic motivating drives of autonomy and affiliation, and that, the computer can retain responses to stimuli in its memory bank, making it possible to reconstruct the actual learning sequence of any given student.

CBI is new in our educational system, and for that matter students were happy when they were asked to use the computer to study. For example, the CBI had both pictures and live movies to facilitate the teaching of certain topics. Such facilities are not available in the traditional method of instruction. Answers were also provided at the end of the study for students to check and make correction.

Another important factor that contributed to the positive impact of CBI is positive attitude towards computers. Indeed, in a study conducted by LaLomia and Sidowski (1991), they found that Computer Attitude Scores indicating positive computer attitudes correlated with high computer science grades among college students.

In his assertion, Lewis (1990) confirmed that CBI design is defined as the programming of content and lesson design that considers the individual differences of the learner to achieve the learning goal level delivered by computer. Critical for promoting achievement in CBI are features that provide opportunities for problem solving, corrective feedback, elaboration, visual and graphic cues, control of the routine by the learner, and appropriate wait time between input and response.

His assertion goes to buttress Fletcher's (1990) conclusion that people remember 20% of what they hear, 40% of what they see and hear and 75% of

what they see, hear and do. Also, Burge (1994), Field (1997), Cahoon (1998) and Eastmond, (1998), in their study also stated that CBI can enhance students learning because it has the potential to increase flexibility, provide access to expertise, and facilitate discussion among learners who cannot meet face to face, reduce feelings of isolation often experienced by non-traditional learners, increase learner autonomy; support and promote constructivist and collaborative learning.

Another advantage of CBI over traditional instruction, which may have accounted for the exceptional performance of the experimental group, is in the area of instructional logics with its variety and flexibilities. The computer has the capability of handling programs for drill and practices, tutor and test, simulation, problem solving, games or learner control. Furthermore, an advantage of CBI over traditional instruction is the ease with which it can be changed. Thus as noted the computer program is easy to modify because CBI instructions are stored in the computer rather than prompted in hard copy. Questions and answers may be quickly added, changed, or deleted by typing a single command at a computer and it is terminated.

In conclusion, the result of the present study indicates that students who used CBI performed better than those who were taught by the traditional method of instruction. However, it must be noted that CBI design is complementary to the work of the teacher. It does not displace him. Alessi and Trolli (2001) assessing the impact of modern technologies in teaching, observed that modern technologies have opened vast new possibilities both to the teacher and to his students. This study has confirmed this observation.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Summary

This chapter summarizes the research questions findings, provides a conclusion for the study, and suggests recommendations for future research.

This dissertation was designed to determine the effect of Computer-Based Instruction on students learning of Law of Contract as compared to traditional method of Instruction. The study sought to determine if there were significant differences in post-test achievement scores between students who used software and students who went through the traditional method of instruction. The theory was developed to provide a framework for research to explain or predict effective learning by students using CBI. A quasi-experimental design was used in a field setting, by including intact classes that offered Business Management. Two schools were selected by the purposive sampling method. The schools involved were Acherensua Senior High School (ACHISCO) and OLA Girls Senior High School (OLA), both in the Asutifi District of Brong Ahafo Region.

Data collection was in two stages. In the first stage, a pre-test was used to show a starting point as to where each of the students were in terms of their knowledge, and to determine which school /class to be used as the control group or experimental group. They were then tutored on the selected topic

(Law of contract), using the software and the traditional method of instruction. Using average post-test scores as the dependent variable, the independent variable was instructional method. Analysis of the differences in post-test scores between the two instructional method groups yielded a t value of 6.015. This was found to be significant at the .05 level of significance; therefore, it was concluded that the CBI was more effective than the traditional method of instruction. It was evident, therefore, that students in the experimental group did have higher average post-test scores than students in the control group. It was concluded, therefore, that CBI was more effective than the traditional-method of instruction.

Conclusions

Based on the findings of this study, the following conclusions were reached:

1. That there was a significant difference in post-test mean scores in favour of students in the Experimental group.
2. That on the effect of the use of different teaching strategies on students with the same entry behavior, the results showed that for the low entry group, the use of the software approach enhanced the achievement of students to a much greater extent than it did with the use of traditional method of instruction.
3. That by giving students some control of their learning, they will develop additional skills and have positive experiences that will improve their level of self-directedness and computer self-efficacy. When students can find the support they need, their computer self-efficacy level will improve.

4. That Students possess different levels of self-directedness and these differences should be taken into consideration when designing CBI.
5. That the student plays an important role in the designing of CBI. Clearly, there are unique characteristics of learners that may significantly impact the design of CBI. The characteristics of self-directedness were found to be important when using CBI.

Recommendations

Based on the findings of the study, the following recommendations are made:

1. There is a need to introduce CBI in the teaching of Business Management throughout the country and that this should be used for other subjects as well.

2. Business Management tutors should be trained in the development of CBI materials so that they can adapt existing materials to teach Business Management

3. Students should be given more time to play with CBI games as they learn better when they are motivated and are under no pressure to impress anyone.

4. This study should be replicated, including a random sample of a larger number of students so that the results can be generalized for students throughout the country, and not just for those in Asutifi District.

5. Replication of the study should utilize software other than the chosen for this study to determine if similar results are obtained.

REFERENCES

Alessi S.M. & Trollip, S.R.(2001). *Multimedia for Learning.* Methods and Development, 3rd edition. Boston: Allyn and Bacon

Association for Educational Communications and Technology, (1977). *Educat ion technology Definition and glossary of terms* (Vol. 1). Washington: C. Association for Educational Communications and Technology.

Aspillaga, M. (1991). Screen design: Location of information and its effects onlearning. *Journal of Computer-Based Instruction,* 18(3), 89-92.

Bednar, A. K., Cunningham, D., Duffy, R. M., & Perry, J. D. (1995).*Theory into practice: How do we link?* In G. J. Anglin (Ed.), Instructional technology: Past, present, and future (2nd ed., pp. 100-112). Englewood, CO: Libraries Unlimited, Inc.

Bitzer, D.L., (1965) "The PLATO teaching system," *Automated Education Letters*, 1(2). 13-15

Bosco, J., & Morrison, J. E. (2000). *Contexts for training*. In S. Tobias, & J. D.Fletcher (Eds.), Training & retraining: A handbook for business, industry, government, and the military (pp.25-50). New York: Macmillan Reference.

Brown, J. S., Collins, A., & Duguid, P. (1989a). Situated cognition and the culture of learning. *Educational Researcher*, 18, 32-42.

Brown, J. S., Collins, A., & Duguid, P. (1989b). Debating the situation: A rejoinder to Palincsar and Winegurg. *Educational Research*, 18, 10-12, 62.

Bruner, J. S. (1961*).* The act of discovery. *Harvard Educational Review*, 31(1). 21-32.

Bruner, J. S. (1985). Models of the learner. *Educational Researcher,14*(6), 5-8.

Bruner, J. S. (1986). *Actual minds, possible worlds*. Cambridge, MA: Harvard University Press.

Burge, E. (1994). *Electronic highway or weaving loom? Thinking about Conferencing technologies for learning.* (ERIC Document Reproduction Service No. ED 377 8

Burgess, L. A. (2003,). WebCT as an E-Learning tool: Study technology students' perceptions. *Journal of Technology Education, 15*(1), 6-15.

Butzin, S. M. (2001). Using instructional technology in transformed learning environments: An evaluation of Project CHILD. *Journal of Research on Computing in Education, 33*, 367-373.

Cahoon, B. (1998). *Teaching and learning internet skills*. In B. Cahoon (Ed.), Adult learning and the Internet: No. 78. New directions for adult and continuing education (pp.5)

Caldwell, R.M. (1980). *A comparison of using computer-based education to teach literacy and numberacy skills to CETA and Non-CETA "Parti CI pants EnroTleT'in Programs of AduTt BalTc Education*^ Boston, MA:

Paper presented at the American Educational Research Association meeting. Eric Document Reproduction Service No. ED 194 721

Campbell, D.T., & Stanley. C. (1966). experimental and Quasi-Experimental Design for research. Chicago: Rand McNally,

Christmann, E. P., Lucking, R. A., & Badgett, J. L. (1997). *The effectiveness of compute based instruction on the academic achievement of seconda ry students: A meta analytic comparison on between urban, suburband rural educational settings*. Computer in the Schools, 13(3/4), 31-40.

Clariana, R. B. (1993). A review of multiple-try feedback in traditional and Computer-based instruction. *Journal of Computer-Based Instruction, 20*(3), 67-74. Sentences in a prose passage. *Journal of Educational Psychology*, 68, 702-710.

Clark, R. E. (1983). Reconsidering research on learning from media. *Review of Educational Research,* 53(4), 445-459.

Clark, R. E. (1985). Confounding in educational computing research. *Journal of Educational Computing Research, 1(2), 137-148*.

Clarke, D. (1999). Getting results with distance education. The American *Journal of Distance Education, 12*(1), 38-51.

Clifford, M. M., & Walster, E. (1973). The effect of physical attractiveness on teacher expectations. Sociology of Education, , 46, 248-258.

Collins, M.A.J. (1990). Some observations on student use of a microcomputer centre. *Collegiate Microcomputer,*8(4):313-318.

Collins, M.A.J. & P.Earle. (1990). A comparison of the effects of computer-

administered testing, computer-based learning and lecture approaches on learning in an introductory biology course. *Journal of Computers in Mathematics and Science Teaching*,*9*(2): 77-84.

Crowder, N. A. (1962). *intrinsic and extrinsic programming*. In J. E. Coulson (Ed.), Proceedings of the Conference on Application of Digital Computers to Automated Instruction (p.58-66). New York: John Wiley and Sons, Inc.

Darlington, R. B. (1990), *Regression and linear models*. New York: McGraw-Hill. Eastmond, D. (1998). *Adult learners and internet-based distance education*. In B.Cahoon (Ed.), Adult learning and the Internet (pp. 33-41). San Francisco: Jossey-Bass.

Eastmond, D. (1998). Adult learners and Internet-based distance education. In B.Cahoon (Ed.), *Adult learning and the Internet* (pp. 33-41). San Francisco: Jossey-Bass.

Field, J. (1997). Passive or proactive*? Adults learning*, 8(6), 160-161.

Fitts, P. M., & Posner, M. J. (1967). *Human performance*. Monterey, CA: Brooks/Cole.

Fletcher, J. D. (2001, August). *Technology, the Columbus Effect, and the Third Revolution in learning*. Institute for Defense Analysis.

Fletcher J. D. (1990). *Effectiveness and cost of interactive videodisc instruction in defense training and education.* Institute for Defense Analyses Paper, P-2372.

Foss, D. G., & Harwood, D. A.(1975).Memory for sentences: Implications for human associative memory. *Journal of Verbal Learning and Verbal Behavior*, 14, 1-16.Friend CL, & Cole CL.

(1990). *Learner control in computer-based instruction*: A current literature review. Educational Technology, 20, 47–49.

Gibbons, A. S., & Fairweather, P. G. (2000). *Computer-based instruction*. In S. Tobias & J. D. Fletcher (Eds.), Training & retraining: A handbook for business, industry, government, and the military (pp. 410-442). New York: Macmillan Reference USA.

Gillingham, M. G. (1988). Text in computer-based instruction*:* What the research says. *Journal of Computer-Based Instruction, 15*(1), 1-6.

Gray, S. H. (1989). The effect of locus of control and sequence control on computerized information retrieval and retention. *Journal of Educational Computing Research, 5(4), 459-471*.

Grippin, P., & Peters, S. (1983). *Learning theory and learning outcomes*: The connection. Lanham, MD: University Press of America, Inc.

Hannafin, M. J., Hannafin, K. M., Hooper, S. R., Rieber, L. P., & Kini, A. S. (1996). *Research on and research with emerging technologies*. In D. H. Jonassen (Ed.), Handbook of research for educational communications and technology (pp. 378-402). New York: Simon & Schuster Macmillan.

Hannafin, R. D., & Sullivan, H. J. (1995). *Learner control in full and lean CAI programs*. Educational Technology Research and Development, 43(1), 19-30.

Hansen, J. B. Ross,S.M & Morrison, G. R. (1989). *Uses and effects of learner control ofcontext and instructional support in computer-based instruction*. Educational Technology Research and Development, 37(4), 29-39.

Hooper, S. & Rieber, L. P. (1995). *Teaching with technology*. In A. Ornstein (Ed.), Theory and practice of teaching (pp. 154-170). New York: Allyn & Bacon.

Jawahar, I. M. (2002). The influence of dispositional factors and situational constraints on 198 end user performance: A replication and extension. *Journal of End User Computing, 14*(4), 17-37

Johnson, S. D., & Aragon, S. R. (2002). *An instructional strategy framework for online learning environments.* In T. M Egan & S. A. Lynham (Eds.), Proceedings of the Academy of Human Resource Development Annual Conference (41-1). Bowling Green, OH: Academy of Human Resource Development.

Kearsley, G. P., & Hillelsohn, M. J. (1982). Human factors considerations for computer based training. *Journal of Computer-Based Instruction, 8*(4), 74-84.

Kellar, J. M., & Suzuki, K. (1988). *Use of the ARCS motivation model incourseware design.* In D. Jonassen (Ed.), Instructional designs for microcomputer courseware (pp. 401-434). Hillsdale, NJ: Erlbaum.

Kemper, D., & Murphy, D. (1990). *Alternative new directions for instructional design.* Educational Technology, 30(4), 42-47.

Kinzie, M. B. (1990). *Requirements and benefits of effective interactive instruction: learner control, self-regulation, and continuing motivation*. Educational Technology Research and Development, 38(1), 5-21

Kinzie, M. B., Sullivan, H. J., & Berdel, R. L. (1988). Learner control andachievement in Science computer-assisted instruction. *Journal of Educational Psychology, 80*(3), 299-303.201.

Kulhavy, R. W., & Stock, W. A. (1989). *Control of feedback in computer-assisted instruction*. Educational Technology Research and Development, 39(4), 27-32.

Kulik, J. A., Kulik, C-L. C., & Cohen, P. A. (1980). *Effectiveness of computer-based college teaching: A meta-analysis of findings*. Review of Educational Research, 50(4), 525-544.

Kulik, C-L. C., Kulik, J. A., & Shwalb, B. J. (1986). The effectiveness of computer-based adult education: A meta-analysis. *Journal of Educational Computing Research, 2*(2), 235-252.

Kulik, C-L., & Kulik, J. A. (1991). *Effectiveness of computer-basedinstruction:* An updated analysis. Computers and Human Behavior, 7, 75-94.

Lewin, K. (1951). *Field theory in social science:* Selected theoretical papers. New York: Harper & Row, Publishers, Incorporated.

LaLomia, M. J., & Sidowski, J. B. (1991). Measurements of computer attitude : A review. *International Journal of Human-Computer Interaction, 3*(2), 171-197.

Liao, Y-K. C. (1998). Effects of hypermedia versus traditional instruction on students' achievement: A meta-analysis. *Journal of Research on Computing in Education, 30*(4), 341-359

Lowe, J. S. (2002). Computer based education: Is it a panacea*? Journal of Re search on Technology in Education, 34*(2), 163-171.

Lewis, L. H. (1990). *Computer-enriched instruction*. In M. W. Galbraith (Ed.), Adult learning methods: A guide for effective instruction (pp. 303-328). Malabar, FL: Robert E. Krieger Publishing Company.

Malone, T. W., & Lepper, M. R. (1987). *Making learning fun: taxonomy of intrinsic motivations for learning.* In R. E. Snow & M. J. Farr (Eds.), *Aptitude, learning, and instruction: cognitive and affective process analyses:* Vol. 4. (pp. 223-253). Hillsdale, NJ: Erlbaum.

Marcoulides, G. A. (1990). Improving learner performance with computer based programs. *Journal of Educational Computing Research, 6*(2), 147-155. 205

Mathieu, J. E., & Martineau, J. W. (1998). *Individual and situation influences on training motivation*. In J. K. Ford, S. W. J. Kozlowski, K. Kraiger, E. Salas, & M. S. Teachout (Eds.), Improving training effectiveness in organization (pp. 193-221). Mahwah, NJ: Lawrence Erlbaum Associates.

Merriam, S. B., & Caffarella, R. S. (1999). *Learning in adulthood: A comprehensive Guide* (2nd ed.). San Francisco: Jossey-Bass Publishers.

Merrill, M. D. (1980). *Learner control in computer based learning*. Computers and Education, 4, 77-95

Meyer, B. J. F. (1977). *The structure of prose: Effects on learning and memory and Implications for educational practice*. In R. C. Anderson, R. J. Spiro, & W.E.Montague (Eds.), Schooling and the acquisition of knowledge (pp. 179-200). Hillsdale, NJ Lawrence Erlbaum Associates.

Meyer, B. J. F. (1985).*Signalling the structure of text*. In D. H. Jonassen (Ed.), The technology of text: *Principles for structuring, designing, and displaying text* (Vol. 2, pp. 64-89).Englewood Cliffs, NJ: Educational Technology Publications.

Moore, P., & Fitz, C. (1993). Gestalt theory and instructional design. *Journal of Technical Writing and Communication, 23*(2), 137-157.

Olson, T. M. & Wisher, R. A. (2002, October). *The Effectiveness of web-based instruction: An initial inquiry*. International Review of Research in Open and Distance Learning.http://www.irrodl.org/content/v3.2/olsen.html>

Ormrod, J. E. (2nd Ed.) (1995). *Human learning*. Englewood Cliffs, NJ: Prentice Hall, Inc.

Papert, S. (1980). *Mindstorms: Children, computers and powerful ideas*. New York: Basic Books.

Papert, S. (1981). *Computer-based micro worlds as incubators for powerful ideas*. In R.Taylor (Ed.), the computer in the school: Tutor, tool, tutee (pp. 203-210). New York: Teacher's College Press.

Peters, L. H., O'Connor, E. J., & Eulberg, J. R. (1985). *Situational constraints*: Sources, 210 consequences and future considerations. In K. M. Rowland & G. R. Ferris (Eds.), Research in personnel and human resources management (Vol. 3, pp. 79-114). Greenwich, CT: JAI Press.

Peters, L. H., & O'Connor, E. J. (1980). *Situational constraints and work outcomes: The Influences of a frequently overlooked construct*. Academy of Management Review, 5, 391-397.

Piaget, J. (1972). *Intellectual evaluation from adolescent to adulthood*. Human Development, 16, 346-370.

Prawat, R. S., & Floden, R. E. (1994). *Philosophical perspectives on constructivist views of learning.* Educational Psychologist, 29(1), 37-48.

Pridemore, D. R., & Klein, J. D. (1991). *Control of feedback in computer-Assisted instruction.* Educational Technology Research and Development, 39(4), 27-32

Reder, L. M., Charney, D. H., & Morgan, K. I. (1986). *The role of elaborations in learning a skill from an instructional tex*t. Memory and Cognition, 14, 64-78.

Resnick, L. B. (1987*). Learning in school and out. Educational Researcher*, 18, 13-20.

Roblyer, M. D. (1988). *The effectiveness of microcomputers in education: review of the research from 1980–1987.* Technological Horizons in Education, 16(2), 85–89.

Ross, S. M., Morrison, G. R., & O'Dell, J. K. (1988). Obtaining more out ofless text in CBI: Effects of varied text density levels as a function of learner characteristics and control strategy. *Educational Communication and Technology Journal*, *36*(3), 131-142.

Sales, G. C., & Williams, M. D. (1988). The effect of adaptive control of feedback in computer-based instruction. *Journal of Research on Computing in Education, 20,* 97-111.

Salisbury, D. F. (1988). *Effective drill and practice strategies.* In D. H. Jonassen (Ed.), Instructional designs for microcomputer courseware (pp. 103-124). Hillsdale, NJ: Lawrence Erlbaum Associates.

Salomon, G., Perkins, D. N., & Globerson, T. (1991). *Partners in cognition: Extending human intelligence with intelligent technologies.* Educational Research, 20(3), 2-9.

Seymour, S. L., Sullivan, H. J., Story, N. O., & Mosley, M. L. (1987).Microcomputers and continuing motivation. *Educational Communications and Technology Journal, 35*(1), 18-23. 216

Shashaani, L. (1994). The effectiveness of computer applications: A met Analysis. *Journal of Research on Computing in Education, 27*(1), 48-61.

Shaw, D. S. (1992*). Computer-aided instruction for adult professionals:* A research report. Journal of Computer-Based Instruction, 19(2), 54-57.

Shlechter, T. M. (1991). *Promises, promises, promises: History and foundations of computer-based training*. In T. M. Shlechter (Ed.), Problems and Promises of Computer-Based Training (pp.1-20). Norwood, New Jersey: Ablex Publishing Corporation.

Stephenson, S. D. (1991). *The effect of instructor-student interaction on achievement in computer-based training (CBT)* (AL-TP-1991-0002, pp 1-7). Brooks Air Force Base, TX: Human Resources Directorate, Technical Training Research Division.

Schnackenberg, H. L., Sullivan, H. J., Leader, L. F., & Jones, E. E. K. (1998) *Learner preferences and achievement under differing amounts of Learner practice*. Educational Technology Research and Development, 46(2), 5-15.

Schwartz, G., Yerushalmy, M., & Wilson, B. (Eds.). (1993). *The geometric supposer: What is it a case of?* Hillsdale, NJ: Erlbaum.

Smith, R. L., & Ragan, T. J. (1993). *Instructional design*. Upper Saddle River, NJ: Prentice-Hall, Inc. Schooling and the acquisition of knowledge (pp. 179-200). Hillsdale, NJ: Lawrence Erlbaum Associates.

Steinberg, E. R. (1991). *Computer-assisted instruction: A synthesis of theory, practice, and technology*. Hillsdale, NJ: Lawrence Erlbaum Associates, Inc., Publishers.

Steinberg, E. R., Baskin, A. B., & Hofer, E. (1986). Organizational/memory tools: A technique for improving problem solving skills. *Journal of Educational Computing Research, 2*(2), 169-187.

Thompson, A. D., Simonson, M. R., & Hargrave, C. P. (1993). *Educational technology: A review of the research.* Washington, D. C.: Association for Educational Communications and Technology.

Tough, A. M. (1979). *Learning with a teacher*. Toronto: Ontario Institute for Studies in Education.

Tobias, S. (1982). *When do instructional methods make a difference?* Educational Researcher, 11, 4-9

Tessmer, M., & Wedman, J. F. (1990). Layers-of necessity instructional

development model. *Educational Technology Research and Development 38* (2), 77-85

Mathieu, J. E., Martineau, J. W., & Tannenbaum, S. I. (1993). *Educational technology: A review of the research.* Washington, D. C.: Association for Educational Communications and Technology.

Trollip, S. R. (1979). *The evaluation of complex computer-based flight procedures trainer.* Human Factors, 21(1), 47-54.

Wadsworth, S.G., and Frazier, W.D. (1982). *PLATO Use in Oklahoma Skill Centers*. Final Report. Stillwater, OK: State Department of Vocational and Technical Education. ERIC Document Reproduction Service No. ED 216 150.

Waxman, H.C., Connell, M. & Gray, J. (2002). *A quantitative synthesis of recent research on the effects of teaching and learning with technology on student out comes.* North Central Regional Education Laboratory. Available: http://www.ncrel.org/tech/effects

Weiss, D (1985). The FAST Process. Computing in High Energy Physics. Rio De Janeiro: IEEE (Gourgey, Azumi, Madhere, & Walker, 1984).

Wells, R., & Hagman, J. D. ((1989). *Training procedures for enhancing reserve component learning, retention, and transfer*. (Technical Report 860) Alexandria, Virginia: U. S. Army Research Institute for the Behavioral and Social Sciences.

Welsh LT, Wanberg CR, Brown KG, & Simmering MJ. (2003). E-learning: Emerging uses, best practices, and future directions. *International Journal of Training and Development,7*, 245–258.

Wetzel, C. D. (1993). *Generative aspects of the computer- based educational*

software system (CBESS). Instructional Science, 21, 269-293.

Wittrock, M. C. (1974) *Learning as a generative process*. Educational Psychologist, 11,87-95.

Wittrock, M. C. (1978). *The cognitive movement in instruction*. Educational Psychologist, 13, 15-29.

APPENDICES

APPENDIX A

Pre-test (Multiple Choice items)

NAME OF SCHOOL .....**TIME: 30 Minutes**

Answer all questions. Options are provided (a - d), circle the right option.

1. While managers may not directly be involved on production, they
    a. are directly involved in the distribution of the products
    b. are the sole contributors of capital for production
    c. directly service the machines that are used for production
    d. direct the effort of others toward achieving organizational objectives

2. Communication that invites customers to make an offer is known as
    a. advertisement
    b. an invitation to treat
    c. contract
    d. declaration

3. One advantage of a sole proprietorship is
    a. access to the stock exchange
    b. closer contact with customers
    c. joint decision making
    d. sharing of risk

4. A partnership may be dissolved
    a. upon the retirement of a partner
    b. when a partner commits a crime
    c. when losses are made in a particular year
    d. when partners have no more personal funds

5. An individual who has not reached the age of entering into a contract is known in business as a/an
    a. adult
    b. child
    c. minor
    d. teenager

6. Which of the following is not a **mistake** in business management?
    a. Bilateral mistake
    b. Common mistake
    c. Mutual mistake
    d. Unilateral mistake

7. If a party fail to perform all or one of his obligations under a contract, he is said to have
    a. breached the contract
    b. damaged the contract
    c. frustrated the contract
    d. refused the contract

8. Long-term sources of finance include shares, 10-year bank loans and
    a. trade credit
    b. overdraft
    c. debentures
    d. personal savings

9. All management activities starts with
    a. planning
    b. direction
    c. organizing
    d. controlling

10. The profit of business is subject to
    a. custom duties
    b. excise duties
    c. income tax
    d. value added tax

11. Short –term capital may be obtained by a company through
    a. hire purchase
    b. mortgage
    c. overdraft
    d. shares

12. Which of the following is an organizational function of management?
    a. Analysing the reasons
    b. Determining the span of control
    c. Formulation objectives for deviations
    d. Providing motivation of employees

13. A barrier to effective management can be created when
    a. are official channels used
    b. gestures are used as illustration
    c. jargons and terminologies are used
    d. the language is too fluent

14. The money contributed by owners to run a business is referred to as
    a. capital
    b. debenture
    c. loan
    d. mortgage

15. In a partnership firm, the death of one of the partners may lead to its
    a. dissolution
    b. formation
    c. incorporation
    b. resolution

16. Anything generally accepted as a means of exchange is called
    a. barter
    b. fixed deposit
    c. money
    d. promissory notes

17. By which of the following forms of communication will policies be made known to the workers of an organization?
    a. Diagonal
    b. Downward
    c. Horizontal
    d. Upward

18. Which of the following best describes a debenture holder?
    a. Creditor
    b. Currency
    c. Debtor
    d. Hirer

19. Which officer of an organization is responsible for training of staff?
    a. Financial Controller
    b. General Supervisor
    c. Managing Director
    d. Personnel Manager

20. The three major types of tax bases are:
    a. income ability to pay, consumption
    b. income, consumption, wealth
    c. income, lifestyle, wealth
    d. income, prestige, lifestyle

APPENDIX B

POST TEST QUESTIONS

NAME OF SCHOOL .....**TIME: 30 Minutes**

Answer all questions. Options are provided (a - d), circle the right option.

1. Which of the following is an essential part of a valid contract?
   A. A third party
   B. Acceptance only
   C. Counter offer
   D. Intention to create legal relations

2. A display of goods for sale with or without price tags is an example of
   A. a contract yet to be executed
   B. an offer to the world at large
   C. an offer which may be accepted
   D. invitation to treat

3. An offer can be accepted
   A. by anybody
   B. by making another offer
   C. when one knows of its existence
   D. whether one knows of its existence or not

4. If "A" makes an offer to "B" about a car and "B" accepts thinking that "A" is referring to a horse
   A. the contract is void because there is cross offer
   B. there is no consideration
   C. there is no consensus ad idem
   D. contractual capacity is lacking

5. When an offeree changes any of the terms of the offerors offer
   A. he has made a counter offer
   B. he has made an unconditional acceptance
   C. mutual assent has taken place
   D. the first offer still holds

6. In law, an offer can be revoked
   A. after it has been accepted
   B. anytime it is accepted
   C. before it is accepted
   D. when no one accepts it

7. A contract which has not yet been fully performed by the parties is called
    A. an executory contract
    B. executed contract
    C. illegal contract
    D. unenforceable contract

8. Agreement takes place when
    A. a party makes a presentation and the other agrees
    B. a party makes an advert and the other accepts
    C. a party makes an offer and the other avoids
    D. a party makes an offer and the other indicate acceptance

9. One important rule in the law of contract is that
    A. acceptance must be communicated
    B. an offer must move from the promisee
    C. all arrangements must be sealed
    D. principals should always ratify agents acts

10. When an offer is accepted the parties are said to have
    A. capacity to enter into a valid contract
    B. entered into an agreement
    C. supplied the necessary consideration
    D. the willingness to have legally intended

Use the information below to answer Questions 11, 12, and 13.

A Golf car and a Tico car were put on sale at a public auction. When the auctioneer invited bids for the Tico car, Frank bid the highest price because he thought the bids were for the Golf car. When the Tico car was offered to Frank he refused acceptance.

11. By bidding, Frank made a/an
    A. acceptance
    B. invitation to treat
    C. offer
    D. partial acceptance

12. By offering the Tico car to Frank, the auctioneer was making
    A. a public offer
    B. an invitation to treat
    C. an acceptance
    D. a partial acceptance

13. Which of the following elements of a valid contract was breached in the above scenario?
    A. Capacity
    B. Consensus
    C. Consideration

D. Legality

14. When the parties to a contract fail to achieve mutual consensus the contract is rendered
    A. voidable
    B. void
    C. valid
    D. enforceable

15. If Ghana pays GH¢6000.00 to America for supplying her with Polio drugs, it is known as a/an
    A. contract of record
    B. executed contract
    C. executory contract
    D. simply contract

16. The following are elements of a valid contract except
    A. an offer may be Specific or General
    B. formality of contract
    C. legality of object of contract
    D. there must be consideration

17. Where a party to a contract is ordered by the court to perform his obligation it is referred to as
    A. a contract of Deed
    B. a simple contract
    C. contract of record
    D. specialty contract

18. The following are forms of contracts except
    A. bilateral contract
    B. offer contract
    C. unilateral contact
    D. voidable contract

19. If Ghana offers to send some soldiers to help in peace keeping in Burkina Faso, for which Burkina Faso will not pay anything in return, it is referred in law as
    A. Bilateral contract
    B. Unenforceable contract
    C. Unilateral contract
    D. Voidable contract.

20. Contracts that binds the minor until his majority are
    A. Contract for loan
    B. Contract for necessaries
    C. Contract to marry
    D. Contract to travel

SCORING KEY FOR PRE-TEST QUESTIONS.

Each question carries two marks.

Appendix A;

1. **d**
2. **b**
3. **b**
4. **a**
5. **c**
6. **a**
7. **a**
8. **a**
9. **a**
10. **d**
11. **c**
12. **d**
13. **c**
14. **a**
15. **a**
16. **c**
17. **b**
18. **b**
19. **d**
20. **b**

SCORING KEY FOR POST-TEST QUESTIONS.

Each question carries two marks.

Appendix B;

1. **C**
2. **D**
3. **C**
4. **C**
5. **A**
6. **A**
7. **A**
8. **D**
9. **A**
10. **B**
11. **A**
12. **B**
13. **B**
14. **B**
15. **B**
16. **A**
17. **C**
18. **B**
19. **C**
20. **B**