Factors affecting the implementation of computer technology in the Imo states high school instructional program

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FACTORS AFFECTING THE IMPLEMENTATION OF COMPUTER TECHNOLOGY IN THE IMO STATE’S HIGH SCHOOL INSTRUCTIONAL PROGRAM

A DISSERTATION
SUBMITTED TO THE FACULTY OF CLARK ATLANTA UNIVERSITY IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF DOCTOR IN EDUCATION

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DEPARTMENT OF EDUCATIONAL LEADERSHIP

ATLANTA, GEORGIA
NOVEMBER, 1998
ABSTRACT

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FACTORS AFFECTING THE IMPLEMENTATION OF COMPUTER TECHNOLOGY IN IMO STATE'S HIGH SCHOOLS INSTRUCTIONAL PROGRAM

Advisor: Dr. Claudette Williams

Dissertation date: December 1998

This study was designed to examine the factors that affect the implementation of computer technology in Imo State, Nigeria, secondary schools' instructional programs. The intent of the study was to determine the relationship between funding, availability of relevant infrastructures, trained personnel, job security, government support and market demand for computer trained personnel and the implementation of computer technology in Imo State school instructional program.

A total of three hundred and twelve (312) educators comprising of two hundred and fifty-five (255) teachers, twenty (20) school principals and thirty-seven (37) administrators were randomly selected to respond to questionnaire items about their perceptions of the factors affecting the implementation of computer technology in instructional programs in secondary schools. Twelve research hypotheses were developed to determine the relationships between the factors affecting the implementation of computer technology in the secondary schools' instructional programs.
Pearson product moment linear correlation coefficient was used to analyze the data about the relationship between the factors affecting the implementation of computer technology in instructional programs. Also, a one-way analysis of variance (ANOVA) was used to analyze data on the differences in perceptions of the respondents to the questionnaire.

The findings showed that school-teachers believed that there were significant relationships between availability of funding, relevant infrastructure, and job security and the implementation of computer technology in secondary schools’ instructional programs. Principals and administrators, on the other hand, found no significant relationships between the variables. However, all sampled groups believed that there were significant relationships between job security, government support and market demand for computer trained personnel and the implementation of computer technology in instructional programs in the secondary schools.

This study revealed that adequate funding is the key to effective implementation of computer technology in instructional programs in Imo State, Nigeria’s secondary schools. This means that, if the Nigerian students from Imo state are to compete effectively in this modern technological age, there is need for the state and national governments to invest more financial resources in the development, production and distribution of technological know-how in the education sector.
ACKNOWLEDGMENTS

I will begin by thanking God, the Almighty Father for the blessings He bestowed on me; for giving me good health; the determination and the courage to finish this course of study. It was through Your power and strength that I was able to finish this course of study.

My special thanks and appreciations go to Dr. Claudette Williams, my advisor. I am immensely grateful for all your dedication, encouragement, positive criticisms, and most importantly, your patience. I appreciated your valuable help in writing this paper.

To Dr. Ogbu Agburu, I appreciate your help in proofreading this document. You have been very helpful in your suggestions, constructive criticisms, and all the feedback you gave me in this paper.

To Dr. William Denton, I extend my appreciation and gratitude for allowing me to include you as a member of the committee at the last minute. I have always counted on your judgement, which I consider very helpful.

To all members of my family: my father, Celestine Okere, my mother, Cecilia Okere, my brothers and sisters, Ethelbert, Geraldine, Cornelius, Ngozi Egejuru, Augustine, Cyril, Victor and Nneka, I thank you all for all of your encouragement and support while I was writing this paper. To my mother especially, who stayed and took care of my two little kids while I spent days and nights in the library, I love you very much. Without you, it would have been very difficult handling the kids and at the same time pursuing this course of study.

To my wife, Immaculata Okere, and my two daughters, Adaeze and Amaka, you are the best thing that has ever happened to me. To you, Immaculata, it has been a blessing having you as my wife.

Finally, I thank all faculty and staff of the Educational Leadership Department. It was indeed a great honor being associated with so many of you who are willing to help others.
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CHAPTER I
INTRODUCTION

One of the greatest contributions of present-day technology to education was the development of the computer. Computer technology has revolutionized the way we live and conduct business today. Computer network and electronic systems have brought a fundamental social change in our lives. Schools, businesses, government agencies and homes are now electronically connected through the Internet. Electronic mail (e-mail) has become the fastest and the most popular means of communication today, apart from the traditional telephone system. With e-mail, a message may be addressed and sent without leaving the computer keyboard. The mail arrives in the recipient’s electronic mailbox usually within seconds. As Paul Saffo stated:

It really is a revolution and it really is big. There are revolutions large and small but one this big probably hasn’t come in at least a hundred years and in the end we may look back and say this was the biggest thing since the advent of the printing press in the mid 1400s (Saffo 1996)

The worth and might of any nation is now determined by the level of her technological sophistication. The gap between the poor and the rich nations, the developed and the developing nations, the powerful and the weak nations is largely a matter of their levels of technological sophistication (Nworgu 1988).

Developed societies have arrived at the ripe age of technology. Technologies are tied up with their social, economic and political progress.
Their lives depend on technology as evidenced in efficient transportation and communication systems by land, air and satellite. There is prolonged life-span brought about by technological breakthrough in curative and preventive medicine; a mechanized agriculture that ensures the availability of food at affordable prices. The hallmarks of today’s technology are educational systems that reflect technological aspiration, disciplined labor force that identifies itself with national goals of high productivity, strong military capabilities and political stability (Igwe 1994).

Underdevelopment has often been attributed to low level of technology which marks the socio-cultural differences between developed and developing countries. According to Akangbou:

In the most simplified version, the North-South gap is nothing other than a glittering reflection of the North-South technological levels. The problems, therefore, must be defined in unmistakable terms: either we accelerate the scientific-technological growth of the underdeveloped world, or, we shall always be condemned to economic dependence upon the whims of the old world. (Akangbou 1989)

Self-sufficiency does not just mean to have enough to eat and to wear, but also it carries with it independence, national dignity, national culture and the ability to boast of all aspects of civilized progress. "When a technological innovation - be it book, the automobile or television, becomes widely available, its ramifications spread through out the society, and this includes education" (Collins 1991). For instance, the invention of the printing press in the 1440s by Johannes Gutenberg brought a rapid expansion of knowledge. Up to that time learning had been the privilege of the few who could afford to have books copied by hands.
The invention brought the most rapid expansion of knowledge. By 1500 there were over a thousand print shops and millions of volumes in print (Lamm and Cross 1985). With the invention, therefore, many people were able to have access to papers and books. Peoples’ opinions started to emerge; they were able to voice and put their thoughts on paper and have them printed and circulated. The effect of this later led to reformation.

Since the minds of the young need to be exposed to critical thinking, analysis and solution of problems, the study of science and technology at the different levels are not crucial but imperative. Pupils must learn to experiment with their environment; ask questions and find answers to those questions. Government of all nations have come to realize this and have expressed the zeal and determination to support the advancement of science and technology in their respective countries.

There are many ways computers can be used in an educational setting. Initially, computers were used for administration purposes, such as maintaining students’ records and scheduling classes. With the advent of the minicomputers and microcomputers, it is now applied to direct instruction. When the computer is combined with electronic transmission systems, it can be used in a variety of ways, including instructional situations and settings. Computer aided learning provides an opportunity to use computer programs as effective instructional tools in the same way other media are used. The computer can become a tool of instruction in many areas of the curriculum for drill and practice, inquiry, problem-solving and as a tutor for remediation, initial teaching, enrichment and learning reinforcement.

However, computer technology has not attained an appreciable level of success in secondary schools in Imo State, Nigeria despite the attention computer technology has
received from government, private institutions and individuals (Onwueme 1989).

Many studies have been done on the factors which affect the implementation of educational technology in Nigerian school systems. Their findings, however, have not included the implementation of computer technology in the Nigerian high schools’ instructional program. Therefore, a concrete study is needed to determine the factors that affect the implementation of computer technology in Nigerian high schools and the implications for educational and national development.

Like any other innovation, implementation of computer technology in the Imo State secondary schools’ instructional program would be an innovative process in the educational systems. Ato (1989), noted that no technological plan, no network of institutions, no policy will work without qualified personnel. Resistance would be less if administrators, teachers, board members and community leaders felt that innovation was their own and not one devised and operated by outsiders. Many administrators and managers in Imo State are themselves impediments to the effective development and maturity of computer education. Such administrators and managers have been known to resist change in computer education on the grounds of their perception of their diminishing roles in the scheme of things.

The importance of starting computer technology at the secondary school level is for the students to develop an early interest in computer technology before they go into colleges and universities. Early start in computer technology would remove the phobia that computer technology is difficult, an idea which many students already have developed.
NIGERIA: THE COUNTRY AND ITS EDUCATIONAL SYSTEM

Geography

Nigeria is a country in West Africa, with an area of about 923,768 square kilometers, and it lies between latitudes 4 degrees and 14 degrees of the Equator, and between longitudes 3 degrees east and 14 degrees east of Greenwich Meridian. Thus, Nigeria is entirely within the tropical zone. Nigeria is bounded on the west by the Republic of Benin, on the North by the Republic of Niger and on the east by the Federal Republic of Cameroun. On the north-east border is Lake Chad, while the southern Nigeria coast line is bathed by the Atlantic Ocean.

The major rivers are the Niger and Benue. The outlets of these rivers and their tributaries are masked by walls of mangrove forest. Behind this barrier, calm lagoons extend from the western border of the great Niger. At the delta, where they break up into a network of creeks and water-ways, they provide a valuable means of navigation through this marshy part of the country.

The tropical rain forest stretches farther inland to approximately 8 degrees northward. The soil in the western part of the country is conducive to the growth of cocoa. North of the tropical forest is the savanna with dense forests in the river valleys. This vegetation is largely grassland dotted with trees. The Savannah zone provides excellent grazing lands for animal husbandry and the bulk of the country’s meat supply comes from this region.

A conspicuous feature of the northern part of the country is the great plateau, which rises as a steep escarpment from the riverine plains of the Niger and Benue rivers
to an average height of 606 meters with ranges of hills between 1,515 and 1,818 meters in the Shere-Hills around Jos. The plateau descends gently northward in the direction of Lake Chad in the north-east and more sharply to Zaria in Kaduna state.

Although Nigeria is wholly within the tropics, its climates vary from the typical tropical at the coast to sub-tropical further inland. There are two well-marked seasons: The rainy season lasting from April to October and the dry season from November to March. Absolute maximum temperature in the coastal areas of the south is 37 degrees centigrade while the absolute minimum temperature is 10 degrees. The climate is drier further north where extremes of temperature ranges from 45 degrees to 60 degrees are common.
Map of Nigeria showing all the states

FIGURE 1
The People

Nigeria is the most populous country in Africa and the tenth largest country by population in the world with about 115 million inhabitants. According to the *World Factbook 1995*, the national average per capital income is $1,250 per year. Life expectancy is currently 55.98 years for females and 54.69 years for males with an infant mortality rate of 72.6 deaths per 1,000 lives.

Form of Government

Nigeria is a fairly new nation. A former British colony, Nigeria gained its independence on October 1, 1960. The present government is a military rule, and plans are underway to institute a constitutional government. The capital city was officially moved from Lagos to Abuja. Many government offices still remain in Lagos pending the completion of facilities in Abuja.

Nigeria is divided into 36 States, plus a federal capital territory in Abuja. In each state, there are about 15 to 20 local government areas, depending on the size and the political demand of the people in that area.
Economy

Nigeria is an oil-rich country, but it is hobbled by political instability and poor macroeconomic management. The government’s domestic and international arrears continue to limit economic growth, even in the oil-sector, and prevent an agreement with the International Monetary Fund (IMF) and bilateral creditors on debt relief.

According to The World Factbook 1995, unemployment rate is over 28 percent, while the rate of inflation is more than 53 percent. The external debt is more than $29.5 billion. The inefficient (largely subsistence) agricultural sector has failed to keep up with the rapid population growth, and Nigeria, once a large net exporter of food, is now forced to import food.

The Educational System

The Nigerian educational system is predominantly a public one. Public authorities run schools and universities and education is free at the primary school level and subsidized at secondary and post-secondary levels. Except for federal government colleges, the ownership and operation of primary and secondary schools is in the hands of various state and local government authorities. Primary and Secondary education is the primary role of the local government authorities.

The administrative structure of a school is comprised of a number of units with well-defined functions. The administration of secondary school in Nigeria is the responsibility of each State Government. In each State there is the Ministry of Education which is headed by the Commissioner. The Commissioner of Education is usually appointed by the Governor of the State. Other top-level administrators include the
Permanent Secretary, who is the Chief Executive officer of the Ministry; and the Chief Inspector of Education. At the local school level, the principal is the highest ranking official, and he/she is assisted by the vice principal and the teachers.

Since independence in 1960, Nigeria as a country has implemented many educational reforms. The most notable among them were the Universal Primary Education (UPE) Scheme and the 6-3-3-4 system. The purpose of the UPE scheme was to make education available to all Nigerians at primary school levels. It was recognized by all Nigerians that a free education at all levels would save the country from slow economic development and other social and economic ills that plagued the illiterate society. Ezeocha (1989), stated that two days after the launching of UPE by the former Head of State, Lt. General Olusegun Obasanjo, the Nigerian Observer Newspaper stated that: “A sound educational background is universally regarded as the foundation on which the structural framework of any nation can stand.” The UPE scheme is perhaps, the most prodigious, far-reaching and patriotic social scheme ever embarked upon by any of the Nigerian governments since Nigeria became independent in 1960.

In implementing the UPE scheme, a number of problems were identified. These same problems contributed to the downfall of the scheme. Among the problems identified were: lack of adequate funding, educational equipment, such as books, library facilities, including housing for the students and other instructional and educational resources. Other problems and issues related to the collapse of the UPE Scheme were poor educational planning, parents’ attitudes towards education, and low job prospects for the graduates.
In 1986, the National Policy on Education launched a revised educational process often known as the 6-3-3-4 system. It was adopted by the national government of Nigeria as a response to the growing criticism of the colonial system of education. The policy provides for, six years of primary education, three years of junior secondary education, followed by three years of senior secondary education and termination with a minimum of four years of a first degree in a University. As noted by Sofolashan (1991), the National Policy on Education document of Nigeria provided for a widening and enrichment programs of educational curriculum with the aim of preparing the Nigerian youth of tomorrow for living in the world’s technological age; to be part of the late twentieth and twenty-first centuries culture; and ready to be launched into the twenty-first century.

The major changes in the system of secondary education were the introduction of the 3-3 structure (3 years of Junior Secondary and 3 years of Senior Secondary) and the inclusion of pre-vocational subjects in the curriculum. As stated by Ogunu (1989), the Junior Secondary School is expected to be both pre-vocational and academic. The content of the Junior Secondary School program recommended is as follows:

**Core subjects:** Mathematics, English, Nigerian Languages, Science, and Social Studies.

**Vocational subjects:** Business Studies, Electronics, Technical Drawing, and Automobile Mechanics.

The aim of this system was to expose students to a broad range of educational programs at this level to enable them to acquire further knowledge and develop skills either in senior secondary schools or in technical and vocational schools, including apprenticeship programs, or in some other scheme for out-of-school vocational training.
The exposure to core subjects will adequately prepare recipients to proceed on their own to seek further enlightenment as responsible and knowledge-seeking individuals. While a 100 percent transition rate is anticipated from primary school to the Junior Secondary School for all states by the year 2000, only a 40 percent transition rate is expected from the Junior Secondary School to Senior Secondary School (Agunu 1989).

The curriculum of the Senior Secondary School is comprised of core subjects and electives as follows:

Core subjects: English Language, One Nigerian Language, Mathematics, Physics, Chemistry and Biology.

The core subjects provide for a foundation in either art or science for those aspiring to higher education. From the list of electives, every student is expected to select three subjects depending on the choice of career. The major objective of the new structure is to make provision for the acquisition of appropriate skills, abilities and competencies both mental and physical as equipment for the individual to live in and contribute to the development of his society.

However, the implementation of the new system of secondary education is beset with many problems. These include lack of understanding of the new system even by those who are supposed to operate it, lack of funds, lack of sufficient number of teachers, especially in technical and prevocational subjects, and lack of equipment, classrooms, workshops and infrastructures. Even where tools and equipment are supplied, lack of workshops for the installation has resulted in many wastes. The majority of the educational equipment, over 50 million Naira, delivered to each state in the country were
reported either rusting away, uninstalled or stolen.

**Imo State: The Studied State**

Imo State is one of the thirty-six states of the Federal Republic of Nigeria. The state was created on February 3, 1976, when the former East Central States of Nigeria were split into Imo and Anambra States (Madueke 1995). Imo State is a one ethnic state inhabited by the Igbo. Igbo language is spoken throughout the state. The official language is English.

**Geography**

Imo State, which is one of the thirty-six states in Nigeria, lies about five degrees north of the equator in the west African sub-region. It is situated east of the River Niger between Anambra State in the north and Rivers State in the south. It is bounded on the east by the Cross River and Akwa Ibom States and on the west by River Niger, over which lies Bendel state. The capital of the state is Owerri, which is also the seat of the government. It is accessible by road from all parts of the Eastern States, namely, Anambra, Akwa Ibom, Cross River and River.

The area of the Imo State is about 12,689 square kilometers. The Imo River, which takes its rise from Isuchi in the Okigwe uplands is the major river. It flows in a west-east direction from source up to the Ihitte Uboma Local Government Area where it changes its course to a north-south direction. Again, at Umuebu near Obigbo, the River diverts its course to a south-east direction, flowing through several Ukwa towns and villages, and enters the sea at Opobo (Madueke 1995).
The major tributaries of the Imo River are the Otamiri and Azumini (Aba) Rivers. The Otamiri river takes its rise at Egbu and has the Oramirukwa as its tributary before flowing into the Imo River.

**Climate**

The State has tropical climate with very high temperatures and seasonal rainfall. Two seasons are prominent in the area, namely, dry and rainy seasons. The dry season starts in November and lasts until March, while the rainy season starts in April and ends in October. There is an unusually dry period in August, popularly known as August Break, and there is another period of dry, chilly, dusty wind in January, known as harmattan.

The driest month is December, which is usually rainless, while March is the hottest with a mean monthly temperature of 80 degrees Fahrenheit. July and September are the rainiest and coldest months with a mean monthly temperature of 70 degrees Fahrenheit. The annual rainfall is 90 inches.

**Population**

According to the 1987 national census, Imo State had a population of 5,672,654. Based on a projected annual growth rate of 2.5 percent, it had a projected population of 7,153,595 in 1990. The population density is 550 persons per square kilometer and it is the highest in the country. About 90 percent of the inhabitants are farmers while others are skilled workers engaged in various trades.
Mineral Resources

Imo state is one of the largest oil producing states in Nigeria. Large deposits of crude oil are found at Egbema and Izombe in the Ohaji/Egbema local government area. Natural gas is also found in commercial quantities in the crude oil zones. Lead and zinc deposits are found in the Ishiagu in Ohaozara.

The Educational System

The educational system in Imo state, like any other state in the country, is predominantly a public one. The public authorities run secondary schools and universities; education is free at primary school level and subsidized at secondary and post-secondary levels. Ownership and operation of primary and secondary schools is in the hands of state and local government authorities. Primary and secondary education is the primary role of the local government authorities, while the various colleges of technologies and the state universities are owned and operated by state government agencies.

The administrative structure of a school is comprised of a number of units with well-defined functions. The administration of secondary schools in Nigeria is in the hands of respective state government agencies. The Commissioner for Education, who represents the State Government is the political head of the State Ministry of Education. The Permanent Secretary/Director-General, is the Chief Executive officer of the Ministry. Other administrative officers include Chief Inspector of Education, and various other department chairpersons. At the school level, the principal is the chief executive officer, and he/she is assisted by the assistant principal and the teachers of the school.
FIGURE 2
Map of Imo State: The Studied state.
Purpose of the study

The purpose of this study was to identify those factors that influence the implementation of computer technology in Imo State’s high schools’ instructional program. Ughamadu (1992) stated that the present content of education in Imo State is not in line with either the state’s conditions, the dominant features of an essentially technological age, or the imperative of balanced economic development. Okonkwo (1994) stated that the present educational system does not meet the need of the Nigerian child’s intelligence, power of observation and creative imagination to develop freely and help him find his bearings in the present world today. Nigerian educational authorities need to revise and reform the content of education in the areas of curricula, so Nigerians can compete with the rest of the world in the global market.

Background of the Problem

The conventional educational system has become outdated and educational advocates are demanding that the old bookish system be changed to a technologically oriented system. It has also become imperative for the school system to expose the minds of her young people to critical thinking analysis and solution of problems so that they can compete with the rest of the world. Nigeria, like other emergent countries, is faced with an alarming rate of unemployment, especially among her youths (Adeleye, 1988). Because of the absence of innovative practices in Nigerian predominantly traditional secondary schools, graduates from these institutions know next to nothing about technical subjects such as word processing, PC repairing and electronics. Consequently, failure in
the West African School Certificate Examination becomes synonymous with failure in life for the greater percentage of our secondary school graduates because our schools offer them grounding in academic pursuits to the exclusion and neglect of practical subjects (Ughamadu 1992).

The rate of unemployment among Nigerian youths has increased to a very unmanageable proportion. Even among those who were able to pass the West African School Certificate Examination, failure to make it to a university or a college also means failure in life. The effect of these is that Imo State has a mass group of white collar criminals who have lost hope in the system but have to do anything to survive. The lack of innovative practices in the Nigerian high schools may probably be due either to lack of cooperation among teachers, lack of dynamic leadership or some other factors. Relevant and functional science education in general and computer technology in particular must be accomplished in Imo State in order that people might be more rationally involved in scientific and technological activities.

Statement of the Problem

This study focused on issues affecting the implementation of computer technology in Imo State, Nigeria, with special attention on reasons why it has not attained an appreciable level of success in secondary schools' instructional programs. The national government of Nigeria, many private business organizations and individuals are highly interested in modern computer technology and its implementation in the secondary schools to provide opportunity for students to have an early start in technology. However, this enthusiasm is not equally shared among all levels of the governments in the country.
Imo State, like many other regional and local governments that have direct control over schools is slow to implementing computer technology in its schools. This study examined whether there were significant relationships between the implementation of computer technology in Imo State high schools' instructional programs and availability of funding, infrastructures, trained personnel, job security, and government support.

Significance of the Study

This study would provide educational policy-makers in Imo State, Nigeria with information, which might assist them in the implementation of computer technology in secondary schools' instructional programs. It would also help educational policy-makers to understand how important computer technology is in schools in order for a Nigerian student to compete with the rest of the world in the global computer age.

Research Questions

This study was guided by the following research questions.

1. Is there a relationship between the implementation of computer Technology in high schools instructional program and availability of Funds?

2. Is there a relationship between the implementation of computer technology in high schools instructional program and availability of infrastructures?

4. Is there a relationship between the implementation of computer technology in high schools instructional program and trained Personnel?

3. Is there a relationship between the implementation of computer? Technology in high schools instructional program and job security?
5. Is there a relationship between the implementation of computer technology in high schools' instructional program and government support?

6. Is there a relationship between the implementation of computer technology in high schools' instructional program and market demand?

7. Is there a difference between the perceptions of teachers, principals and administrators on Availability of funds and the implementation of computer technology in high schools' instructional program in Imo state?

8. Is there a difference between the perceptions of teachers, principals and school administration on availability of infrastructures and the implementation of computer technology in high schools' instructional program in Imo State?

9. Is there a difference between the perceptions of teachers, principals and school administrators on availability of trained personnel and the implementation of computer technology in high schools' instructional program in Imo state?

10. Is there a difference between the perceptions of teachers, principals, and school Administration on Job Security and the Implementation of computer technology in high schools' instructional program in Imo State?

11. Is there a difference between the perceptions of teachers, principals, and school administration on government support and the implementation of computer technology in high schools' instructional program?

12. Is there a difference between the perceptions of teachers, principals, and school administration on market demand and the implementation of computer technology in high schools' instructional program in Imo State?

Summary

One of the greatest contributions of present-day technology to education is the development of the computer. Computer technology has revolutionized the way we live and conduct business today. In Imo state today, the conventional educational system has become so outdated that educational advocates are demanding that the old bookish system be changed to a technologically oriented system. It has also become imperative
for the school system to expose the minds of its young people to critical thinking, analysis and solution of problems so that they can compete with the rest of the world. The worth and might of any nation is now determined by the level of her technological sophistication. The gap between the poor and the rich nations, the developed and the developing nations, the powerful and the weak nations is largely a matter of their levels of technological sophistication. Computer technology should be started at the secondary school level in order for students to develop an early interest in computer technology before going into colleges and universities.
CHAPTER II
REVIEW OF LITERATURE

Introduction:

This chapter presents a review of selected literature pertinent to the core elements of this study. The literature is reviewed in four sections. The first section gives a general view of education and computer technology. The second section offers a brief description of historical development of computer and educational technology in Nigerian schools. The third section reviews literature that discusses relationships among barrier factors affecting the implementation of computer technology. The fourth section reviews literature on the extent of computer usage in Nigerian schools. The fifth section reviews its effects on educational advancement.

Education and Computer Technology

There are many ways in which computers can be used in an educational setting. Initially, computers were used for administration purposes such as maintaining students’ records and scheduling classes. With the advent of the minicomputers and microcomputers, it is now applied to direct instruction. When a computer is combined with an electronic transmission system, it can be used in a variety of ways in instructional situations and settings such as Computer-Assisted Instruction (CAI) and Computer-Managed Instruction (CMI).
The Computer-Assisted Instruction is sometimes called Computer-Assisted Learning (CAL) or Computer Scheduled Education (CSE) or Computer-Based Learning (CBL). Each operates as a chain, which includes a learner, a computer, a program and, presumably, an end in view. The Computer Assisted Instruction uses the computer directly as a medium of instruction and an information delivery system. In other words, it uses the computer as a sophisticated teaching machine which presents the instructional material to the student and interprets his response. The computer’s ability to engage in instructional dialogue with the student while delivering information makes it adaptable to any number of instructional situations. The digital computer operates at a high speed and, as such, it can switch rapidly between a number of different terminals appearing to handle them simultaneously. This is known as time-sharing.

When a computer is used for Computer-Assisted Instruction, such instruction can be given to a number of students at the same time. Thus, a class of students working on different programs in the computer can receive individual feedback from the computer. In other words, the computer can switch from student to student so rapidly that each student appears that he alone is using the computer.

Computer-Managed Instruction is basically a management technique for keeping track of instruction and supplying support services, such as materials appropriate to specific learning objectives, at specific stages of the learner’s progress. CMI is one of the ways by which individualization of the educational process can be implemented. According to Okonkwo (1989), the following general models are useful for implementing individualization:
1. The goals of learning are specified in terms of observable student behavior and the conditions under which this behavior is to be manifested.

2. When the learner begins a particular course of instruction, the initial capabilities relevant to the forthcoming instructions are assessed.

3. Educational alternatives suited to the student's initial capabilities are presented. The student selects or is assigned to one of these alternatives.

4. The student's performance is monitored and continuously assessed as he learns.

5. Instruction proceeds as a function of the relationship between measures of student performance, available instructional alternatives, and criteria of competence.

6. As instruction proceeds, data are generated for monitoring and improving the instructional system. The CMI system speeds up the collection and analysis of data for the constant development and improvement of the system.

**Development of Computer and Educational Technology in Nigeria**

Ughamadu (1992) stated that the development of educational technology in Nigeria started in the 1950's with the use of teaching aids and the improvisation of simple teaching support materials in teacher training colleges when the Ministries of Education started to emphasize the place of pieces of apparatus in both teaching practice and classroom activities. According to Ughamadu, in the 1950's, students and teachers had to exhibit a fair understanding of audio-visuals and also make a show or display of
materials that they had designed and produced based on specific units of curriculum handled during their teaching practice. At this period, emphasis was on the design and production of low-cost aids like charts, boards, specimens and the collection of things.

The development of computer technology also started in the 1950's with the introduction of teaching machines. The idea was said to be distasteful to some teachers. Some argued that the use of a teaching machine dehumanized teachers and inevitably led them to act like machines themselves (Okonkwo 1989).

**Computer Use in Nigerian Schools**

Few traces of computer technology could be seen only in federal and unity colleges (federal government-operated high schools). Initially these colleges were designed for gifted students but are now for students who come from well-to-do families and families of federal and state government officials. A few state government universities and polytechnics have just started to offer to make a course in computer technology compulsory for their students. Due to a limited number of computers available in these colleges and universities, students have to wait for weeks to get a turn to use the computer. Many international companies and organizations are making donations to some colleges and universities to ease the shortage of computers in these schools but none has been made available to the secondary schools.

Private individuals and businesses have opened their doors to computer technology. In some major cities in the country, especially in Lagos, many vocational institutions offering training in computer usage are springing up. Some of the leading computer companies, such as Infotec, Debis Cotalex, DPMIS, NCR, Imatech, and
Universal Systems provide short and specialized courses leading to the award of City and Guides as well as International Data Processing Management (IDPM) certificates. As Umunnakwe (1998) stated, Microsoft Corporation has recently established an office in Nigeria, which provides, among other things, Microsoft Certifications and Microsoft BackOffice products. All these, no doubt, have tremendously increased the level of computer awareness in the country; yet, more increase is needed in the secondary schools.

**Barrier Factors in Computer Technology**

Okonkwo (1994) discussed factors that militate against computer technology in Nigerian education under four broad headings, namely: political, economic, systematic and institutional. These barriers are discussed in brief as follows.

**Political Barriers**

Okonkwo stated that frequent change of governments does not allow consistency in educational policy. Political instability destabilizes education and slows down the rate of technological change in education. He noted that bureaucratic red tape stifles change efforts. In Nigeria, it takes days for files to move from one office to another. Approval of proposals is not easily come by. Even when proposal are approved, implementation encounters all sorts of "man-made" obstacles, especially from people who feel they have no monetary gain from it.
Economic Barriers

The greatest barrier to technological change in the Nigerian school system is lack of funds. Educational technology is capital intensive. The expenses range from the purchase of equipment and materials, installation, maintenance and service, spare parts, staff training and development. These problems are encountered by both the developed and developing countries. However, the situation is worse with a developing country like Nigeria which has a lean foreign exchange. Yet, most of these expenditures are paid with foreign exchange.

Systemic Barriers

There is no clearly established systematic approach in the computer technology in secondary schools in Imo State. Until the Government agency responsible for education in the Imo clearly set policy directions for computer technology as part of educational curricula, change process in education will remain a haphazard enterprise.

Teacher educational programs in Nigerian higher educational institutions have failed to develop the skills and knowledge needed for innovation. The reasons are obvious. Educational technologists are few and few institutions have experts that offer programs in educational innovation. The graduates of these institutions who turn out yearly are too few to make any impact on the educational process. So the educational institutions are dominated by non-educational technologists who are change resisters. Again, our teachers have failed to develop in themselves habits of scholarship required to
stay abreast of the knowledge and information explosion. The few funding agencies in Nigeria, like the Nigerian Education Research Council (NERC), African Development Banks (ADB), and many of the oil companies, hardly provide funds for research and development in the areas of educational technology.

**Institutional Barriers**

Among barriers to innovation in Nigerian schools, perhaps one of the greatest is status quo. According to Okonkwo (1989) most of the time and energy is spent trying to run the existing curriculum. The institutional structures and policies are channeled toward maintaining the status quo. Almost all of the budget is devoted to the prevalent practices and procedures. Proposing a technological change, therefore, meets with stiff resistance from all angles. Compounding the problems facing educational technologists is that of traditional rewards. Institutions of higher learning provide jobs and promotions for their staff who further their departmental or faculty interests. Professors usually are not supported by reduced workloads, money for instructional equipment and materials, expert consultation, nor professional rewards for such ventures. Rather, they could be penalized for having to deviate from more formally rewarding pursuits to innovate. Moreover, such innovations do not provide opportunities for promotions for a prospective professor.

The fear that technology (especially the computer technology) brings about unemployment is widespread. For this reason, faculty members who might be willing to introduce computer technology for use in the libraries, personnel departments, administrations or in the classrooms, would be discouraged very quickly. The would-be-affected staff, on their part, would not take kindly to such innovation and would do every
thing possible to stop such innovation.

Finally, Nigerian lecturers are locked into systems that block the effective use of educational technology. While their counterparts in the developed world receive occasional summer grants to develop a new program, they are denied such incentives.

Ogunu (1989), stated that the problems faced by Nigeria’s educational reform is lack adequate educational assessment and understanding of the new system even by those who are supposed to operate it. He noted that principals and teachers who are supposed to operate the new system are not always aware of the changes and what is required of them.

Okere (1993) noted two common problems associated with the implementation of computer technology in Nigerian secondary school instructional programs: (1) Cost of computer. (2) Electricity Power Supply. The average cost of a computer is a staggering. Not many average Nigerians can afford a computer, especially with the ailing Nigerian economy. Most State Governments can not afford to spend or buy five (5) computers for each of their secondary schools. For example, Abia State Government donated 121 computers to be shared by 121 secondary.

Another major hindrance is the unreliability of electricity supply in Nigeria. About 50% of Nigerian secondary schools are located in rural areas with no electricity. Since computers operate with electricity, most of these schools must have a source of power supply in order to use computers.
Computer Technology and Educational Advancement

Mehlinger (1996) said that the use of computer technology will have a profound affect on schools. The very relationship between students and teachers will be challenged because the technology enables learners to gain control of their own learning. He noted that, in the past, schools have been places where people in authority decided what would be taught (and possibly learned), at what age, and in what sequence. The new technology provide students access to information that was once under the control of teachers.

Also, it possible to connect computers, either through a local area network (LAN) or through a wide area network (WAN). The advantage of networking is that people can work together and share information.

Peck and Dorricott (1994) listed some reasons for using technology. First, students learn and develop at different rates. Technology can individualize instruction. Through computer networks called integrated learning systems, teachers can prescribe individual learning paths for students. With an integrated learning system, students can move at an appropriate pace in a non-threatening environment, developing a solid foundation of basic skills rather than the shaky foundation a calendar-based progression often creates.

Secondly, educational technologies can-be designed to provoke students to raise searching questions, enter debates, formulate opinions, engage in problem solving and critical thinking, and test their view of reality. Online tools and resources allow students to efficiently gather and evaluate information, then communicate their thoughts and findings.
Thirdly, technology can foster an increase in the quantity and quality of students’ thinking and writing. Perhaps, one of the best known documented success with computers in education is in developing students’ writing. Several features of word processors seem to reduce the phobia often associated with writing. Writing on the computer has a temporary feel, making it easier to take creative and grammatical risks.

Fourthly, high-level process skills cannot be taught in the traditional sense; they cannot be transferred directly from the teacher to the learner. Students need to develop these skills for themselves, with appropriate guidance. They need to struggle with questions they have posed and search out their own answers.

A collection of computer applications often called productivity tools could revolutionize the way students work and, more important, the way they think. Databases, spreadsheet, computer-assisted design, graphics program, and multimedia authoring programs allow students to independently organize, analyze, interpret, develop and evaluate their own work.

Fifthly, technology can re-place (not replace) the teacher. With stage-three educators determine what students should do and how teachers and technologies can support students, many of the routine tasks done by teachers can be reassigned to technology, elevating the role of teachers.

Callister and Dunne (1992) said that the notion that technology can be used to “end-run” teachers is not new. They pointed to some of the reasons why teachers fear computer technology in instructional programs in the secondary schools. Among those reasons were, shifting the focus of control. Computers shift the focus of instructional control from the teacher to an array of experts. Because most teachers cannot develop or
even modify computerized curriculum materials, they are bound to the concepts and strategies of a distant programmer who does not fully understand important pedagogical principles. Crucial instructional decisions, such as appropriate content, method, and timing, are removed from teacher control, and issues of personal style, often the soul of a good classroom, are ignored.

Secondly, removing the teacher from the instructional loop. Computers can shift the structure of the classroom by removing the teachers from the instructional loop and redefining their educational role. In several popular visions of "computerized classrooms," technology structures the nature of learning. While students sit at their workstations, vessels to be filled with facts suitably stored in machine-retrievable code, teachers oversee the operation like foremen in an automated factory.

Collins (1991) identified some major trends that can be found in schools that have adopted computer technology. They are:

1. Shift from whole-class to small group instruction. When teachers use computers, one or two students are normally assigned to each computer. Teachers do not find it feasible to maintain all the students in lockstep, and so they move to an individualized model of teaching. This shift, Collins noted, means that teachers begin to talk to individual students and to develop an idea of how much students understand and what their confusions are.

2. A shift from working with better students to working with weaker students. In whole-class instruction, teachers carry on dialogue with their better students. This is because it is the better students who raise their
hands to offer ideas. Teachers do not like to call on the weaker students, because they do not like to embarrass them in front of the whole class. In a classroom in which students are working on computers, the teacher is naturally drawn to students who need help, and those are the weaker ones.

3. A shift from assessment based on test performance to assessment based on products, progress, and effort. Assessment in most classrooms is based on students' performance on tests that are given after different sections of the curriculum have been completed. The introduction of computer technology and the shift to individualized instruction move assessment away from the classroom test, which seems inappropriate to teachers under the circumstances.

4. A shift from a situation where all students learn the same things to a situation where different students learn different things. An underlying assumption of the education system is that every student must acquire certain basic knowledge and skills. This assumption leads to failing students who have not mastered parts of the curriculum and directing students' efforts toward their weaknesses rather than their strengths. Electronic networks and shared databases foster a different view of knowledge in which expertise is spread among different participants and brought together in a common place.
Summary

The review of literature and research indicated that there are so many factors that affect the implementation of computer technology in the Nigerian schools’ instructional program. The review of literature was conducted in four broad sections: The first section, gave a brief definition of the computer. The second section talked about computer technology and education. The third section reviewed literature on historical development of computer and educational technology and traced the development of educational technology to the 1950’s with the introduction of the teaching machine. The idea was said to be distasteful to some teachers, Who argued that the use of teaching machine would dehumanize teachers and inevitably lead them to act like machines themselves.

The fourth section reviewed the extent of computer use in Nigerian educational system and noted that there are very few traces of computer technology in Nigerian colleges and universities and very little could be seen in federal and unity colleges. The fifth section discussed some barrier factors militating against the implementation of computer technology in the Nigerian secondary schools’ instructional program which includes, political instability, economics, systematic, and institutional factors. The section noted that the cost of computer and lack of electricity power supply also militate against the implementation of computer technology in Nigerian secondary schools’ instructional program.

The sixth section, computer technology and educational advancement reviewed some of the social and private returns that may accrue from investing in computer technology at Nigerian secondary schools’ instructional program. Some of these returns
the section noted include, reducing unemployment by offering students the skills they need to function in the real world, removing the teacher from the instructional loop, shift from whole-class to small-group instruction, and shift from working with better students to working with weaker students. In whole-class instruction, teachers carry on dialogue with their better students. This is because it is the better students who raise their hands to offer ideas, and teachers do not like to call on weaker students, in order not to embarrass them in front of the whole class. In classrooms in which students are working on computers, the teacher is naturally drawn to students who need help, and those are the weaker ones.
CHAPTER III
THEORETICAL FRAMEWORK

Introduction

This study examined the relationship among selected barrier factors and the implementation of computer technology in schools' instruction. That is, to what extent do these factors affect the implementation of computer technology in Imo State, Nigeria, schools?

Nigeria as a consumer society, with no technological break-through in computer technology, depends on the importation of computers, which constitute a drain on her foreign reserve. According to Durueke (1997), the private use of computers and computer accessories has risen 400 percent more than government use over the past 5 years. The shift in demand is due to the ailing Nigerian economy. The increase in computer purchases in the private sector is largely attributed to the few Nigerians who are stationed in foreign countries who can afford to buy computers to invest in Nigeria. The Daily Times of Nigeria, PLC, also noted that the absence of adequate infrastructures, like electricity, water supply and properly wired buildings, have also made it very difficult for those interested in investing in computer technology. It also noted that, since computer technology requires a lot of training, Nigeria does not have the manpower to undertake such a technology.
Definition of Variables

The following definitions are operationalized for use in this study.

**Implementation of Computer Technology** --- is defined as the availability of computer technology in Nigerian schools for instructional purpose.

**Availability of Fund** --- is defined as money provided by public and private sectors for the implementation of computer technology in education.

**Availability of Infrastructures** --- is defined as the availability of power supply, accommodation, water and accessibility to schools.

**Trained Personnel** --- is defined as individuals knowledgeable about the application of computer technology in education.

**Job Security** --- is defined as the feeling individuals have that they will not easily lose their job.

**Government Support** --- is defined as social technology provided for the implementation of computer technology schools, like distance learning, mobile technology and providing infrastructure for access to the Internet.

**Market Demand** --- is defined as the desire and request by private and public sectors to employ individuals with computer skills.

Definition of Terms

The following definitions are established to facilitate the understanding of technical terms that are used in this study.
Technology --- is defined as the application of science to industrial or commercial objectives. Computer technology refers to the use of a computer in the application of science.

Computer --- is defined as an electro-mechanical device that accepts input (digits, texts, signal numbers, sound, letters, etc.), processes them and produces output.

Creativity --- is defined by the Dictionary of Reading and Related terms as inventiveness, originality, the development of a new thought or artistic effort.

Network --- is defined as the interconnection of computers, terminal, printer, etc. so that they can share information.

Internet --- is defined as the worldwide collection of interconnected computer networks that use TCP/IP protocols.

Electronic mail (e-mail) --- is defined as the use of the Internet to send mail.

Local area network (LAN) --- is defined as a network in which all the nodes exit in a relatively small area, such as an office or building.

Wide area network (WAN) --- is defined as a data communication network originally designed to connect computers and terminals that were located far from one another.

Innovation --- is defined as the generation, acceptance, and implementation of new ideas, process, products or services.

Secondary school --- is defined as a educational institution that is intermediate in level between elementary school and university. A term used in British system to mean American high school.

Federal and Unity colleges --- is defined as federal or state government-operated secondary schools.
IMF --- International Monetary Fund. An international lending institution.

Social Technology--- is defined to be policies, procedures and regulations governing the use and integration of computer technology into the educational system.

**Relationship Among Variables**

The researcher proposed that the implementation of computer technology is influenced by the absence of funds, trained personnel, infrastructure, job security, government support, market demand. The extent or degree to which computer technology correlates to educational advancement is determined in this study. The following were researched:

- Funds: The research contended that the few funding agencies in Nigeria do not provide funds for research and development in educational technology as seen in other countries like the United States of America and Canada.

- Infrastructures: The fact that computer technology is capital as well as human intensive, the research proposed that lack of adequate infrastructures like power supply, adequate accommodation, water and accessibility to schools affect the implementation of computer technology in the Imo State secondary schools’ instructional programs.

- Trained Personnel: Because effective use of a computer demands high skills and training, there are not enough teachers trained on the application of computer technology to education. Okorie (1994) stated that lack of well trained and qualified educational technologists, as well as technicians, pose a stumbling block to successful educational technology implementation in Nigerian schools.
Job Security: One of the biggest obstacles affecting the implementation of computer technology in Nigerian schools is job security. In Nigeria, the fear that computer technology brings unemployment is widely spread and therefore people will stop any effort that is geared toward the implementation of computer technology in order to keep their job.

Government Support: Because the ownership and operation of secondary education is in the hands of the government, decision-making is very slow. The decision to change or not to change any aspect of the school curriculum or innovation is entirely for the state or federal governments, while teachers merely carry out the chores as laid down by the government. Individual creativity and innovation are not allowed. Uwandu (1992) stated that teachers could be penalized for having to deviate from more formally rewarding pursuits to innovate. Also, lack of procedures and policies governing the use and integration of computer, including lack of infrastructures like adequate telephone services to encourage distance learning in education, do affect the implementation of computer technology in Imo State schools and the state as a whole. Distance education can be used to decongest Imo State’s congested classrooms.

Market Demand: In Imo State, the demand for computers and computer-trained personnel is very little because most businesses do not use or require the skills of computer trained personnel. This invariably, perhaps, affects the implementation of computer technology because the government and most of the funding agencies are unwilling to channel the resources to an area that is not highly demanded.
FIGURE 3
Diagram showing relationship among variables

INDEPENDENT VARIABLES

Funds
Infrastructures
Trained Personnel
Job Security
Government Support
Market Demand

MODERATOR VARIABLES

Teachers
Principals
Administrators

DEPENDENT VARIABLES

Implementation of Computer Technology
Research hypotheses

The hypotheses on which this research study is based include the following:

Hypothesis 1: There is no significant relationship between Availability of Funds and the Implementation of Computer Technology in High Schools Instructional program in Imo State as perceived by (a) Teachers, (b) Principals and (c) Administrators.

Hypothesis 2: There is no significant relationship between Availability of Infrastructures and the Implementation of Computer Technology in High Schools Instructional program in Imo State as perceived by (a) Teachers, (b) Principals and (c) Administrators.

Hypothesis 3: There is no significant relationship between Availability of Trained Personnel and the Implementation of Computer Technology in High Schools Instructional program in Imo State as perceived by (a) Teachers, (b) Principals and (c) Administrators.

Hypothesis 4: There is no significant relationship between Job Security and the Implementation of Computer Technology in High Schools Instructional program in Imo State as perceived by (a) Teachers, (b) Principals and (c) Administrators.

Hypothesis 5: There is no significant relationship between Government Support and the Implementation of Computer Technology in High Schools Instructional program in Imo State as perceived by (a) Teachers, (b) Principals and (c) Administrators.

Hypothesis 6: There is no significant relationship between Market Demand and the Implementation of Computer Technology in High Schools Instructional program in Imo State as perceived by (a) Teachers, (b) Principals and (c) Administrators.

Hypothesis 7: There is no significant difference between the perception of
teachers, principals and administrators on Availability of Funds and the Implementation of Computer Technology in High Schools Instructional program in Imo State as perceived by (a) Teachers, (b) Principals and (c) Administrators.

Hypothesis 8: There is no significant difference between the perception of Teachers, Principals and school Administration on Availability of Infrastructures and the Implementation of Computer Technology in High Schools Instructional program in Imo State as perceived by (a) Teachers, (b) Principals and (c) Administrators.

Hypothesis 9: There is no significant difference between the perception of Teachers, Principals and school Administration on Availability of Trained Personnel and the Implementation of Computer Technology in High Schools Instructional program in Imo State as perceived by (a) Teachers, (b) Principals and (c) Administrators.

Hypothesis 10: There is no significant difference between the perception of Teachers, Principals and school Administration on Job Security and the Implementation of Computer Technology in High Schools Instructional program in Imo State as perceived by (a) Teachers, (b) Principals and (c) Administrators.

Hypothesis 11: There is no significant difference between the perception of Teachers, Principals and school Administration on Government Support and the Implementation of Computer Technology in High Schools Instructional program as perceived by (a) Teachers, (b) Principals and (c) Administrators.

Hypothesis 12: There is no significant difference between the perception of Teachers, Principals and school Administration on Market Demand and the Implementation of Computer Technology in High Schools Instructional program in Imo State as perceived by (a) Teachers, (b) Principals and (c) Administrators.
Limitations

A major limitation of the study is that it is a perception study. The hypotheses are all tested through data based on perceptions of teachers, principals and administrators. There is considerable subjectivity in perception studies as different from empirical research based on more quantitative findings of actual funding, infrastructure development and availability of trained personnel.

Summary:

This chapter provided the theoretical and conceptual framework upon which this study is based. The variables, the proposed relationship among variables, definitions of terms, and the null hypotheses were presented. The next chapter discusses the methodology to be employed in this investigation.
CHAPTER IV

Methods and Procedures

Introduction

This study examined the relationship between some barrier factors and the implementation of computer technology in Imo State’s high schools’ instructional programs. The research procedure used in this study is presented in this chapter. They were divided into the following sections: (A) Research Design, (B) Sampling Procedures, (C) Working with Human Element, (D) Description of the Instrument(s), (E) Data Collection, and (F) Statistical Applications.

Research Design

This study examined if a relationship exits between the implementation of computer technology in Imo State’s high school instructional program and some selected variables. The investigation employed a survey design in which the researcher administered questionnaires to a sample population of secondary school principals and teachers. Using the Pearson Product-Moment Linear Correlation Coefficient Analysis, the researcher estimated the relationship between variables stated in the twelve null hypothesis. The Pearson r is used to determine how a change in one variable may tend to be related to a change in a second variable.
Sampling Procedures

Using a stratified random sample technique, twenty school principals from 51 secondary schools in Imo State were sampled. Twenty-one questionnaires each containing 50 Naira (N50.00) were mailed to twenty high school principals. Each principal was asked complete one questionnaire and randomly select 20 teachers from their faculties to complete the questionnaires. Also 50 administrators from the State Ministry of Education were randomly selected to complete 50 questionnaires. The completed questionnaires were collected by the researcher.

Working with Human Subjects

This research employed group data rather than individual data. Hence, the researcher instructed subjects not to write their names on the questionnaire nor identify themselves on the questionnaire so that strict confidentiality could be maintained. In addition, subjects were given an opportunity to express any reservations about participating in the research in order to ensure voluntary participation.

Description of the Instrument(s)

The research instrument used in this study was developed by the researcher. In constructing the instrument, some basic steps suggested by Borg and Gail (1995) were used as a guide. These included:

Step 1: Defining the objective for developing scale.
Step 2: Defining the target population. The target population in this study included principals and teachers in Imo State high schools.
Using stratified random sampling techniques, 20 schools were selected to be sampled, as well as 50 school administrators.

Step 3: Reviewing related measures.

Step 4: Developing an Item pool. An item pool of 5 items were developed for each of the independent variable.

Step 5: Preparing the prototype.

Step 6: Evaluating the Prototype. The instrument was evaluated by experts from Clark Atlanta University.

Step 7: Revising the measure, if necessary. Following the recommendation of the expert panel, some of the items were removed, while some items were added to the instrument.

Step 8: Pilot testing of instrument. In pilot testing, a sample population was chosen outside the target population to test the validity of the instrument.

Step 9: Statistically analyzing the score. In this phase of study, the statistical instrument used in this study was Person Moment Linear Correlation Coefficient to test the relationship among the variables.

The research instrument met all requirements for reliability and validity. The research instrument adhered to the following procedures: First, following the examination and advice of members of the researcher's doctoral committee, a thorough examination of the instrument was conducted using the Expert Panel Technique to establish face validity. That panel consisted of panel of a experts at Clark Atlanta University.

Secondly, a second testing of the instrument was conducted by administering it to some selected Nigerian professionals and students in metro Atlanta.
That testing allowed the investigator to conduct further editing based on input prior to field-testing. That procedure strengthened the face validity and reliability.

The instrument was divided into five parts, with one section for each of the dependent and independent variables. The instrument was designed to test the hypotheses and test the research questions.

Availability of Funds. The purpose of this section was to collect data on the relationship between the implementation of computer technology in the Imo State high schools’ instructional program and availability of funds. Items 1 through 5 were used to test the relationship.

Lack of infrastructures. The data in this section was used to examine the relationship between the implementation of computer technology in the Imo state high schools instructional program and the availability of infrastructures (classrooms, electricity, water, school accessibility, and technical instructional equipment). Items 6 through 10 were used to establish the relationship.

Trained personnel. This section collected data used to establish the relationship between the implementation of computer technology in Imo State high schools instructional program and trained technical personnel. Items 11 through 15 were used to test the relationship.

Job security. The purpose of this section was to collect data on the relationship between the implementation of computer technology in the Imo state high schools instructional program and job security. Items 16 through 20 were used to test the relationship.
Government support. The purpose of this section is to collect data on the relationship between the implementation of computer technology in the Imo state high schools instructional program and government support. Items 21 through 28 were used to test the relationship.

Market Demand. The purpose of this section was to collect data on the relationship between market demand and the implementation of computer technology in the Imo State high schools instructional programs. Items 29 through 35 were used to test the relationship.

Table 1

The distribution of items by variables.

<table>
<thead>
<tr>
<th>VARIABLES</th>
<th>ITEMS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Availability of Funds</td>
<td>1 - 5</td>
</tr>
<tr>
<td>Availability of Infrastructures</td>
<td>6 - 10</td>
</tr>
<tr>
<td>Trained Personnel</td>
<td>11 - 15</td>
</tr>
<tr>
<td>Job Security</td>
<td>16 - 20</td>
</tr>
<tr>
<td>Government Support</td>
<td>21 - 28</td>
</tr>
<tr>
<td>Market Demand</td>
<td>29 - 35</td>
</tr>
</tbody>
</table>

Data Collection Procedure

The data for this study was collected in the summer of 1998. The researcher obtained permission from the state Ministry of Education to conduct the study. Once the permission was granted, the researcher administered the questionnaires to employees of State Ministry of Education as well as the individual schools that were randomly selected using stratified random sampling. Questionnaires were completed independently. Only completed questionnaires were used for this study.

The researcher arranged for the pick up of completed questionnaires that were coded to
answer the research questions investigated in this study.

**Statistical Application**

The primary statistical treatment consisted of the Pearson Moment Linear Correlation Coefficient that was used to test the relationship among variables stated in the hypotheses in the research. In addition to the Pearson r, this study also employed some descriptive statistics like the mean and the standard deviation. Analysis of Variance (ANOVA), and Sheffee test of significance were also used in the study. The .05 level of significance was used to determine acceptance or rejection of the hypotheses.

**Summary**

This chapter discussed the research method and procedures that were used for this study. The design for this study was a correlational research design, it determined if a relationship exists between implementation of computer technology and selected factors. The Sampled population in this study included teachers, principals and administrators from randomly selected secondary schools in Imo State. The instrument used in the study was developed by the researcher. A panel of experts from Clark Atlanta University evaluated the instrument for reliability and validity. A pilot study was conducted by selecting some Nigerian professionals and students in metro Atlanta to establish validity of the instrument. Upon approval of permission to conduct the study, the researcher distributed questionnaire to selected schools and was responsible for picking up completed questionnaires. The data collected for this study was analyzed by the researcher using some descriptive statistics and the Pearson r.
CHAPTER V

ANALYSIS OF DATA

Introduction

The purpose of this study was to determine the factors that affect the implementation of computer technology in the Imo State high schools instructional program. The primary statistical instrument used was the Pearson Product Moment Linear Correlation Coefficient as the measure to test the relationship among variable stated in the hypotheses. In addition to the Pearson r, the study also used some descriptive statistics such the means and standard deviations to further describe the data. The .05 level of significance was used to determine acceptance or rejection of the hypotheses.

Analysis of data by research questions was done in terms of the null hypotheses presented. Significant relationship between dependent and independent variables were determined using Pearson Product Moment Linear Correlation Coefficient to show relationships. Also, Analysis of Variance and Scheffee test of significance were used to determine the difference in perceptions between the groups on each of the variables stated in the hypotheses.

The research questions were answered in terms of null hypotheses. The level of significance was set at .05 level.

Hypothesis 1: There is no significant relationship between Availability of Funds and the Implementation of Computer Technology in High Schools Instructional program in Imo State as perceived by (a) Teachers, (b) Principals and (c) Administrators.
Table 2 shows the results of the analysis of the relationship between availability of funds and implementation of computer technology by each of the subgroups identified.

**TABLE 2**

<table>
<thead>
<tr>
<th>Group</th>
<th>Number</th>
<th>‘r’</th>
<th>Probability of ‘r’</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teachers</td>
<td>255</td>
<td>.305</td>
<td>.000**</td>
</tr>
<tr>
<td>Principals</td>
<td>20</td>
<td>.0309</td>
<td>.869</td>
</tr>
<tr>
<td>Administrators</td>
<td>37</td>
<td>.075</td>
<td>.659</td>
</tr>
</tbody>
</table>

**P < .01
*p < .05

The results of testing the first null hypothesis as shown in Table 2 above indicate that teachers perceive a significant relationship between the availability of funds and the implementation of computer technology at the .000 level of significance. This is a considerably higher level of significance than .05 in that the probability of this result occurring by chance is at least 1 in 1000. This hypothesis was rejected.

In the case of Principals and Administrators, however, the computations failed to achieve significance at the .05 level or higher with the correlation coefficients being .869 and .659 respectively. Consequently, hypotheses b and c were accepted. This means that principals, and administrators felt that there was no significance difference between the availability of funds and the implementation of computer technology.
Table 3 shows additional information on the computations indicating the mean and standard deviation for teachers, principals, and administrators on availability of funds.

<table>
<thead>
<tr>
<th>Group</th>
<th>Number</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teachers</td>
<td>255</td>
<td>2.30</td>
<td>.79</td>
</tr>
<tr>
<td>Principals</td>
<td>20</td>
<td>1.65</td>
<td>.25</td>
</tr>
<tr>
<td>Administrators</td>
<td>37</td>
<td>1.69</td>
<td>.34</td>
</tr>
<tr>
<td>Total Group</td>
<td>312</td>
<td>2.19</td>
<td>.77</td>
</tr>
</tbody>
</table>

For teachers a mean score of 2.30 indicates that most of the response on this variable were between disagree and undecided. The SD of .79, shows a fairly wide spread of scores around the mean especially when compared with that of .25 for principals and .34 for administrators. The mean for principals and administrators, however, are even less than that for teachers, in that these mean scores are 1.65 and 1.69 respectively. This indicates that most of the responses were between strongly disagree and disagree.

Hypothesis 2: There is no significant relationship between the Availability of Infrastructures and the Implementation of Computer Technology in High Schools Instructional program in Imo State as perceived by (a) Teachers, (b) Principals and (c) Administrators. Table 4 displays the results of the analysis of the relationship between the Availability of Infrastructures and the Implementation of computer technology.
Table 4
Pearson Product Moment Coefficient of Correlation for Availability of Infrastructures and the Implementation of Computer Technology in High Schools Instructional Program in Imo State.

<table>
<thead>
<tr>
<th>Group</th>
<th>Number</th>
<th>&quot;r&quot;</th>
<th>Probability of &quot;r&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teachers</td>
<td>255</td>
<td>.302</td>
<td>.000**</td>
</tr>
<tr>
<td>Principals</td>
<td>20</td>
<td>.115</td>
<td>.628</td>
</tr>
<tr>
<td>Administrators</td>
<td>37</td>
<td>.250</td>
<td>.135</td>
</tr>
</tbody>
</table>

**p < .01
*p < .05

As indicated in the data in Table 4, the results of testing the null hypothesis suggested that teachers perceive a significant relationship between the Availability of Infrastructures and the Implementation of Computer Technology. With the correlation coefficient of .000, hypothesis 4(a) was therefore rejected.

For Principals, and administrators, with their correlation coefficients being of .628, and .135 respectively, the analysis failed to achieve a significance level of .05 level or higher and therefore hypotheses (b) and (c) were accepted. This means that while teachers, felt that there was a significant relationship between the availability of Infrastructures and the Implementation of computer technology, principals and administrators, on the other hand, felt there is not significant relationship between the two variables. Table 5 displays the mean and standard deviation for teachers principals and administrators on availability of infrastructures.
Table 5
Means and Standard Deviation for Teachers, Principals, and Administrators in Imo State on Availability of Infrastructures.

<table>
<thead>
<tr>
<th>Group</th>
<th>N</th>
<th>Mean</th>
<th>S.D</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teachers</td>
<td>255</td>
<td>2.65</td>
<td>.66</td>
</tr>
<tr>
<td>Principals</td>
<td>20</td>
<td>1.93</td>
<td>.45</td>
</tr>
<tr>
<td>Administrators</td>
<td>37</td>
<td>2.19</td>
<td>.34</td>
</tr>
<tr>
<td>Total Group</td>
<td>312</td>
<td>2.55</td>
<td>.67</td>
</tr>
</tbody>
</table>

As displayed in Table 5, for teachers a mean score of 2.65 indicates that most of the responses on this variable were either disagree or undecided. The 1.93 mean score for principals and 2.19 mean score for administrators indicate that most of their responses were either strongly disagree or disagree. The SD of .66 for teachers shows fair distribution of scores around the mean especially when compared with that of .34 for administrator and slightly narrows at .45 for principals.

Hypothesis 3: There is no significant relationship between the Availability of Trained Personnel and the Implementation of Computer Technology in High Schools Instructional program in Imo State as perceived by (a) Teachers, (b) Principals and (c) Administrators. Table 6 displays the results of the analysis of the relationship between the availability of Trained Personnel and the Implementation of computer technology.
Table 6
Pearson Product Moment Coefficient of Correlation for Availability of Trained Personnel and the Implementation of Computer Technology in High Schools Instructional Programs in Imo State.

<table>
<thead>
<tr>
<th>Group</th>
<th>Number</th>
<th>&quot;r&quot;</th>
<th>Probability of &quot;r&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teachers</td>
<td>255</td>
<td>.521</td>
<td>.000**</td>
</tr>
<tr>
<td>Principals</td>
<td>20</td>
<td>.444</td>
<td>.050*</td>
</tr>
<tr>
<td>Administrators</td>
<td>37</td>
<td>.499</td>
<td>.002**</td>
</tr>
</tbody>
</table>

**p < .01
*p < .05

As shown in Table 6, the results indicate that for teachers, principals, and administrators there is a significant relationship between the Availability of trained personnel and the implementation of Computer technology at a .000, .050, and .002 level of significance respectively. The hypotheses were rejected. This indicates that there is no significant difference between the perception of teachers, principals, and administrators on availability of trained personnel and implementation of computer technology in Imo State's high school instructional program.

Table 7 shows the mean and standard deviation for teachers, principals and administrators on the availability of trained personnel.

Table 7
Means and Standard Deviation for Teachers, Principals, and Administrators in Imo State on Availability of Trained Personnel.

<table>
<thead>
<tr>
<th>Group</th>
<th>N</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teachers</td>
<td>255</td>
<td>3.00</td>
<td>.75</td>
</tr>
<tr>
<td>Principals</td>
<td>20</td>
<td>2.92</td>
<td>.59</td>
</tr>
<tr>
<td>Administrators</td>
<td>37</td>
<td>2.85</td>
<td>.60</td>
</tr>
<tr>
<td>Total Group</td>
<td>312</td>
<td>2.98</td>
<td>.72</td>
</tr>
</tbody>
</table>
In data in Table 7, the mean scores of 3.0, 2.92, and 2.85 for teachers, principals and administrators respectively indicate that most of the responses on this variable were between strongly disagree and unsure. It also shows the standard deviations of 0.79, 0.59 and 0.60 for teachers, principals and administrators respectively.

Hypothesis 4: There is no significant relationship between the Job Security and the Implementation of Computer Technology in High Schools Instructional program in Imo State as perceived by (a) Teachers, (b) Principals and (c) Administrators.

Table 8 shows the results of the analysis of the relationship between Job Security and the Implementation of computer technology.

<table>
<thead>
<tr>
<th>Group</th>
<th>Number</th>
<th>&quot;r&quot;</th>
<th>Probability of &quot;r&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teachers</td>
<td>255</td>
<td>.581</td>
<td>.000**</td>
</tr>
<tr>
<td>Principals</td>
<td>20</td>
<td>.520</td>
<td>.019**</td>
</tr>
<tr>
<td>Administrators</td>
<td>37</td>
<td>.489</td>
<td>.002**</td>
</tr>
</tbody>
</table>

**P < .01
*p < .05

The data as shown on Table 8, revealed that for teachers, principals and administrators there is a significant relationship between the Availability of job security and the implementation of Computer technology. With their correlation coefficients being .000, .019 and .002 respectively these are considered higher than .05 level of significance and therefore the hypotheses were rejected. This means is that, all the three groups (teachers, principals, and administrators) believed that there is significant
relationship between Job Security and the Implementation of computer technology. Table 9 shows the mean and standard deviation for teachers, principals and administrators on job security.

Table 9: Means and Standard Deviation for Teachers, Principal, and Administrators in Imo State on Job Security.

<table>
<thead>
<tr>
<th>Group</th>
<th>N</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teachers</td>
<td>255</td>
<td>3.82</td>
<td>.92</td>
</tr>
<tr>
<td>Principals</td>
<td>20</td>
<td>4.55</td>
<td>.23</td>
</tr>
<tr>
<td>Administrators</td>
<td>37</td>
<td>4.22</td>
<td>.48</td>
</tr>
<tr>
<td>Total Group</td>
<td>312</td>
<td>3.91</td>
<td>.87</td>
</tr>
</tbody>
</table>

For teachers a mean score of 3.82 indicates that most of the responses on the this variable were between disagree and unsure. The mean scores of 4.55 and 4.22 for principals and administrators respectively indicate that most of the responses on the variable were between strongly disagree and disagree. The SD. of .92 for teachers shows fairly wide spread of scores around the mean, especially when compared with that of .23 for principals and .48 for administrators.

Hypothesis 5: There is no significant relationship between the Government Support and the Implementation of Computer Technology in High Schools Instructional program in Imo State as perceived by (a) Teachers, (b) Principals and (c) Administrators. Table 10 displays the results of the analysis of the relationship between government support and the Implementation of computer technology.
Table 10
Pearson Product Moment Coefficient of Correlation for Government Support and the Implementation of Computer Technology in High Schools Instructional Program in Imo State.

<table>
<thead>
<tr>
<th>Group</th>
<th>Number</th>
<th>&quot;r&quot;</th>
<th>Probability of &quot;r&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teachers</td>
<td>255</td>
<td>.088</td>
<td>.165</td>
</tr>
<tr>
<td>Principals</td>
<td>20</td>
<td>.608</td>
<td>.004**</td>
</tr>
<tr>
<td>Administrators</td>
<td>37</td>
<td>.484</td>
<td>.002**</td>
</tr>
</tbody>
</table>

**P < .01
*p < .05

As indicated in Table 10, principals and administrators believed that there is a significant relationship between the availability of government support and the implementation of Computer technology. With their correlation coefficients of .004 and .002 respectively, this is considered higher than .05 and therefore the hypotheses was rejected.

For teachers, however, the analysis failed to achieve a significant at the .05 level or higher with a correlation coefficient at .165, and therefore the hypothesis 10(a) was accepted. This indicated that there was no significant difference between the perception of teachers, principals, and administrators in Imo State on government support. Table 11 shows the mean and standard deviation for teachers principals and administrator on job security.
Table 11
Means and Standard Deviation for Teachers, Principal, and Administrators in Imo State on Government Support.

<table>
<thead>
<tr>
<th>Group</th>
<th>N</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teachers</td>
<td>255</td>
<td>2.78</td>
<td>.60</td>
</tr>
<tr>
<td>Principals</td>
<td>20</td>
<td>2.62</td>
<td>.65</td>
</tr>
<tr>
<td>Administrators</td>
<td>37</td>
<td>2.43</td>
<td>.56</td>
</tr>
<tr>
<td>Total Group</td>
<td>312</td>
<td>2.73</td>
<td>.60</td>
</tr>
</tbody>
</table>

As table 11 indicates, mean scores of 2.78, 2.62, and 2.43 for teachers, principals and administrator respectively indicate that most of the response on the this variable were between disagree and unsure. It also indicates standard deviation of .60, .65, and .56 for teachers, principals and administrators respectively.

Hypothesis 6: There is no significant relationship between Market Demand and the Implementation of Computer Technology in High Schools Instructional program in Imo State as perceived by (a) Teachers, (b) Principals and (c) Administrators. Table 12 displays the results of the analysis of the relationship between market demand and the Implementation of computer technology.

Table 12
Pearson Product Moment Coefficient of Correlation for Availability of Market Demand and the Implementation of Computer Technology in the High Schools Instructional Programs in Imo State.

<table>
<thead>
<tr>
<th>Group</th>
<th>Number</th>
<th>“r”</th>
<th>Probability of “r”</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teachers</td>
<td>255</td>
<td>.366</td>
<td>.000**</td>
</tr>
<tr>
<td>Principals</td>
<td>20</td>
<td>.858</td>
<td>.000**</td>
</tr>
<tr>
<td>Administrators</td>
<td>37</td>
<td>.469</td>
<td>.003**</td>
</tr>
</tbody>
</table>

**P < .01
*p < .05
The data as shown in Table 12, indicates that for teachers, principals and administrators there is a significant relationship between Market Demand and the implementation of Computer technology at least at the .003 level of significance. This is considerably higher than .05. This means that the probability of this result occurring by chance is at least 1 in 1000. The hypotheses were rejected.

The results of the computation for teachers, principals and administrators indicated that there is no significance relationship between market demand and the implementation of computer technology in the high schools instructional program in Imo State. Table 13 displays the mean and standard deviation for teachers, principals, and administrator on market demand.

<table>
<thead>
<tr>
<th>Group</th>
<th>N</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teachers</td>
<td>255</td>
<td>3.33</td>
<td>.73</td>
</tr>
<tr>
<td>Principals</td>
<td>20</td>
<td>2.81</td>
<td>.66</td>
</tr>
<tr>
<td>Administrators</td>
<td>37</td>
<td>2.63</td>
<td>.51</td>
</tr>
<tr>
<td>Total Group</td>
<td>312</td>
<td>3.24</td>
<td>.73</td>
</tr>
</tbody>
</table>

As Table 13 indicated, a mean score of 3.33 for teachers indicates that most of the response on this variable were between disagree and unsure. While mean scores of 2.81 and 2.63 for principals and administrators indicate that most responses on this variable were between unsure and agree. Also the table reveals an SD. of .73, .66, and .51 for teachers, principals and administrators respectively.
Hypothesis 7: There is no significant difference between the perception of teachers, principals and administrators on Availability of Funds and the Implementation of computer technology in the high schools instructional program in Imo State. Table 14 shows the analysis of variance and ‘F’ ratio comparing the perceptions of teachers, principals and administrators on the availability of funds and the implementation of computer technology.

<table>
<thead>
<tr>
<th></th>
<th>Sum of Squares</th>
<th>df.</th>
<th>Mean Square</th>
<th>F Ratio</th>
<th>F Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between Groups</td>
<td>18.344</td>
<td>2</td>
<td>9.172</td>
<td>17.096</td>
<td>.000**</td>
</tr>
<tr>
<td>Within Groups</td>
<td>165.783</td>
<td>309</td>
<td>.537</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*P < .05

Table 14 shows that there was a significant difference between the perceptions of teachers, principals, and administrators on the availability of funds and implementation of computer technology. Hypothesis 7 was rejected at the .000 level of significance.

Also, the data were subjected to the Scheffe test to identify any significant difference between the groups. Table 15 sets out the results of the Scheffe test. The results revealed significant differences between the perceptions of teachers and principals and the perceptions of teachers and administrators.
Table 15
Scheffé Test of Significance on Perceptions of teachers, principals and administrators on the availability of funds and implementation of computer technology.

<table>
<thead>
<tr>
<th>Group</th>
<th>Number</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teachers</td>
<td>255</td>
<td>2.30</td>
</tr>
<tr>
<td>Principals</td>
<td>20</td>
<td>1.65*</td>
</tr>
<tr>
<td>Administrators</td>
<td>37</td>
<td>1.69*</td>
</tr>
<tr>
<td>Total</td>
<td>312</td>
<td>2.19</td>
</tr>
</tbody>
</table>

*Denotes pairs of groups significantly different at the .05 level.

Hypothesis 8: There is no significant difference between the perception of Teachers, Principals and school Administration on Availability of Infrastructures and the Implementation of Computer Technology in High Schools Instructional program in Imo State. Table 16 displays the analysis of variance and “F” ratio comparing the perceptions of teachers, principals and administrators on the availability of infrastructures and the implementation of computer technology.

Table 16
Analysis of Variance and “F” Ratios Comparing Teachers, Principals, and Administrators in Imo State on Availability of Infrastructures.

<table>
<thead>
<tr>
<th></th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F-Ratio</th>
<th>F-Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between Groups</td>
<td>14.842</td>
<td>2</td>
<td>7.421</td>
<td>18.597</td>
<td>.000**</td>
</tr>
<tr>
<td>Within Groups</td>
<td>123.298</td>
<td>309</td>
<td>.399</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 16 shows there is a significant difference between the perceptions of teachers, principals, and administrators on the Availability of Infrastructures and the Implementation of Computer technology, therefore, the hypothesis was rejected at the .05 level of significance. These data were also subjected to the Scheffe’s test to identify the source of the significant difference between the groups. Table 17 shows the results of the Scheffe’ test.

The results revealed significant differences between teachers and principals and teachers and administrators.

<table>
<thead>
<tr>
<th>Group</th>
<th>Number</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teachers</td>
<td>255</td>
<td>2.65</td>
</tr>
<tr>
<td>Principals</td>
<td>20</td>
<td>1.93 *</td>
</tr>
<tr>
<td>Administrators</td>
<td>37</td>
<td>2.19 *</td>
</tr>
<tr>
<td>Total</td>
<td>312</td>
<td>2.55</td>
</tr>
</tbody>
</table>

*Denotes pairs of groups significantly different at the .05

Hypothesis 9: There is no significant difference between the perception of Teachers, Principals and school Administration on Availability of Trained Personnel and the Implementation of Computer Technology in High Schools Instructional program in Imo State. Table 18 shows the analysis of variance and ‘F’ ratio for teachers, principals and administrators on the availability of trained personnel and the implementation of
computer technology.

Table 18
Analysis of Variance and “F” Ratios Comparing Teachers, Principals, and Administrators in Imo State on Availability of Trained Personnel.

<table>
<thead>
<tr>
<th></th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F-Ratio</th>
<th>F-Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between Groups</td>
<td>750</td>
<td>2</td>
<td>.375</td>
<td>.714</td>
<td>.490</td>
</tr>
<tr>
<td>Within Groups</td>
<td>162.264</td>
<td>309</td>
<td>.525</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

p>0.05

As shown in Table 18, there is no significant difference between the perception of teachers, principals, and administrators on availability of trained personnel and implementation of computer technology. The hypothesis was accepted at the .490 level of significance.

Hypothesis 10: There is no significant difference between the perception of Teachers, Principals and school Administration on Job Security and the Implementation of computer technology in the high schools instructional program in Imo State. Table 19 shows the analysis of variance and ‘F’ ratio for teachers, principals, and administrators on job security and the implementation of computer technology.
Table 19
Analysis of Variance and “F” Ratios Comparing Teachers, Principals, and Administrators in Imo State on Availability of Job Security.

<table>
<thead>
<tr>
<th></th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F-Ratio</th>
<th>F-Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between Groups</td>
<td>14.053</td>
<td>2</td>
<td>7.026</td>
<td>9.735</td>
<td>.000**</td>
</tr>
<tr>
<td>Within Groups</td>
<td>223.030</td>
<td>309</td>
<td>.722</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*p < .05

Table 19 reveals that there is significant difference between the perception of teachers, principals and administrators on job security and the implementation of computer technology. The hypothesis was rejected at the .000 level of significance.

These data were also subjected to the Scheffe statistical procedure to identify the source of significance among the three groups. Table 20 shows the results of the Scheffe test. The Scheffe test indicates that significant differences occurred between the perceptions of teachers and principals and the perceptions of teachers and administrators.
TABLE 20
Scheffée Test of Significance on Perceptions of Teachers, Principals and Administrators on Job Security and Implementation of Computer Technology.

<table>
<thead>
<tr>
<th>Group</th>
<th>Number</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teachers</td>
<td>255</td>
<td>2.65</td>
</tr>
<tr>
<td>Principals</td>
<td>20</td>
<td>1.93*</td>
</tr>
<tr>
<td>Administrators</td>
<td>37</td>
<td>2.19*</td>
</tr>
<tr>
<td>Total</td>
<td>312</td>
<td>2.55</td>
</tr>
</tbody>
</table>

*Denotes pairs of groups significantly different at the .05 level.

Hypothesis 11: There is no significant difference between the perception of Teachers, Principals and school Administration on Government Support and the Implementation of Computer Technology in High Schools Instructional program in Imo State. Table 21 shows the analysis of variance and ‘F’ ratio for teachers, principals and administrators on government support and the implementation of computer technology.

Table 21
Analysis of Variance and “F” Ratios Comparing Teachers, Principals, and Administrators in Imo State on Government Support.

<table>
<thead>
<tr>
<th></th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F-Ratio</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between Groups</td>
<td>4.258</td>
<td>2</td>
<td>2.129</td>
<td>6.010*</td>
<td>.003**</td>
</tr>
<tr>
<td>Within Groups</td>
<td>109.460</td>
<td>309</td>
<td>.354</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**p < .01
*p < .05
The results on Table 21 indicate that there is no significant difference between the perceptions of teachers, principals and administrators on the availability of government support and implementation of computer technology. The hypothesis was then rejected at the .003 level of significance.

The Scheffe statistical procedure was also employed to identify significance among the three groups. Table 22 displays the results of the Scheffe’s test. It indicated that significant differences occurred between the perceptions of teachers and administrators on government support and the implementation of computer technology

Table 22

<table>
<thead>
<tr>
<th>Group</th>
<th>Number</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teachers</td>
<td>255</td>
<td>2.78</td>
</tr>
<tr>
<td>Principals</td>
<td>20</td>
<td>2.62</td>
</tr>
<tr>
<td>Administrators</td>
<td>37</td>
<td>2.43*</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>312</td>
<td>2.73</td>
</tr>
</tbody>
</table>

*Denotes pairs of groups significantly different at the .05

Hypothesis 12: There is no significant difference between the perception of Teachers, Principals and school Administration on Market Demand and the Implementation of Computer Technology in High Schools Instructional program in Imo State. Table 23 shows the analysis of variance and ‘F’ ratio for teachers, principals, and administrators on market demand and the implementation of computer technology.
Table 23
Analysis of Variance and "F" Ratios Comparing Teachers, Principals, and Administrators in Imo State on Market Demand.

<table>
<thead>
<tr>
<th></th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F-Ratio</th>
<th>F-Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between Groups</td>
<td>11.830</td>
<td>2</td>
<td>5.915</td>
<td>11.833</td>
<td>.000**</td>
</tr>
<tr>
<td>Within Groups</td>
<td>154.468</td>
<td>309</td>
<td>.500</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

** P < .01
*p < .05

Table 23 indicates that there is a significant difference between the perception of teachers, principals and administrators on market demand and the implementation of computer technology. The hypothesis was therefore rejected at the .000 level of significance. These data were also subjected to the Scheffe statistical procedure to locate the groups between which the significance difference was found. Table 23 reveals the results of the Scheffe's test and indicated that significant differences between the perceptions of teachers and principals and between the perceptions of teachers and administrators.
Table 24
Scheffé Test of Significance on Perceptions of Teachers, Principals and Administrators on Market Demand and implementation of Computer Technology.

<table>
<thead>
<tr>
<th>Group</th>
<th>Number</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teachers</td>
<td>255</td>
<td>3.33</td>
</tr>
<tr>
<td>Principals</td>
<td>20</td>
<td>2.81*</td>
</tr>
<tr>
<td>Administrators</td>
<td>37</td>
<td>2.63 *</td>
</tr>
<tr>
<td>Total</td>
<td>312</td>
<td>3.24</td>
</tr>
</tbody>
</table>

Summary

This chapter analyzed the results of the data collected for the study using Pearson Product Moment Linear Coefficient of Correlation. The results indicated as follows: on funding and implementation of computer technology, teachers found a significant relationship, while principals and administrators found no significance. The result also indicated that teachers felt that there is a significant relationship between availability of infrastructures and the implementation of computer technology, while principals and administrator saw no significance at all.

Furthermore, the result indicated that teachers, principals, and administrator all agreed that there is a significant relationship between availability of trained personnel and the implementation of computer technology. The result also indicated that on job security and the implementation of computer technology, the three groups, teachers, principals, and administrators found a significant relationship.

On Government support and the implementation of computer technology, principals and administrators found a significant relationship, while teachers found no significant relationship all. Also, on market demand and the implementation of computer Technology, the three groups, teachers, principals, and administrators found a significant
relationship.

Also, the results revealed significant differences between the perceptions of teachers, principals, and administrators on the implementation of computer technology and many of the variables stated in the hypotheses as follows: the result shows a significant difference between the perceptions of teachers and principals as well as teachers and administrators on the funds and the implementation of computer technology. The result also, indicated a significant difference between the perceptions of teachers and principals, and teachers and administrators on the availability of infrastructures and the implementation of computer technology.

Furthermore, the result revealed that teachers and administrators differed in their perceptions on job Security and the implementation of computer technology. Finally, the result also, indicated perception difference between teachers and principals as well as teachers and administrators on market demand and the implementation of computer technology.
CHAPTER VI
FINDINGS, CONCLUSIONS, IMPLICATIONS AND RECOMMENDATIONS

Introduction

This chapter presents a summary of the findings, the implications and conclusions and gives recommendations drawn from the findings. This study investigated the factors that affect the implementation of computer technology in Imo State high schools instructional program. Incorporating a correlational analysis, the researcher sought to determine possible relationships between implementation of computer technology and selected variables identified from the literature to bear some relationship.

Findings

Hypothesis 1: There is no significant relationship between Availability of Funds and the Implementation of Computer Technology in High Schools Instructional program in the Imo State as perceived by (a) Teachers, (b) Principals and (c) Administrators.

The finding revealed that for teachers there is a significant relationship between the availability of funds and the implementation of computer technology at the .05 level. For principals and administrators, the test revealed no significant relationship.

Hypothesis 2: There is no significant relationship between the Availability of Infrastructures and the Implementation of Computer Technology in High Schools Instructional program in Imo State as perceived by (a) Teachers, (b) Principals and (c) Administrators.
The result of testing the hypothesis indicated that teachers perceive a significant relationship between the availability of infrastructures and the implementation of computer technology. A coefficient of .000 indicated a significance at the .05 level (Table 3) hence, hypothesis (a) was rejected. In the case of the principals and administrators the test showed no significance with their correlation coefficients being .628 and .135. Therefore, hypotheses b, and c were rejected.

Hypothesis 3: There is no significant relationship between Availability of Trained Personnel and the Implementation of Computer Technology in High Schools Instructional program in Imo State as perceived by (a) Teachers, (b) Principals and (c) Administrators.

Pearson Product Moment Linear Correlation Coefficient was applied to the data. The three groups, as revealed on Table 5, believe there is a significant relationship between the availability of trained personnel and the implementation of computer technology. Their correlation coefficients show .000, .050, and .002 for teachers, principals, and administrators respectively. Hypotheses a, b and c were all rejected.

Hypothesis 4: There is no significant relationship between the Job Security and the Implementation of Computer Technology in High Schools Instructional program in Imo State as perceived by (a) Teachers, (b) Principals and (c) Administrators.

Applying Pearson Product Moment Linear Correlation Coefficient on the data revealed as indicated on table 7 that teachers, principals and administrators all believed that there is significant relationship between Job security and Implementation of computer technology hence the researcher rejected the hypotheses.
Hypothesis 5: There is no significant relationship between Government Support and the Implementation of Computer Technology in High Schools’ Instructional program in Imo State as perceived by (a) Teachers, (b) Principals and (c) Administrators.

Based on the computed coefficient of this test (Table 9), principals and administrator believed that there was a significant relationship between government support and the implementation of computer technology, therefore the hypotheses b and c were rejected. On the other hand, teachers believed there was no significant relationship hence the hypothesis “a” was accepted.

Hypothesis 6: There is no significant relationship between the Market Demand and the Implementation of Computer Technology in High Schools Instructional program in Imo State as perceived by (a) Teachers, (b) Principals and (c) Administrators.

Hypothesis 6 was tested using the correlation coefficient as with Hypotheses 1 through 5. The result indicated that teachers, principals and administrators all believed that there was a significant relationship between market demand and the implementation of computer technology, hence the hypothesis was rejected.

Hypothesis 7: There is no significant difference between the perception of teachers, principals and administrators on Availability of Funds and the Implementation of Computer Technology in High Schools Instructional program in Imo State.

The perceptions of teachers, principals, and administrators were tested using the Analysis of Variance (ANOVA). The result indicated that there is a significant difference on their perceptions on availability of funds and the implementation of computer technology. Hypothesis 7 was rejected at the .000 level of significance.
Also, Scheffe’s Test of significance revealed, as shown on Table 14, that there were significant differences between teachers and principals, and teachers and administrators.

**Hypothesis 8:** There is no significant difference between the perceptions of Teachers, Principals and school Administration on Availability of Infrastructures and the Implementation of Computer Technology in the High Schools Instructional program in Imo State.

Analysis of Variance (ANOVA) was applied on the data to determined if there were significant differences between the perceptions of teachers, principals and administrators on the availability of infrastructures and the implementation of computer technology. As displayed on table 15, the result indicated significant differences between the three groups. The hypothesis was rejected at the .000 level of significance. Again, Scheffe’s test of significance indicated significant differences between teachers and principals and teachers and administrators.

**Hypothesis 9:** There is no significant difference between the perceptions of Teachers, Principals and school Administration on Availability of Trained Personnel and the Implementation of Computer Technology in the High Schools Instructional program in Imo State.

The analysis of variance applied to the data as indicated on Table 17, indicated that there are no significant differences between the perceptions of teachers, principals and administrators on the availability of trained personnel and the implementation of computer technology. Hypothesis 9 was accepted at the .490 level of significance.

**Hypothesis 10:** There is no significant difference between the perceptions of Teachers, Principals, and Administrators on Job Security and the Implementation of
Computer Technology in the High Schools Instructional program in Imo State.

Analysis of variance was used to test if there are significant differences between the perceptions of teachers, principals, and administrators on job security and the implementation of computer technology. The Analysis of Variance indicated a significant difference between the three groups. Hypothesis 10 was rejected at the .000 level of significance. Scheffee test of significance indicated that teachers and principals, and teachers and administrators differ on the perceptions on Job Security and the Implementation of Computer Technology.

Hypothesis 11: There is no significant difference between the perception of Teachers, Principals, and Administrators on Government Support and the Implementation of Computer Technology in the High Schools Instructional program.

The results of applying the analysis of variance on the data (Table 21) for the perceptions of teachers, principals and administrators on government support and the implementation of computer technology, indicated significant differences. The hypothesis was rejected at the .003 level of significance. Scheffé's test of significance (22) indicated a difference between teachers and administrators.

Hypothesis 12: There is no significant difference between the perception of Teachers, Principals and school Administration on Market Demand and the Implementation of Computer Technology in the High Schools Instructional program in Imo State.

The Analysis of Variance on Table 23 revealed that there were significant differences on the perceptions of sample groupings between market demand and the implementation of computer technology. Sheffée's Test of significance as indicated on
Table 24, revealed a difference in perceptions between teachers and principals, and teachers and administrators on market demand and the implementation of computer technology.

Conclusions

Based on the findings of this study, the researcher concluded that funding and implementation of computer technology in instructional programs in Imo State secondary schools are directly related. Teachers believed that there is a significant relationship between the two variables. On the other hand, principals and administrators thought there was no significant relationship between funding and the implementation of computer technology. Based on the findings, the researcher concluded that the state of the country’s economic situation affect the implementation of computer technology. In Imo State, as at the time this study was conducted, most teachers had not received their salaries for three months.

On infrastructures and computer technology, the study showed that lack of fund was the cause of the absence of relevant infrastructures, like adequate classrooms, instructional facilities and building structures adequate to house computers. On trained personnel and the implementation of computer technology, the researcher concluded that because computer technology is capital as well as human intensive, the schools did not have the resources to train teachers in the area of computer technology.

The fact that three groups (teachers, principals, and administrators) all believed there was a significant relationship between job security and implementation led the researcher to conclude that: (1) The fear computer technology brings unemployment was
still widely held by teachers, principals, and administrators. (2) Resistance to change is the biggest fact to technological innovation and that teachers, principals, and administrators will stop any effort that is geared towards the implementation of computer technology for fear of loss of job. On government support and the implementation of computer technology, the researcher concluded that lack of government support was as a result of the present state of the country's economic situation. Because of the country's economic status, the government did not have the financial resources to support the implementation of computer technology. Also, that the country's economic problems could be the reason the government had little or no policy in place to reward and train teachers to use computer technology in schools.

Finally, the significant relationship between market demand and the implementation of computer technology made the researcher to conclude that most businesses did not use or require the skills of computer-trained personnel. The implication of this is that if there is no demand for computer trained personnel by businesses and schools, the government will find it unnecessary to channel resources to this area. It should also be noted that computer technology was still at an infancy stage in part of the country. The respondents to the questionnaire could not have been exposed to this type of technology.

**Implications**

The fact that there are significant relationships between availability of funds and the implementation computer technology and between infrastructures and implementation of computer technology do indicate that funds are the greatest obstacle to the
implementation of computer technology. If funds are made available, adequate infrastructures will be in place for the implementation of computer technology.

Again, the significant relationship that exists between trained personnel and the implementation of computer technology indicates that there are no funds available to train teachers in the use of computers. As indicated fund is the biggest obstacle in the implementation of computer technology. If funds are made available, teachers could be train in the use of computer technology.

The most disturbing finding in this study was the relationship between job security and implementation of computer technology. The significant relationship indicates that, the fear that computer technology brings unemployment is strongly held by the teachers, principals and administrators. The implication of this outcome is that people who would be willing to introduce computer technology would stop very quickly once they perceive that they would lose their jobs or that some of their colleagues could lose their jobs.

Another implication of this finding is that government is not developing policy to encourage the implementation of computer technology in the schools. There is no system in place for tracking the use of computer technology, no budget for procuring computer technology and no provision for infrastructures in schools for implementing computer technology.

Finally, the finding revealed that most businesses do not use or require the skills of computer trained personnel. The implication of this is that if there is no demand for Computer-trained personnel by businesses and schools, the government will find it unnecessary to channel resources to this area.
Recommendations

Computers have become a very important part of today’s modern society. Even the most basic employment opportunities in this decade requires at least a general understanding of computer technology in the Western world. In a society as demanding as Nigeria’s, it is imperative to introduce computer technology to students as early as possible. This opportunity has become a realistic component of elementary, secondary as well as post secondary curriculums across the whole world.

The ability to apply technological capabilities has become a basic skill that is essential to all members of today’s society, including Nigerians. It is, therefore, a necessity for Nigerian policy-makers and school administrators to develop a plan that would help implement computer technology into all areas of classroom curriculum in order for Nigerians to compete in the global market.

In Nigeria, the biggest problem to technological innovation is resistance to change. Resistance will be less if administrators, teachers, board members, community leaders feel that innovation is their own and not one devised and operated by outsiders.

As Nwachukwu (1997) stated:

Technological achievement is the result of a combination of forces: intellectual habit of inquiry and problem-solving/socio-political discipline; patriotism and commitment to individual and collective excellence. For Nigeria to attain an appreciable level of technology, there must be a radical change of attitude to work and to the nation. It is important to note, however, that technology cannot thrive where there is minimal investment on science education, on scientific research and teaching.

The government should develop policies and programs for training teachers for computer use and provide infrastructures for the implementation of computer technology. The fact that teachers, principals, and administrators all believed that there is a significant
relationship between job security and computer technology led the researcher to recommend that there should be mass computer literacy campaigns to educate the people that computer technology does not cause unemployment but creates jobs for the people.

Summary:

This chapter provided conclusions, implications, and recommendations developed from the findings of this study. It was concluded that there is a relationship between funds and implementation of computer technology. One of the greatest implications of the study indicated that people do fear that computer technology brings unemployment so if computer technology is implemented, they might loss their jobs.

The researcher recommended that mass literacy campaigns should be carried out to educate people that computer technology does not bring unemployment but rather creates jobs for the people. Finally, the study recommended that more study should be done on why computer technology should be implemented at the high school instructional level.
BIBLIOGRAPHY


Uwandu Paul "Qualitative and Quantitative Factor in Education." Paper Read at the Imo State Ministry of Education: Colloguin, 1st March 1992.
Computer Technology Assessment Survey

This study is designed to obtain information on factors which affect the implementation of computer educational technology in Imo State schools. Please use the following response code to select the response which best describes your view.

SA – Strongly Agree  
A – Agree  
U – Unsure  
D – Disagree  
SD – Strongly Disagree

<p>| | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Organizations give money specifically for buying computer technology for Nigerian schools.</td>
<td>SA</td>
<td>A</td>
<td>U</td>
</tr>
<tr>
<td>2.</td>
<td>Sufficient funds are allocated to implement computer technology.</td>
<td>SA</td>
<td>A</td>
<td>U</td>
</tr>
<tr>
<td>3.</td>
<td>Funds are available to train teacher in computer technology.</td>
<td>SA</td>
<td>A</td>
<td>U</td>
</tr>
<tr>
<td>4.</td>
<td>Because of the economic condition of the country, Adequate funds are not available for the implementation of computer technology.</td>
<td>SA</td>
<td>A</td>
<td>U</td>
</tr>
<tr>
<td>5.</td>
<td>Commercial businesses receive tax concession when they provide funding for the implementation of computer technology.</td>
<td>SA</td>
<td>A</td>
<td>U</td>
</tr>
<tr>
<td>6.</td>
<td>There is a dependable supply of electricity for the Implementation computer technology.</td>
<td>SA</td>
<td>A</td>
<td>U</td>
</tr>
<tr>
<td>7.</td>
<td>There are adequate classrooms or instructional facilities for the implementation of computer technology.</td>
<td>SA</td>
<td>A</td>
<td>U</td>
</tr>
<tr>
<td>7.</td>
<td>Current building structures are not designed for Technical instruction.</td>
<td>SA</td>
<td>A</td>
<td>U</td>
</tr>
<tr>
<td>9.</td>
<td>Buildings are not secure enough to house computers.</td>
<td>SA</td>
<td>A</td>
<td>U</td>
</tr>
<tr>
<td>10.</td>
<td>Maintenance services for computer technology are readily available.</td>
<td>SA</td>
<td>A</td>
<td>U</td>
</tr>
<tr>
<td>11.</td>
<td>There are sufficient number of teachers trained in computer technology to implement it in the instructional program.</td>
<td>SA</td>
<td>A</td>
<td>U</td>
</tr>
<tr>
<td>12.</td>
<td>People do not get the opportunity to contribute and, as a result, do not feel committed</td>
<td>SA</td>
<td>A</td>
<td>U</td>
</tr>
<tr>
<td>13.</td>
<td>There is no policy in place to reward teachers who use of computer technology in the instructional program.</td>
<td>SA</td>
<td>A</td>
<td>U</td>
</tr>
</tbody>
</table>
14. Teachers competent in computer technology often leave for higher wages.

15. People are not interested in using computer technology in teaching.

16. If computer technology is implemented I could lose my job.

17. Implementation of Computer technology will force people to retire.

18. Teachers who are not willing to be trained in the use of computer technology might lose their jobs.

19. If I find it difficult to learn how to use computers, I might loose my job.

20. Individuals who do not have aptitude for working with computer technology might be eliminated from classrooms.

21. The government has clearly defined policies governing the use of computer technology in schools.

22. Government does not provide facilities to support computer technology.

23. Schools are involved in developing policies to guide the implementation of computer technology in the curriculum.

24. Government does not provide adequate infrastructure in schools for the implementation of computer technology.

25. The government has developed guidelines for applying for assistance in procuring computer technology for schools.

26. The government has established a system for tracking the use of computer technology in the instructional program.

27. The government has a budget for procuring technology for use in schools.

28. It is clearly established who is responsible for training teachers to use technology in schools.

29. There is no demand for computer trained personnel by the industry.

30. Computer technology does not attract much pay.

31. Many companies in Imo State do not need the skills of computer trained personnel.

32. Job positions for computer trained individuals are very rarely advertised.