

Factors that Hinder the Implementation of Information and Communication Technology (ICT) in Public Secondary Schools in Fako Division, South West Region of Cameroon

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Abstract: This study sought to investigate factors that hinder the implementation of Information and Communication Technology (ICT) in Secondary Schools in Cameroon: The case of Fako Division. The study is limited to Form Fours of six government general education schools within Fako Division, South West Region of Cameroon. The study, more specifically sought to provide answers to the following research questions: What are the factors that hinder the successful implementation of ICT in secondary schools? The survey research design was employed and a sample of 350 students and 18 teachers were selected from six schools in Fako Division. A questionnaire was used to collect data which was analysed using SPSS version 17. The results of the data analysis revealed that factors that hinder the implementation process include, inadequate number of computers, lack of reliable internet connectivity, lack of skilled human resources, unreliable electrical supply, frequent disruption of electricity power, lack of uninterrupted power supply units (UPS), and inadequate teacher training. Based on the findings, recommendations based on successful implementation of ICT polices, were made.

Keywords: *Hinder, Implementation, ICT, Secondary Schools in Cameroon, Fako Division, number of computers, Teacher Training.*

I. INTRODUCTION

There is growing recognition of the importance of ICT in all areas of human endeavour and more so in enhancing the quality of educational services in schools in Cameroon. In Cameroon, many schools have adopted and are in the process of implementing ICT policies. Many others may also be considering joining the band wagon. It is therefore very important to be familiar with the experiences of schools with the lessons of experience in the use of ICT. However, within a context that is not characterised by regular monitoring and evaluation, much is not known about the experiences of schools already implementing ICT. This constitutes a problem because it makes it difficult for improvements and the potential for others considering similar ventures to learn from the experiences of those who have gone before. It is hoped that this study will close this gap by shedding light on the factors that facilitate and those that hinder the implementation of ICT in secondary schools. Furthermore, it should inform educationist on how ICT are increasingly being used in secondary schools.

II. RESEARCH PROBLEM

In Cameroon, many schools have adopted and are in the process of implementing ICT policies. Many others may also be considering joining the band wagon. It is therefore very important to be familiar with the experiences of schools with

the lessons of experience in the use of ICT. It is hoped that this study will close this gap by shedding light on the factors that hinder the implementation of ICT in secondary schools.

The study specifically has as objective to investigate the factors that hinder the successful implementation of ICT in Secondary schools. The study will attempt to answer the question, what are the factors that help the successful implementation of ICT in Secondary Schools?

III. REVIEW OF RELATED LITERATURE

The Ministry of National Education authorised the Inspectorate General of Pedagogy in charge of teaching computer sciences at all levels to design and develop a project on cyber education in Cameroon as a means of consolidating the presidential statement and the World Bank initiative. The project was implemented in April 2001. In 2004, key strategies on using ICT in education were highlighted in the first official draft of the Cameroon National Information and Communication Infrastructure (NICI) policy Tchinda (2007), a plan prepared by the government with support from the United Nations Development Program (UNDP) and the United Nations Economic Commission for Africa (UNECA). In this document, the Cameroonian government recognises ICT as a national priority along with education, healthcare, forestry, and good governance.

In recent years, there has been a groundswell of interest on how computers and the Internet can best be harnessed to improve the efficiency and effectiveness of education at all levels and in both formal and non-formal settings all over the world. This was evident on the 18th November 2005, at Tunis, when the Geneva Declaration of Principles and Plan of Action adopted at the first phase of the World Summit on the Information Society in Geneva in December 2003 were reaffirmed (WSIS-05/TUNIS/DOC/7-E). The importance of ICT was also reinforced by Koffi Annan (Former UN Secretary General) at the Second World Summit on the Information Society at Tunis in November 2005, when he reminded participants that:

IV. THEORETICAL FRAMEWORK

Fullan's Theory of Educational Change and Ludwig Von Bertalanffy Organisational System Theory. To Fullan (1982) change is a process that involves four inter-related stages or phases: adoption, implementation, continuation and outcomes. There are factors associated with each of these stages:

Adoption ⇔ Implementation ⇔ Continuation ⇔ Outcomes

According to Fullan, (1982) when it is not necessary to change, it is necessary not to change (p. 13). To him, the nature of educational and social change must first be understood in terms of its sources and purposes. Major

external and internal forces, over time, create pressures for change. There are three broad ways in which pressures for educational policy change may arise (Levin, 1976; Fullan, 1982).

A system, according to Houghton, V. et al. (1975), is "a complex set of elements in mutual interaction". The systems theory views an organisation as a social system which can be sub-divided into sub-systems with each having a part to play in order to ensure the optimal performance and growth of the system. The parts are interrelated and interdependent to the extent that if one does not perform as expected, the entire system will be negatively affected. (Hoy & Miskel, 1996).

There are many scholars who share the opinion that our experience and those of others can be powerful sources of learning (for example, Dewey, 1938). However, Dewey also cautions that, the fact that a genuine education comes about through experience does not mean that all experiences are genuinely or equally educative. Some experiences could be miseducative. Furthermore, Dewey holds that an experience is miseducative if it has the effect of arresting or distorting the growth of further experience. To him, if an experience engenders callousness; it may produce lack of sensitivity and responsiveness. As a consequence, the possibilities of having richer experiences in the future are restricted. An experience may be immediately enjoyable and yet promote the formation of a slack and careless attitude that does not help learning.

V. SIGNIFICANCE OF THE STUDY

This work will also be beneficial to researchers. This study aims to add to the existing stock of information on the use of ICT in Cameroon, Africa and the World at large. This will provide researchers with pertinent information needed in schools' experiences with ICT.

VI. MATERIAL AND METHODS

In this study, the research design used is the survey research design. According to Mbua (2003), a survey research can be defined as "the collection of data from a defined population to describe the present condition of the population using the variables or issues under study" (p.521). A questionnaire was designed and used to collect needed data. Thus, the opinions of students and teachers towards the use of ICT and the factors that help as well as factors that hinder the implementation of ICT were obtained and these were used to answer the relevant research questions.

The target population is made up of all the 12 government secondary schools of Fako Division implementing ICT with computer laboratories as stated by the 2009/2010 report from the Regional Delegation of Computer Studies. The accessible population consists of all the form four students of the six government high schools which were used in the study. These were Government High School (G.H.S) Limbe, Government Bilingual High School (G.B.H.S) Limbe, Bilingual Grammar School (B.G.S) Molyko, Government High School (G.H.S) Bokwango, Government Bilingual High School (G.B.H.S) Tiko and Government Bilingual High School (G.B.H.S) Muyuka. A total of 12 Government Secondary Schools were identified in the Urban and Rural areas of Fako Division. This is because they have computer laboratories, have adopted ICT and are in the process of implementing the use of ICT. Furthermore, accessibility was also a consideration.

Administratively, only Limbe is an Urban area while the rests are Rural areas. Government Bilingual High School Limbe (G.B.H.S) is located at the outskirts of Limbe along the Mile 4-SONARA high way. G.B.H.S Limbe is about 200ms adjacent to G.H.S Limbe. G.B.H.S Limbe was created in 1988. It has a student enrolment of 1662 students with 108 staff members. G.H.S Limbe was created in 1975 and has a student enrolment of 2301 students with 115 staff members. Bilingual Grammar School Molyko-Buea is located at "Checkpoint Quarter" in Molyko and was created in 1961 and has a staff capacity of 159 with a student population of 2025. While Government High School Bokwango is located at LykokoMembea in Buea. It was created in 1987 and has a student population of 2205 with 100 staff members.

Government Bilingual High School Tiko is located at "Wireless Quarter" at Likomba in Tiko. It was created in 1983 and has a student enrolment of 3280 and 95 staff members. Government Bilingual High School Muyuka is located at "Makangha Quarter" in Muyuka. It was created in 1985. It has a student population of 2030 with 87 teachers.

Schools were purposively selected to reflect the research focus based on statistics from the South West Delegation of Secondary Education. The basis for selection was the use of ICT. A multistage approach was used to select the sample. Firstly, the researcher purposively selected the schools which constituted the target population, thereafter, 18 ICT teachers and 360 ICT students were selected from the accessible population of 60 teachers and 2,700 students respectively. The multistage sampling procedure was used to come out with the 378 respondents in this study (18 teachers and 360 students). In the first stage, the researcher used the purposive sampling technique to select 6 schools, at least one from each subdivision in Fako division. This was based on the strength that, the selected schools possess all the necessary information, in other words they all use ICT.

The second stage consisted of selecting the respondents. The researcher purposively decided to use 360 ICT students and 18 ICT teachers, choosing 60 ICT students and 3 ICT teachers from each school in the accessible population.

Data was analysed using SPSS Version 20.0 for windows. Table, frequencies and percentages were the mean tools used.

VII. FINDINGS

Research Question One: What are the factors that hinder the implementation of ICT in Secondary Schools?

Two items (open ended and closed ended questionnaire) were designed for students to provide answers to the first research question above.

Item 1: "What, in your opinion, are the problems being faced by the school's computer or internet services"?

Table 1 with descending frequencies ranging from 76-7 presents the problems faced by students. Figure 1 reinforces the responses on Table 1. The responses to item 3 are further analysed below as follows:

Problem: The lack or inadequate number of computers in schools was the first problem mentioned (Freq. =76).

Analysis of responses of students

Table 1: Frequency distribution of students' opinion of problems faced by ICT services

Problems	G.H.S Limbe Freq.	G.B.H.S Limbe Freq.	B.G.S Molyko Freq.	G.B.H.S Tiko Freq.	G.H.S Bokwango Freq.	G.B.H.S Muyuka Freq.	Total Freq.
Inadequate number of computers	15	14	3	19	19	6	76
Unreliable internet connectivity services	19	5	7	9	15	2	57
Lack of skilled technical support personnel.	6	5	5	6	18	14	54
Lack of internal rules and regulations	13	24	6	6	1	-	50
Frequent disruption of electricity power	5	-	-	-	33	-	38
Lack of Uninterrupted Power Supply Units (UPS)	3	3	-	2	4	15	27
Inadequate teacher training	4	-	-	3	-	-	7
Total	65	51	21	45	90	37	309

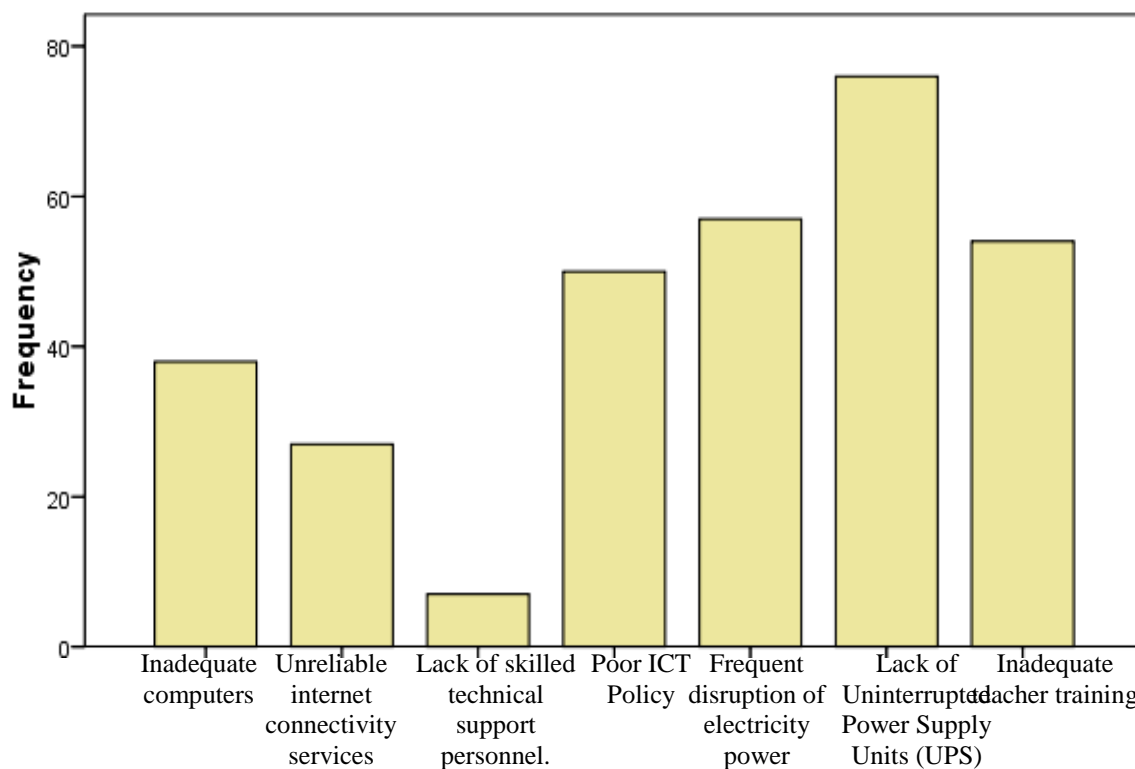


Figure 1: Bar Chart reflecting problems faced by ICT

Since this questionnaire item was open-ended, below are samples of what some of the students had to say:

- “Due to Shortage of Computers (30) distributed over a population of about 2500 students each student does not have ample time to browse through as everybody is willing to” (Student GHS, Limbe).
- “To me, the only problem is that the computers are small relative to the number of students in our school. We have just 30 computers” (Student GHS, Limbe).
- “The computers are insufficient for proper studies” (Student, GBHS Tiko).
- “Our school have a small number of computers which cannot even accommodate all the students in one class” (Student GBHS, Muyuka).

Problem: Unreliable, inadequate and slow internet connectivity were the second problem respectively mentioned (Freq. =57).

Below are some of the things said by the students in this regard:

- “Most of our internet services are very slow which makes it difficult to access the Internet quickly” (Student GBHS, Tiko).
- “Internet service is not in all computers” (Student BGS, Molyko).
- “In our school not all the computers have internet services” (Student GHS, Bokwango).
- “The Internet service is not functioning properly” (Student GBHS, Tiko).

Problem: Lack of skilled technical support personnel in school was the third frequently mentioned problem (Freq. =54).

What follows is a sample of what was said by these students:

- “Most of the computers have viruses”, “there are many computers but most of them are bad and I feel uncomfortable”, and “some of the computer systems are bad and some not having mouse” (Student GHS, Buea).
- “Sometimes the computers get bad easily” (Student GBHS, Muyuka).
- “The computers usually have viruses which disturb them from functioning well” (Student GBHS, Muyuka).
- “Some computers do not function at all” (Student GBHS, Muyuka).
- “The problems being faced by the school is the lack of programmes” (Student GBHS, Muyuka).
- “The computers now presently are in French (Keyboard) than before which was in English” (Student GHS Limbe).
- “I think the school lack teachers for computer science” (Student GHS, Bokwango).

Problem: Lack of internal rules and regulations /the absence of aproject implementation strategy was also mentioned (Freq. =50).

- The general complaint was that computer Lab. visits were very few and as consequence students did not have adequate practical computer experience. In addition, students reportedly damaged the ICT services placed at their disposal while others use the Internet mostly for entertainment rather than for academic purpose e.g watching pornographic movies, scamming, chatting or playing games.

Problem: The Absence of a power generator had a frequency of 38.

- “We need a generator to help us supply electricity to the computer during the periods of black-out by AES-SONEL” (Student, GHS Limbe).
- “When we are in the computer lab., manipulating the computer it goes off” (Student GHS, Bokwango).

- “There is always power failure” (Student GHS, Bokwango).

Problem: Lack of Uninterrupted Power Supply Units (UPS) (Freq. 27)

Frequency here ranges from (2-15). GBHS Muyuka recorded the highest. These are what some students of had to say:

- “We usually face problems like low voltage” (Student GBHS, Muyuka).
- “Low voltage of electricity and electricity problems” (Student GHS Limbe).
- “The computers sometimes have low voltage or light goes off when working” (Student GBS, Molyko).
- “Inadequate electricity” (Student GBHS, Muyuka).
- “Computers at times face low voltage” (Student BGS, Molyko).

Problem: Inadequate teacher training had a frequency of 7

Looking at Table 4.10, it is observed that only students of G.B.H.S Tiko (Freq. 3) and G.H.S Limbe (Freq. 4) complained of inadequate teacher training. They made statements such as:

- “Lack of good teachers to teach computer studies” (Student GBHS, Tiko).
- “Lack of sufficient staff to carryout this service” (Student GBHS, Tiko).
- “Teachers are not always around” (Student GHS, Limbe).
- “No effective teacher training” (Student GHS, Limbe).

Item 2: “The following factors have been observed to hinder or negatively affect the implementation of computer/internet services in schools. Which of them apply to your school?”

From Table 2 and Figure 2 above, it is evident that *inadequate computers* were had the highest frequency of 227, followed by *unreliable internet connectivity services* with a frequency of 147, closely followed by *inadequate teacher training* and *lack of skilled technical support personnel* with a tie of 121. *Lack of uninterrupted power supply units (UPS)* and *frequent disruption of electricity power* were close at 91 and 86 respectively.

Table 2: Frequency distribution of factors identified by students to affect the implementation of ICT services

Responses	G.H.S Limbe Freq.	G.B.H.S Limbe Freq.	B.G.S Molyko Freq.	G.B.H.S Tiko Freq.	G.H.S Bokwango Freq.	G.B.H.S Muyuka Freq.	Total Freq.
Inadequate number of computers	48	32	30	35	41	41	227
Unreliable internet connectivity services	21	26	26	32	27	15	147
Inadequate teacher training	22	14	20	25	18	22	121
Lack of skilled technical support personnel.	22	20	20	26	20	13	121
Lack of Uninterrupted Power Supply Units (UPS)	14	14	12	8	24	19	91
Frequent disruption of electricity power	9	17	18	4	19	19	86
Others	5	13	1		3	13	35
Lack of internal rules and regulations	-	-	12	12	5	4	33
Total	141	136	139	142	157	146	861

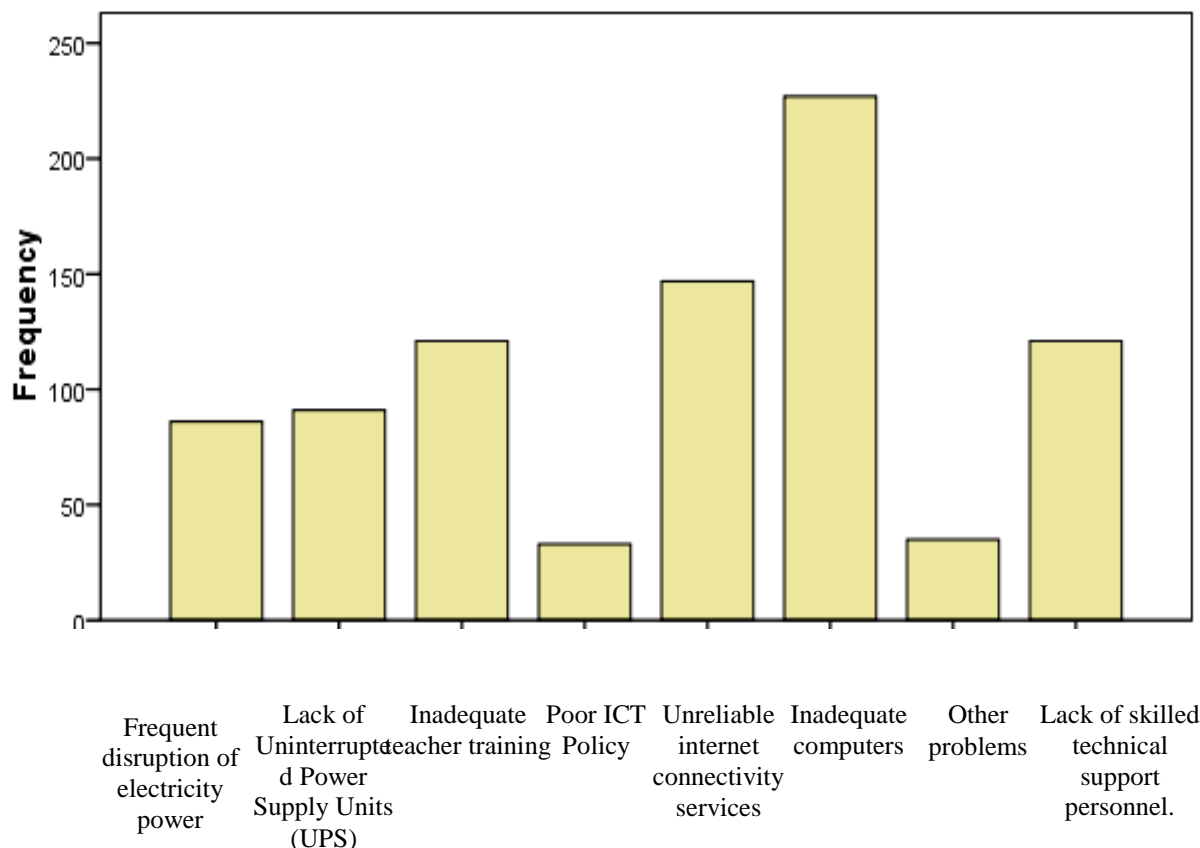


Figure 2: Bar chart showing factors identified by students to affect the provision of ICT services

Analysis of responses of teachers

Table 3: Frequency distribution of teachers' opinions of the problems in the provision of ICT services

Problems faced	G.H.S Limbe	G.B.H.S Limbe	B.G.S Molyko	G.B.H.S Tiko	G.H.S Bokwango	G.B.H.S Muyuka	Total
	F	F	F	F	F	F	F
Inadequate number of computers	2	4	1	-	-	1	8
Frequent disruption of electricity power	-	2	-	-	-	2	5
Lack of Uninterrupted Power Supply Units (UPS)	1	2	-	-	-	1	3
Lack of internal rules and regulations	-	1	1	-	-	1	3
Unreliable internet connectivity services	-	-	1	-	-	1	2
Total	3	9	3	-	-	6	21

Table 3 with frequency ranging from 8-2, presents the problems teachers faced with the provision of ICTs services in their various schools.

Below are samples of what some of the teachers had to say:

Problem: The lack of or inadequate number of computer in school was the first problem mentioned (Freq. =8).

- “The computers are fewer with respect to the user population” (Teacher BGS Molyko).
- “Limited number of computers” (Teacher GBHS Limbe).
- “Inadequate number of computers” (Teacher GBHS, Muyuka).

Problem: Frequent disruption of electricity power (Freq. =5):

- “Power failure” (Teacher GBHS, Limbe).
- “Electricity interruptions from AES-SONEL” (Teacher of GHS, Limbe).

Problem: Lack of internal rules and regulations (Freq. =3):

- “Low bandwidth or limited connectivity from the ISP” (Vice principal of ICT, GBHS Limbe).

Problem: Lack of Uninterrupted Power Supply Units (UPS) (Freq. =3):

- Light fluctuations and failures” (Teacher GBHS Muyuka).

- “Unreliable power supply” (Teacher GBHS Muyuka).
Problem: Unreliable internet connectivity services (Freq. =2):
 - “Frequent bridge in the network” (Teacher GBHS, Limbe).
 - “At times the network is not quite well” (Teacher GBHS Muyuka).
 - “The Internet services are not satisfactory” (Teacher GHS Limbe).
- Item 10: The following factors have been observed to hinder or negatively affect the implementation of computer / internet services in schools. Chose those that apply to you?

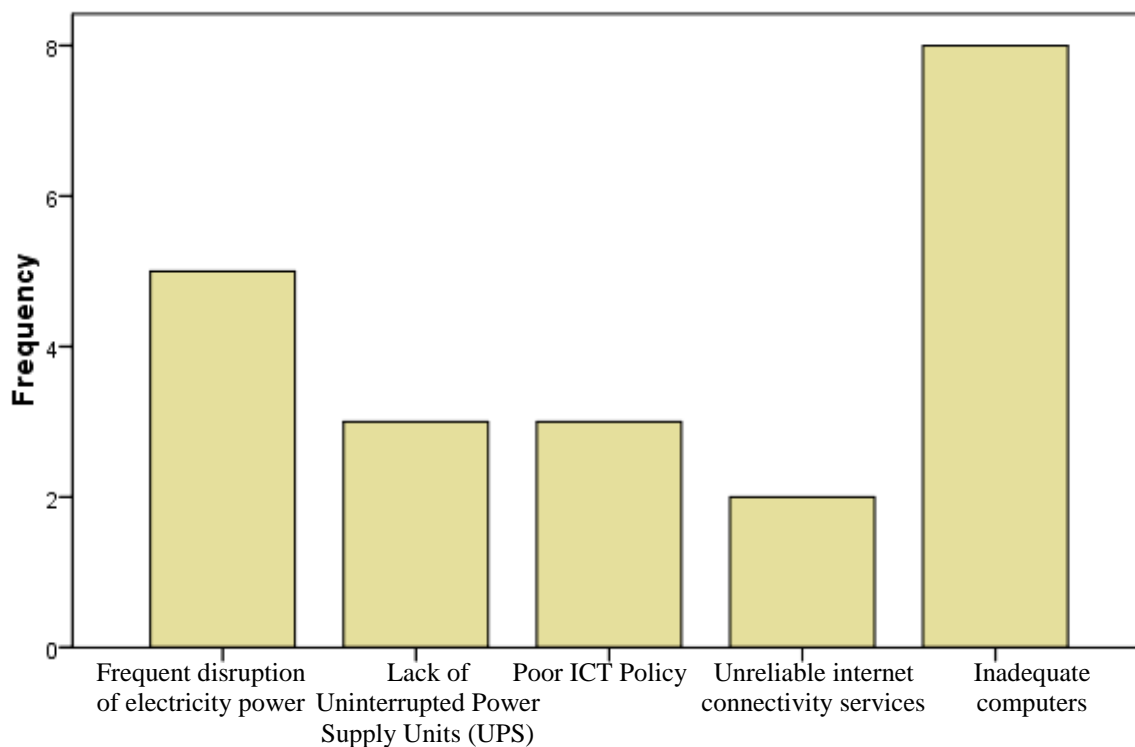


Figure 3: Bar Chart reflecting frequency of teachers' opinions of the problems in the provision of ICT services

Table 4: Frequency distribution of factors affecting ICT

Responses	G.H.S Limbe	G.B.H.S Limbe	B.G.S Molyko	G.B.H.S Tiko	G.H.S Bokwango	G.B.H.S Muyuka	Total
	Freq.	Freq.	Freq.	Freq.	Freq.	Freq.	Freq.
Inadequate number of computers	2	2	1	1	-	1	7
Unreliable internet connectivity services	1	3	1		-	2	7
Inadequate teacher training	1	1	1	-	-	3	6
Frequent disruption of electricity power	1	2	-	1	-	2	6
Lack of Uninterrupted Power Supply Units (UPS)	-	2	-	-	-	1	3
Lack of internal rules and regulations	-	-	1	-	-	1	2
Lack of skilled technical support personnel.	-	1	1	-	-	-	2
Total	5	11	5	2	-	10	33

From table 4 and Figure 4 above, it is evident that inadequate computers and unreliable internet connectivity services were the most observed with the highest frequency of 7 each. Followed closely by inadequate teachers training and frequent disruption of electricity power with frequencies of 6. These were the first four factors identified by teachers.

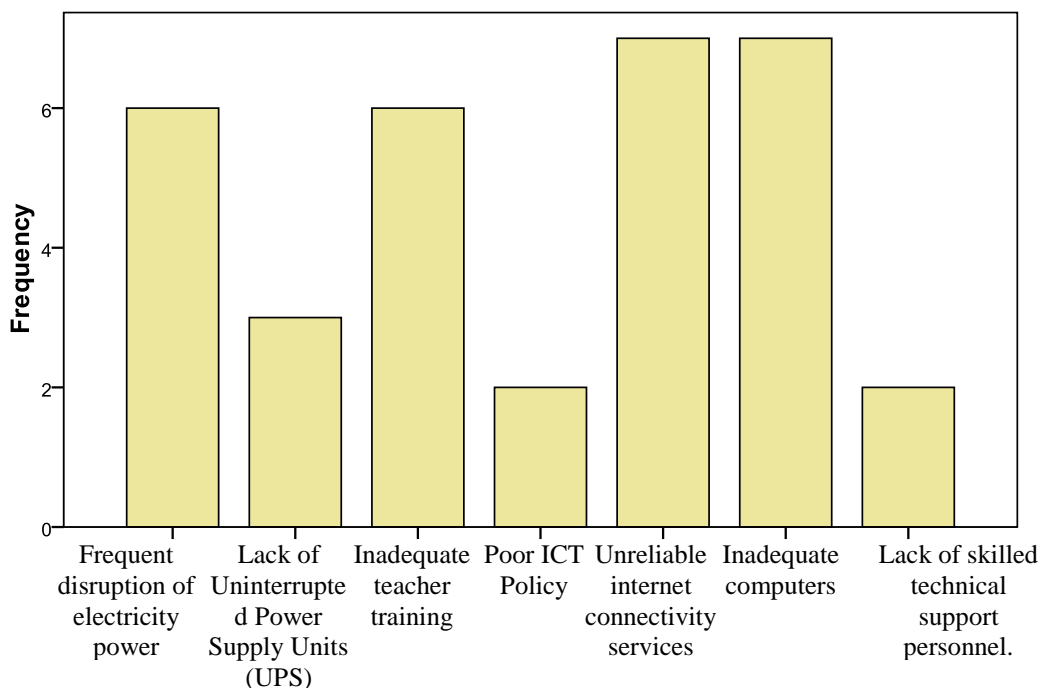


Figure 4: Bar chart showing factors identified by teachers to affect the implementation of ICT.

DISCUSSION OF FINDINGS

Research Question: What are the factors that hinder the implementation of ICT in Secondary Schools?

Three questionnaire items were designed to provide answers to this research question. Seven factors were found to hinder the implementation of ICT with frequencies ranging from 33-227 for students and 2-7 for teachers. The factors, in descending frequencies, are: inadequate number of computers (mentioned by 227 students and seven teachers in the sample); unreliable internet connectivity (mentioned by 147 students and 3 teachers); absence of trained support personnel (mentioned by 121 students and 2 teachers); shortage of teachers to teach computer studies (mentioned by 121 students and 6 teachers); lack of accessories such as uninterrupted power supply units (mentioned by 91 students and 3 teachers); frequent interruption of electricity supply (mentioned by 86 students and 6 teachers); unsupportive rules and regulations (mentioned by 33 students and 2 teachers).

These findings support those of earlier studies and align with theories of change. For example, Ndiku (2003), cited by Wims and Lawler (2007), found that the implementation of ICT services in Nigeria was hindered by insufficient number of computers and peripheral devices, as well as frequent power cuts. The findings are also in line with those of *The Second Information Technology in Education Study (SITES)*, conducted in 1997-1999 involving 26 countries. This empirical study concluded that insufficient number of computers in schools was one of the main reasons for not realising a school's computer-related goals (Pelgrum, 2001, p. 173). Pelgrum holds that lack of sufficient number of computers and appropriate software can seriously limit the potential of ICT to shape teaching and learning.

Unreliable internet connectivity as well as lack of training has been identified by other researchers as factors that hinder the provision of ICT services in schools (for example, Okwudishu, 2005). Lack of adequate search skills and of access points in the schools were also reported as factors

inhibiting the use of the Internet by secondary school teachers in Nigeria (Kaku, 2005). The absence of ICT equipment in most Nigerian secondary schools forced students to resort to cybercafés for internet access.

Fullan's (1982) theory of how educational change can be successfully managed can be used to explain the findings of this study. His framework conceptualises change as having four interrelated stages: adoption, implementation, outcomes, and continuity. This study principally deals with the implementation phase and more specifically, the factors which must be addressed if change initiatives have to produce desired results. Among the factors identified by Fullan are the availability of basic inputs (in this case computers and accessories, as well as regular power supply), provision of training to personnel who will be expected to use the materials, among others. The findings of this study therefore align neatly with this theory of change because the factors identified as hindering the implementation of ICT policies in the selected schools reflect those identified by Fullan. In other words, ensuring regular electricity supply, providing adequate number of computers and related accessories to the users, and capacity building for personnel is important during the implementation of a desired change.

These findings are also in line with the system theory of Bertalanffy (1986) which views an organisation as a social system which can be sub-divided into sub-systems with each having a part to play in order to ensure the optimal performance and growth of the system. The parts are interrelated and interdependent to the extent that if one does not perform as expected, the entire system will be negatively affected (Hoy & Miskel, 1996). This is because for successful implementation to occur, change has to be approached from a systemic perspective. There are many factors that must be addressed if ICT policies have to be successfully implemented. For example, having computers is not enough. Attention has to be paid to accessories such as uninterrupted power supply units to address power shortages, and the provision of support in the form of training of personnel prior to and during the

implementation process. Many teachers are of the opinion that technical support constitutes an essential component of educational change (Becta, 2004), especially when things go wrong during their lessons. Lack of continuous technical support and fear of the breakdown of equipment has the potential to inhibit the use of ICT by teachers during the teaching and learning process (Jimoyiannis&Komis, 2004). Lack of appropriate training and experience has also been identified by other researchers as one of the main reasons why teachers have negative attitudes towards the use of ICTs (for example, Becta, 2004; Yildirim, 2000). Teachers' competence and confidence with ICT is a principal determinant of effective classroom use by teachers and students. It is therefore logical to conclude that the provision of opportunities to teachers and students to acquire ICT skills is critical in order to strengthen their beliefs in the value of ICT in teaching and learning as well as to strengthen their belief in their own competence (Becta, 2004a; Kumar & Kumar, 2003).

CONCLUSION

The secondary education sub-system in Cameroon is facing many problems documented by many sources and more vividly in The draft Report of the sector-Wide Approach to Education (2005). Some of these problems are: acute shortages of basic resource inputs (human and material), such as teachers and textbooks. According to Law No. 98/004 of 14th April 1998 to lay down guidelines for basic and secondary education, education constitutes a "top priority" of the nation. One of the ways of ensuring that documented and other problems are solved and quality secondary education provided is to adopt and implement ICT policies. However, adoption is not enough. Schools, as Fullan advises must pay attention to the details of implementation. This study has shed light on some of the details in the form of implementation difficulties encountered from the perspective of students and teachers. The challenge is for all stakeholders to address these problems.

RECOMMENDATIONS

Schools could create and nurture partnerships with other members/groups/organisations within the community to support the implementation of ICT policies. Parents, through the Parents Teachers Association (PTA), can work in partnership with the school to provide computers and related accessories as well as other forms of assistance.

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