Review

Nigerian schools as a system: information and communication technology (ICT)

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The components of a system and the Nigerian schools as a system have been highlighted. Management of information and data using computers in the Nigerian school, their importance and significant have been identified. The adoption of integrated payroll system and primary utilization of computer to store data are found to be the major areas where computer function most in the Nigerian School system. The authors viewed administrative imagination, lack of training programs and poor funding as the major problems militating against the ultimate utilization of computer in the Nigerian schools.

Key words: Nigerian school system, computer, prospect and problem.

INTRODUCTION

The school as a system

The term *system* has multiple meanings, it is a collection of organized things, as a solar system, a way of organizing or planning, a whole composed of relationships among the members. Most systems share the same common characteristics. These common characteristics include the following,

i.   Systems have a structure that is defined by its parts and processes.

ii.   Systems are generalizations of reality.

iii.   Systems tend to function in the same way. This involves the inputs and outputs of material (energy and/or matter) that is then processed causing it to change in some way.

iv.   The various parts of a system have functional as well as structural relationships between each other.

In a system, every parts are related to another and the output from one part of a system (which can include material, energy, or information) can become the input to other parts. Such feedback can serve to control what goes on in the system as a whole. Any system is usually connected to other systems, both internally and externally. Thus a system contains subsystems and may be regarded as a sub-system of a larger system. Some portion of the output of a system may be fed back to that system's input. Systems are defined by placing boundaries around collections of interrelated things to make them easier to study. Regardless of where the boundaries are placed, a system still interacts with its surrounding environment. Therefore, some components or parts of the school systems are: principal, vice principal, administrative staff, teachers, students, the building, buses, bus drivers, custodians, cafeteria staff, media specialists, guidance counselors, nurses, and books/supplies. If any of these components is not
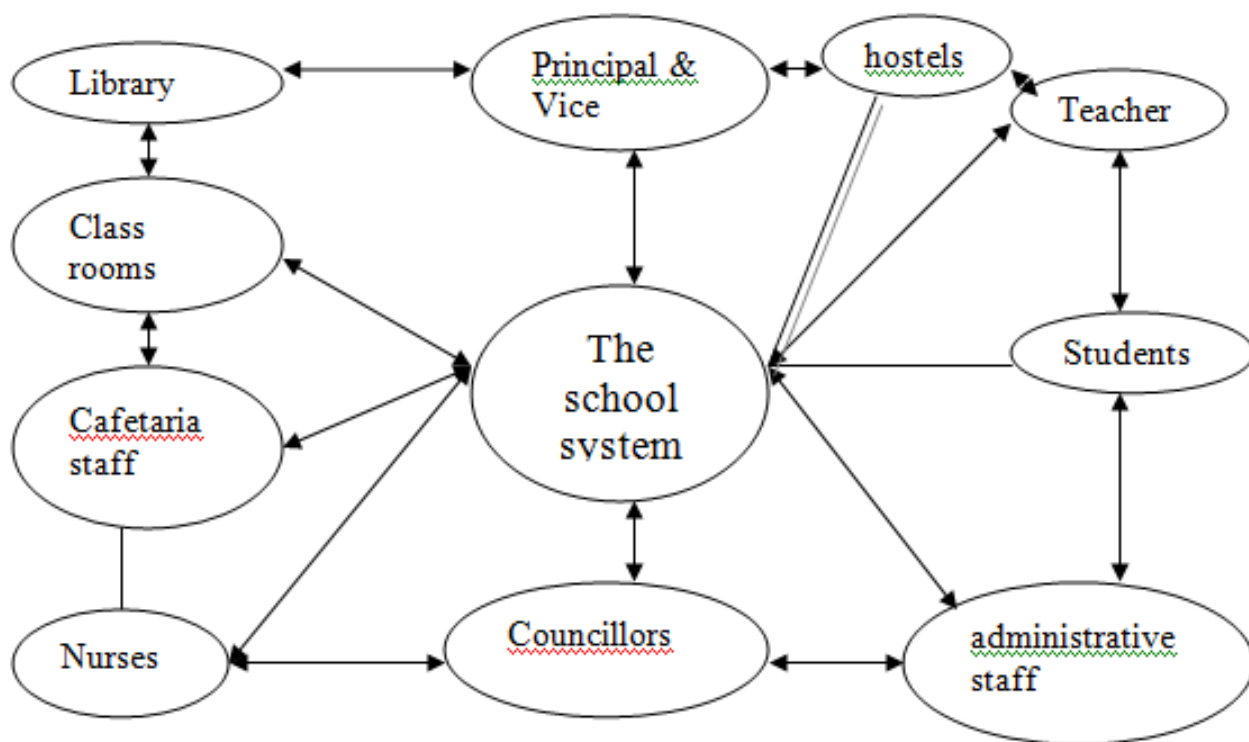
Figure 1. The school as a system.

functioning, the whole system suffers. For example if there weren't any teachers, the students wouldn't have guidance/supervision or be able to learn new things; confusion would most likely result because the teachers wouldn't be available to direct the students. The non-teaching staff [e.g., principal, media specialists and guidance counselors wouldn't be able to manage the large number of students, and they would be unable to perform their own jobs. The books/supplies wouldn't be used properly, if at all. The building, itself, may also become damaged because of the large number of students using the building unsupervised. Also, if a nearby school closed down and all students had to join another school, giving them many more students, then the administrative staff would be overloaded with all of the tasks associated with inputting new students into the computer system. The classrooms would be overloaded, the teachers wouldn't be able to teach as effectively, and the students wouldn't get as much attention from the teachers and therefore would not learn as well. The building would be overcrowded. The bus drivers would have to work longer hours to be able to pick up all of the students, and the custodians would have to deal with cleaning more trash and spend longer hours maintaining the property. Figure 1 below shows the major components of the Nigerian secondary school system. Each component is regarded as a subsystem. The Figure 1 clearly indicates that the school can not exist without

the subsystem and the subsystem can not exist without the school therefore all of them are interrelated.

Nigerian School system

Nigeria runs a 6-3-3-4 system of education. This translates to six years of primary school for children whose ages ranged from 6 to 11 years. For the two levels of secondary education in Nigeria, students range in age from 12 to 18 years. The last 4 in the Nigerian system (6-3-3-4) refers to tertiary education offered in three-year colleges of education that award National Certificates in Education (NCE) as the minimum qualification for teaching in Nigerian primary schools; in the two-year Polytechnics that award the Ordinary National Diploma (OND); and in the two-year Higher National Diploma for technical and vocational programs. The universities, at the highest level of tertiary education, provide opportunities for degrees of three or more years and postgraduate degree (M.Ed. ,M.Sc., M.A., PhD., etc) programs.

Importance of computers in Nigerian school system

According to Olakulehin, (2007), the general ICT competencies include the general understanding of the

basic building blocks of the computer systems, literacy in operating the computer and using the windows interface called windows explorer and other similar interfaces (e.g. Mackintosh or Apple). The understanding of word processing activity, usage of PowerPoint slides to enunciate aspects of their teaching activities, through to the application of basic features of spreadsheet packages or excel sheets and using facilities like Microsoft access to create databases for their students' records, would comprise the general skills and abilities required of would-be teachers. Therfore, all teachers should be equipped with the above ICT skills.

The computer has been used in a variety of ways in instructional processes and in administration. In the instructional process, through computer-assisted instruction, integrated learning systems, and collaborative networked technologies, among others, computer information and messages are presented to learners through interactive process involving drill, practice, tutorials, dialogue, practical hands-on-experience, simulation, and software that teaches high order thinking. Computers present materials or problem situations to students, guide their thinking, respond to their questions, and manage their performance. That is, the computer is used to instruct so as to achieve the desired level of proficiency (Jenkins and Springer, 2002; Milner and Anderson, 1984; Schacter, 1999). A review of several empirical studies in the United States indicated that computers generally have positive effects on student achievement as students show gains in achievement on researcher-constructed tests, standardized tests, and national tests (Schacter, 1999). However, according to Kmitta and Davis (2004), computer technologies have both positive and negative impact on student achievement, and thus computers, in and of themselves, are not panaceas for improving student achievement.

Through Computer Managed Instruction (CMI), school administrators can administer and guide the instructional process by scheduling classes, budgeting, and so on. CMI involves learning support systems that includes information organization and retrieval by students as well as teachers and generation of materials through the computer (Milner and Anderson, 1984).In addition, the computer has had significant impact on the school social system. It has engendered more constructivist approaches to teaching, improved overall student motivation to learn, to stay and behave better in school, and it has radically changed administrators' professional development through constant update of their knowledge on the latest technologies and the use of computers in content areas. Also, computers have been useful as tools in ensuring a safe school environment as improved communication is facilitated among parents, teachers, students, and administrators' (Kmitta and Davis, 2004).

Computer education in Nigeria school system

Computer education was introduced into the Nigerian

education system in the late 1980s specifically based on the recommendation of the 32nd ministerial council meeting of the National Council on Education in 1987. The pilot scheme for the program started with the Federal Government Colleges (Unity Schools) and the armed forces secondary schools in 1988. Training programs were also conducted for 197 teachers from the schools in the pilot (Yoloye, 1990). Computer education was introduced to bring Nigerian children into contact with the computer so that they could use it, appreciate its potential, understand how it works, and learn to apply the knowledge and skills to solve emerging problems (Aminu, 1988). The computer systems were introduced into the Federal Unity Schools throughout the federation in 1989. The revised national policy on education (FRN, 1998; 2004) gave prominence to computer education. For instance, in the 2004 edition, computer education was made pre-vocational and vocational elective at the junior and senior secondary school levels, respectively. However, the objectives of introducing computer education in the Nigerian schools can only be successful if and only if the teachers are equipped with the needed ICT tools.

School administrators and data utilization

School leaders (teachers and administrators) need tools and resources that can help them see better and that provide meaningful information quickly and reliably for themselves and to their teachers. The strong desire by most school leaders to understand and manage data is often matched by frustration which may be due to lack of training opportunities. When educators can draw inferences from data, they cannot only see the need for change, but can identify the direction of change needed, pinpoint the students needing intervention and identify approaches offering promising solutions to help students succeed. The use of multiple, and sometimes creative, sources of data enables school leaders to make mid-course corrections and continuous improvement toward academic success by their students. Integrated, interoperable data systems are the key to better allocation of resources, greater management efficiency, and online assessments of student performance that empower educators to truly transform teaching and personalize instruction. Computer has greatly enhanced the management of data in the Nigerian Schools. The effective use of data plays a major role in the development of school, improvement of plans and making of daily decision. The use of data can be a powerful and positive educational tool. School that engage in data-driven decision making have the information that not only measures students' progress in meeting standards, but also enables them to assess current and future needs of students, parents, staff and the community; determine if goals are being met; ensure that students are not falling through the cracks; improve

instruction; identify the root causes of problems; and engage in continuous school improvement.   There are numerous ICT packages that can aids in the management of data. This extends from Microsoft office (for typing and storing data), power point (for presentation), Microsoft excel (for calculation and presentation of data).

Integrated Personnel and Payroll Information System (IPPIS)

An agreement signing ceremony between the Federal Government of Nigeria through the Bureau of Public Service Reforms (BPSR), a World Bank sponsored $4.9 million contract with SystemSpecs Consortium comprising Impact, Interglobal and Telnet for the provision of an Integrated Personnel and Payroll Information System (IPPIS) for the public sector noted that ghost workers operating in government agencies will no longer outwit the long arm of the law with the introduction of the new technology. On this note, the Integrated Payroll and Personnel Information System (IPPIS) were introduced. In these payroll systems, names of staff, their rank, grade level, school name, salary, expected year of promotion/retirements, incremental period and other relevant information about the staff are fed into the computer and the payment are made on these basis. Thus, information on the identity of the staff constitutes the input data. In some schools, students name, class, personal data and other useful information are fed into a computer hence computation of their results are made easy. From the above, it can be stated that ICT can enhanced the reduction in fraud and efficient management of the school system.

The problem: The Administrators imagination

The introduction of computer education into schools has consisted mainly of buying a few computers and some software. These are added to existing educational technology facilities in schools with little in the traditional operation of the school being affected by the presence of computers. Consequently, the full potential of computers is yet to be exploited within the Nigerian school system.

School administrators are indispensable to successful computer education. The ultimate decision to use or not to use the computer is dependent on the individual administrator. Successful implementation of computer education can only be assured through administrators who have acquired necessary knowledge and skills. If computer education is to succeed in Nigerian schools, school administrators/teachers must be competent in the use of computers. Albion, (1999) stated that teachers' self-efficacy or belief in their capacity to work effectively with computers is a significant factor in determining their

patterns of computer usage. He also noted that decisions to use computers in classrooms or in schools are likely to be influenced by administrator/teacher beliefs. That is, administrator/teachers' beliefs about their capacity to work effectively with computers are a significant factor in determining patterns of classroom usage. Bandura (1986) defined self-efficacy as "peoples' judgments of their capabilities to organize and execute courses of action required to attain designated types of performances. It is concerned not with the skills one has but with judgments of what one can do with whatever skills one possesses. Bandura (1986) also affirmed that self-efficacy/beliefs develop in response to four sources of information. These are enactive experience, vicarious experience, verbal persuasion, and physiological and affective states. Enactive experience implies that success in the performance of a given task will increase the self-efficacy of the person who has successfully performed the task. The vicarious involves experiences where other people are seen to succeed or fail and how that can affect one's own self-efficacy. Verbal persuasion, if realistic, can encourage efforts that are more likely to increase efficacy through success, while physiological and affective conditions such as stress can also affect self-efficacy.

Compeau and Higgins (1995) also stated that the computer self-efficacy is the "judgment of one's capability to use a computer. Computer self-efficacy is positively correlated with a willingness to choose and participate in computer activities, an expectation of success, the ability to persevere when faced with computer-related difficulties, and one's computer -related performance (Holcomb, Brown, Kulikowich and Zheng, 2003). Computer self-efficacy increases performance and technological innovation of employees, reduces computer-induced anxiety, and promotes higher occupational positions (Compeau and Higgins, 1995).

In the context of this paper, self-efficacy refers to school administrators/teachers' belief in their competence to make use of computer hardware and software. Some empirical studies (Busch, 1995; Chen, 1986; Koohang, 1987) have concluded that acquisition of ICT skills is related to the attitude of the person toward computers. According to Milner (1980) educational opportunities are being missed because most administrators/teachers do not know how to use the computer neither can they teach students about the impact of computers on the society. One of the greatest barriers to proper computer education in several parts of the world is the shortage of trained administrator/teachers. The vast majority of teachers simply do not know how to use computers to promote educational efficiency, and they are not adequately trained to use modern information media (Kirschner, and Selinger, 2003, Summers, 1990). In order for teachers to implement computer education, they will need to become proficient in basic computer operations, basic applications of software like word processing,

databases, spreadsheets, graphic software, and so forth, and the integration of computers in teaching (Collis, 1987, Kirschner and Davis, 2003). It should be pointed out that school adminstrtaors/teachers need to become sufficiently competent to make personal use of computers, to make use of information and communication technology as a mind tool, to become masters of a range of educational paradigms that use ICT, and also to become sufficiently competent to make use of ICT as a tool for teaching (Krischner & Davis, 2003).

School administrators competence is of particular concern when new subjects or media are introduced into the school system. This is because their experience and competence will form the foundation of their ability to implement computer education in schools.

The problem: Poor training and poor funding

According to Olakulehin, (2007), The initial teacher training process and the continuing professional development of Nigerian teachers is currently besotted by a number of challenges. These are directly connected with the incessant modification of the planning policies several times before such policies have been appropriately implemented in its original form. These problems have been further accentuated by the parlous state of economic development, which has made 'teaching' a less desirable profession for many youth. According to the NPE (1977, revised 1998, 2005), the objectives of teacher education in Nigeria are as follows:

 (i)   to provide highly motivated, conscientious and efficient classroom teachers;
(ii)   to encourage further the spirit of enquiry and creativity in teachers;
(iii)   to help teachers to fit into the social life of the community and society at   large;
(iv)   to enhance teachers commitment to the teaching profession.

The above objectives are never made due to a numbers of factors in which the major ones includes poor funding, recruitment of unqualified teachers and political initiatives (Eddy and Akpan, 2009).

CONCLUSION

The Nigerian Schools operates as a system. Information is the key to holding schools accountable for improved performance processing of data using computers and the adoption of integrated payroll systems are the major application of computer in the Nigerian School system. The administrator imagination significantly affects the successful utilization of computers in the Nigerian school system.

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