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# Managing Computer Information and Computing Facilities for Effective Teaching Activity

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**Abstract:** Computing and networking play increasingly important roles in teaching, research and administration. The university in particular and the educational sector at large anticipates many benefits from the use of computer facilities by students and staff. Proper management of computing facilities and the information they generate aids in no small measure in promoting better teaching methods and understanding in the classroom and laboratory. In addition, since it is practically difficult to fund the Information and Communications Technology (ICT) budget 100% and since the use of ICT promotes better interaction and learning, it becomes more practicable to manage well, the existing computing facilities so as to promote better information generation. In this study, we look at how computer information and facilities could be managed to promote better teaching and learning activities.

**Key words:** Managing ICT facilities, effective teaching, promoting better learning, ICT and teaching, computer resource management

## INTRODUCTION

Information is a term with many meanings depending on context, but is as a rule closely related to such concepts as meaning, knowledge, instruction, communication, representation and mental stimulus. Simply stated, information is a message received and understood. In terms of data, it can be defined as a collection of facts from which conclusions may be drawn. There are many other aspects of information since it is the knowledge acquired through study or experience or instruction. But overall, information is the result of processing, manipulating and organizing data in a way that adds to the knowledge of the person receiving it.

By computer facilities, we refer to computers, computer networks and peripherals, connections to external computer services and copyrighted/proprietary programs, data and documentation that are used in generating information. These facilities are sourced for and maintained by huge budgets in the organization concerned and how well they are used or maintained would help in determining the type of information that is generated and whether it would be meaningful or not. In this era of global economic meltdown, ICT budgets in developing countries would be expected to trim down and for the organization (in this case, an educational institution) to still remain relevant in the information sphere, proper management of computing and ICT facilities as well as the information produced would go a long way in lightening the burden of teaching in the educational sector.

The management of computer information and facilities in schools is becoming increasingly important in Nigeria due to enormous amount of funds and initiatives by the government and private sector to implement Information and Communications Technology (ICT) in education. The modern day classroom activities encompasses the traditional teacher-students lecture scenario, activities in the computer laboratory and other knowledge-related activities outside the classroom including use of the library, laboratories, etc. To make these activities possible, huge funds are invested in the provision of compatible and related ICT tools that aid the learning process. These ICT tools and related technology in the classroom is widely believed to help teachers promote a constructive class environment and it is viewed by many researchers to have an influential effect on the teaching and learning process (Muir-Herzig, 2004). Furthermore, from the perspective of various educators, with a variety of computer-based activities, ICT tools and facilities can help facilitate needs and challenge students' learning practices (Warschauer and Healey, 1998).

## MATERIALS AND METHODS

**Computer facilities and information:** The quality of a Computer Science or ICT program depends not only on the content and quality of the lectures but also on the facilities and support provided for teaching, the environment available for student learning, the possibilities for the professional development of the faculty as well as the resultant information produced

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Fig. 1: A typical computer laboratory or computer room

(Karagiozov *et al*., 2008). Even though, these facilities need to be upgraded frequently due to the changing aspect of technology, but due to the dearth of funds, managing and maintaining these facilities becomes a better option. Some of these facilities that are:

**Computer laboratory:** A computer lab, also known as a computer room is typically a room which contains many networked computers for public use. Computer labs can be found in libraries, schools, government buildings, science labs, community centers, companies with IT departments that requires such a place for their employees to do their jobs and research centers. They are distinct from Internet cafes in that the usage of the computer lab is typically free for those with access. In a typical computer lab, desktops, printers, mice and pads, scanners, plotters and webcams could be installed. Students are expected to use the lab for their practical, while staffs utilize the facility for research and development purposes (Fig. 1).

**Computer hardware and peripherals:** Computer hardware refers to the physical components that make up a computer system, while every other movable component that could be attached to a computer system is referred to as peripherals and they are found in the computer laboratory or even in individual teachers' offices. Examples of computer hardware are computer monitors, keyboards, mice, Central Processing Unit (CPU), external speakers, scanners, printers, digital cameras and webcams, Internet connections, voltage stabilizers, Uninterruptible Power Supply systems (UPS), etc. (Fig. 2).

**Software packages and documentation:** Latest software packages for word processing, desktop publishing, graphics, communications, statistical analysis, programming, anti-virus, spreadsheets and database management systems amongst others as well as their appropriate documentation are equally part of the facilities

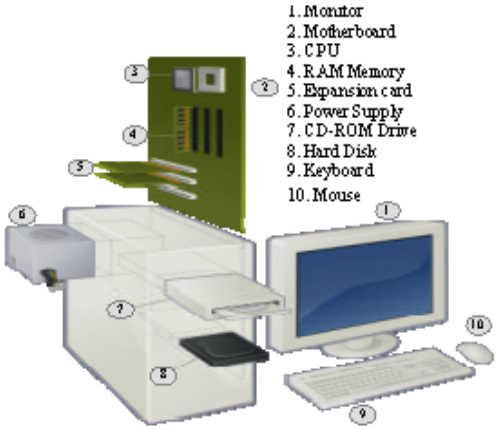


Fig. 2: Hardware of personal computer

a typical computer lab of an educational institution should have. These software are however genuine and their licenses could be renewed on a regular basis as the need arises. Examples of software are Microsoft Word, Microsoft Excel, CorelDraw, Instant Artist, Microsoft PowerPoint, Internet Explorer, Windows Operating System, etc. Their documentation in this case refers to the user manual that accompanied the software when they were purchased.

**Internet connectivity:** In some computer labs, Internet connection are present and the students improve their research capabilities here, while staffs could use the facility to keep up with the latest trends in ICT and computing. The Internet facilities could include the radio link, bulletin boards, power inverter, communication masts and antennae in some cases, user account information as well as the webpage or site created amongst others.

**Other hardware:** Other piece of hardware that could make up the computing facility are the desks, chairs, fans, air-conditioners, fluorescent lights, filing cabinets, trash

cans, power extension cords, voltage stabilizers, television and video sets, projectors, slides, film strips, cd/dvd packs, radio/tape recorder, disk player, electric power generators, uninterruptible power supply systems, floor mats as well as log books amongst others.

**Trained personnel:** The category of skilled manpower in charge of running and managing the computing and ICT resources are equally part of the facilities available. They include the Computer Operator, the Database Administrator, the Lab Attendant, the Programmer and Systems Analysts, the Security Guards, etc. These personnel my not be clustered in one location and could be dispersed to man several aspects of ICT in the institution. They are regarded as part of the ICT facility because their quality affects the quality of information that is produced in the long run.

In addition, the facilities mentioned above are utilized in the production of relevant information by the students and members of staff. Such information could be in form of outputs of assignments, prepared reports, downloaded files, students' records and results, staff profiles, websites and WebPages, lecture notes and presentations, patented designs amongst others. How accurate, relevant, needful and usable these information are to the teaching and learning system depends on how well they are managed alongside the relevant ICT facilities.

**Teaching and learning activities of computers:** The idea of computers in developing country classrooms may seem incongruous to some at first glance. Why put computers in places, where there are few textbooks, no electricity, or where the teacher rarely comes to school? And it is true, computers will not suddenly and magically solve everything that plagues an educational system. Computers can be used, however to address several pressing problems facing educational institutions. Today computers are used to improve data processing, administration and teaching and learning especially in the classroom (Fig. 3).

In the classroom or school setting, teaching and learning activities need to conform to acceptable standards and in this age of ICT, every form of knowledge dissemination in the formal level need to be hybridized with computing technology.

The impact of globalization and the rapid growth of ICT have brought an opportunity in the teaching sector to implement the use of computers in the classroom (Bakar, 2007). The aim is to educate students to become computer-literate citizens and to position ICT as a

Fig. 3: Pupils learning how to use the computer

teaching and learning tool and to increase the productivity, efficiency and effectiveness of the teaching and management staff.

Under the right circumstance computers can become a helpful and well-functioning instructional tool which on the one hand, provides knowledge to the students and on the other hand mitigates the teaching and research burden of the teacher. It also exposes the school concerned to technology.

Bakar (2007) identified three different classroom environments, where computer activities could be carried out for learning purposes, the various participants, what they could be used for and the functions they perform and they are summarized in the Table 1.

From the Table 1, we could deduce the functions of computers in the classroom to include; as presentation tools, as exploratory devices and as tutorial aids.

The function of computers as tutorial aids is when computers are used directly to teach students by providing information, demonstration and practice opportunity (Means, 1994).

The meaning of the function of computers as tools (Means, 1994) is the general uses of computers tasks like writing in terms of word processing and PowerPoint presentations, data analysis and data storage, while the use of computers as exploratory devices is to encourage students and researchers to explore and discover their learning in most cases, through the Internet and these devices could also be used for communications purposes through the same Internet.

The teachers play a huge role in using ICT tools to promote learning. They could engage the students in assignments, group discussions or practical lessons and

Table 1: The functions of computers in the classroom

| Subject | Place | Situation | Used | Functions |
|---|---|---|---|---|
| Teacher | Classroom | Traditional teacher-centered classroom | Computers were used for instructional purposes: Computers for data/information transmission | Presentation tools |
| Students-group work | Classroom | Student-centered classroom | Information search using the Internet | Exploratory devices |
| Students-group work | Classroom | Student-centered classroom | The computer is used for the students' group Presentation: Computers for data/information transmission | Presentation tools |
| Students-individual work | Computer laboratory | Student-centered classroom | The computer is used as a practice-learning device to achieve the three language skills, reading, writing and listening | Tutorial aids |
| Group work | Computer laboratory | Student-centered classroom | The computers are used for word processing and creative layout of the tasks | Presentation tools |

the aim is to make the students become more perfect in the use of ICT tools for learning. In most cases, there are trained programmers, laboratory attendants and operators available to lend a helping hand to the students. From the feedback received when interacting with students, the teacher would know if they are making enough progress and where to make amends if necessary, while the students' involvement in group discussions and group assignments could expose him to his peers who would help in passing direct knowledge to him and in boosting his self-esteem.

**Challenges faced by classroom teachers in use of ICT facilities/information and means of managing them:** Classroom teachers are embracing the use of technology to enhance their classroom teaching more today than ever before. But in order to effectively use the technology in their classroom they must prepare themselves for some of the challenges they will face in accomplishing this goal. Listed below are four of the major issues classroom teachers identify when they discuss the challenges of infusing technology into their teaching and some brief thoughts you as an aspiring educator might consider in order to prepare yourself to meet those challenges. Equally important is the meaning they ascribe to the different information produced when using the computer for teaching or research.

**Availability of computer tools and hardware:** The public schools in Nigeria today are a mixed bag when it comes to what type of computers and other technology devices are available to the classroom teacher. There is also the question of how many computers will be available for teacher needs. Are the computers in the classroom (when just two or three are kept in a classroom) or in lab situations? All of these hardware questions and more can only be answered when you actually have a classroom to yourself in a school. Until that time make sure you learn a variety of different technology tools, prepare yourself for the possibility that you will have to group children on computers and learn other strategies for making the most of the fewest available computers. There is a whole set of instructional activities for the one computer classroom and you may want to learn some of them. In a majority of cases, where the tools are inadequate, you might consider rationing on the bases of drawing up a roster or time-table that would make the facilities usable by all on a limited time basis.

**Availability of technical assistance:** In Nigeria today, rare is the secondary school or even university that has enough technical resource specialists to assist teachers at the building level, let alone in the individual classroom. As a result, future classroom teachers need to familiarize themselves with simple trouble-shooting technology tasks. Knowing how to connect peripheral devises and load software packages are but a few of the many simple little skills you can master in order to help yourself keep the technology tools going in your classroom. In most cases, such information or technical help could be gotten from the manual or documentation that came with the software. You won't find such documentation if your school purchased pirated software as is the case in most parts of Nigeria.

**Software applications:** There really are an unbelievably large number of software applications available to the classroom teacher. That's the good news! The bad news is that they all require some time to master their use and format of operation. Some good advice is to select a few multi-use packages and master them well. Surprisingly, they all start to look alike when you get the fundamentals for a few mastered. Make sure you have a specific use for the application in mind before you start learning how it works. People generally learn computer applications more quickly and completely when they have a specific purpose in mind. For instance, you could prepare some written notes and use it to learn via Microsoft Word, the essentials of typing and word processing. Remember this practical idea when you have your own classroom. You might avoid that all too familiar student response, Why do we have to learn this stuff? We will never use it.

**Time to integrate technology into teaching:** Even if you have the hardware, trouble shooting skills and knowledge of how to use the software, it still takes time and experience to effectively integrate the technology into your teaching. While you are developing the skills associated with becoming a good teacher, bring your technology integration skills right along. When you are learning how to plan for effective teaching, build the technology into those plans right then. A yearly planning calendar might just as well be developed as a computer document instead of written in a 3 ring binder. If your goal is for your students to communicate the results of their work and effort, have them use the computer to enhance their presentation. Be a technology advocate from the beginning of your career. It truly is more difficult to relearn old practices in new ways than it is to learn the new way in the beginning.

Finally, as a teacher, you have a lot of role to play in the use and management of ICT tools and the information they produce. To be successful, you have to adopt the following attitudes:

- Develop a positive rather than a negative attitude towards ICT. Teachers who have a positive attitude towards ICT itself would be positively disposed towards using it in the classroom
- Promoting the pupil's/student's choice rather than the teacher's direction. Teachers who preferred directive styles of teaching tended to rate their own competence as low and made use of helpers with ICT
- Elevating the pupil's empowerment as learners rather than pupils receiving instruction. This would help in making learning interesting as the pupils would see themselves as partners in knowledge dissemination
- A preference for individual study rather than pupils receiving instruction (Mumtaz, 2000)

These attitudes would go a long way in promoting the advancement of computer skills and knowledge in the classroom and beyond.

## RESULTS AND DISCUSSION

**Managing ICT tools and information for best results:** How are these ICT facilities and the information they produce managed in schools? By management, we refer to how they are put into effective use even when they are not enough and what would be the effect if they are misused or mismanaged. We would categorize the ICT tools and the information they produce and suggest best practices in terms of managing them.

**Computer Lab:** The Computer Lab is under the headship of a computer operator or programmer in some cases who is in charge of managing the facilities installed. To help him more better, a roster of pupils designated for practical should be drawn up and apportioned on the basis of the available facilities. Such would help reduce overcrowding and misuse. In addition, a logbook should be placed side by side with each computer where users' details are entered, while a periodic check should be made on each system to ascertain their efficiency. Regular virus scan should be initiated and pirated software use should be dissuaded as this would rob the facility of the benefit of upgrades, add-ons and even freebies from the software manufacturer. Finally, the lab should be well lit, cleaned regularly and ventilated. All these best practices when put in place, would promote a more effective teaching environment.

**Computer hardware/peripherals and other hardware:** The hardware components are delicate and well they are managed would help in determining its lifespan. The computer monitor should be protected from human eyes with anti-glare filters to minimize radiation effects. An uninterruptible power supply system with a voltage stabilizer should be used in connecting the computer system while users should be discouraged from working for unnecessarily long periods of time on a computer system. These useful tips alongside some others which are available on the user manuals of the hardware would help promote effective learning. Other hardware present like the air conditioner, tables and chairs, fans, lights, etc. should be well protected and maintained as any damage could prove disastrous.

**Computer software:** The computer software is very important since it is the major tool used for disseminating knowledge in an ICT setting. Several software installed on the computer system need to be kept updated, while proper care must be taken in selecting the most appropriate software for teaching. Software that promotes learning like educational software, word processing, spreadsheets, graphics and communications should be installed and used of game software must be de-emphasized as much as possible as this would encourage the students to waste valuable time on them. As stated before, use of pirated software must be discouraged.

**Internet facilities:** The Internet is the hub of learning whether positive or negative and due care should be taken on how it should be managed. Pupils should never be encouraged to use the Internet unsupervised and even

when they use the Internet facilities, it should be for research or learning purposes. Parental guidance software and filters should be installed to block access by pupils to obscene, x-rated or illegal sites.

In addition, the information produced would give us a better idea of when the facilities are adequately managed and supervised.

Well-managed ICT facilities tend to generate more reliable and better information and provide suitable returns on investment and in the long-run, help to promote effective learning. In terms of managing information, proper supervision should not be ruled out as the pupils tend to concentrate on their work, whenever their teacher or any other personnel of the computer lab is around.

## CONCLUSION

In this study, we have been able to look at various ways of managing ICT facilities vis-à-vis the information generated by these facilities. Since we operate ICT in a developing economy, where fewer computing facilities are utilized by too-many pupils, it is imperative that such facilities should be well-managed for optimal output as such could help promote effectiveness in teaching. The role of the teacher is not trivialized as the teacher is the main organ through which knowledge flows to the pupil. How well the teacher puts these ICT tools into use could affect the quality of knowledge that is being absorbed by his pupils.

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