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Impact of Effective Teaching and Learning Process in Schools through Information and Communication Technology (ICT)

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Abstract: Technology is developed to solve problems associated with human need in more productive ways, if there is no problem to solve. The technology is not developed and or not adopted. Applying this principle to educational technology would mean that the educators should create and adopt technologies that address educational problems, of which there are many. Further, technology will not be adopted by educators where there is no perceived need or productivity gain. This is what LANSHEAR and SNYDER(2000) refer to as the WORKABILITY PRINCIPLE. Therefore when discussing applications of computer technology to education , the question must always be asked, what educational problems(s) needs to be addressed. This questions needs to be asked at all level of decision making, from the teacher planning a programme, to a school administrator purchasing hardware and software, to an educational system officer developing policy and strategic plans.

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I. INTRODUCTION

The need to completely employ information and communication Technology (ICT) in the teaching and learning process cannot be emphasized as it will facilitate teaching and learning process, help learners develop creative thinking and self-confidence, create conducive learning environment, etc. ICT is an indispensable tool in teaching and learning process as course like mathematics, Engineering, Earth sciences, etc. are made easier to both teachers and learners. Educational system cannot be left behind in the adoption of ICT as its advantages outweigh its challenges. The manual teaching and learning process has been dropped In most countries of the world , hence any Educational system not completely employing ICT may not meet the challenges of its society nor measure itself among the ever changing communities in the world. This paper suggests that effective introduction of ICT in the teaching and learning process is an indispensable means of improving it.

At the Teacher level, the question becomes: am I satisfied with the educational opportunities, I am able to offer children in school classrooms? While teacher should never completely satisfied, and they will always strive to do better.

The question really is whether what they provide adequately develops the potential of the students and adequately prepares them for a productive life in society. Many more educators (e.g National Centre or Vocational Education Research , 2002 and educational commentators (e.g Murdoch, 2001)believes that what is during the late 1970s and early 1980s , computer became more affordable to schools.,

The use of Information and Communications Technology (ICT). In schools is taken very seriously by Governments and educational systems around the world. As educational institutions moves towards the mainstream use of ICT in teaching and learning appears to be some critical steps and vital ingredients needed for the successful infusion of ICT into educational environments. Although stand alone computers have been in most schools for decades now, networked ICT is relatively new for many schools as they continue to grapple with how to use ICT to enhance teaching and learning environment. Since the development of the first computers many have argued that computers should be used to support learning. These Arguments have amplified as computers have evolved into the powerful relatively low cost technology available today. However , there is

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considerable debate over how computers should be used in schools (RAIEL, 2003). This paper focuses on the use of ICT In schools by students and teachers to support the processes of learning and teaching. It will aim to describe the ways in which teachers could and/or should facilitate student use of computers systems and how they can progress. This paper begins with a background to the use of computers in schools. This leads into a discussion of the professional development needs of teachers for the progression of using ICT in learning and teaching.

II. SCHOOLS, LEARNING AND COMPUTERS.

Schools and educational systems must provide the infrastructure and support for students and teachers, and the maintenance of constructive learning environments in which ICT is used, At the same time ICT tools will assist schools and educational system in carrying this out. Research has consistently shown that the few schools and teachers implement ICT support to a degree where the potential benefits are likely to be realized. There are a number of significant problems which impede and prevent teachers from achieving the full advantage offered by ICT applications. CRADLER (2002) gave seven requirements for effective use of ICT in Education

1. Suiting technology to education goals and standards.
2. Having a vision for the use of technology to support curriculum
3. Providing for both in –service and pre-service training
4. Ensuring access to appropriate technology
5. Providing for administrative support for technology use .
6. Providing time for teachers to plan and learn how to integrate technology.
7. Providing for ongoing technical support or technology use,

In general , these requirement Fall into five areas of impact:

1. Providing the infrastructure of hardware and software,
2. Providing curriculum and technical support for teachers.
3. School organization , design, policies and practices, schooling and management support.

Any discussion about the use of computer systems in schools built upon understanding the link between schools, learning and computer technology. When the potential use of computers in schools was first mooted, the predominant conception was that student would be' taught by computers (MEVARECH, LIGHT, 1992). In a sense it was considered that the computer would "takeover" the teachers "job in

much the same way as a robot computer may take over a welder's job.

Broadly speaking ,the computer literacy is a component of technology education. Which is distinct from using technologies such as blackboard, and chalk, pencils, books, is applied and slide-rule to television facsimiles and computer. This paper will focus on the use of computer systems such as educational technologies. Since the beginning of the 1990s, educators have been particularly concerned that very little of the potential of computers to support learning in schools seems to been realized, despite a sufficient installed base of computers. One of the reasons often given for this anomaly is that the technology is not sufficiently accessible , particularly If students have to go to a special room to gain access. The 1990s was the decade of computer communication and information access, particularly with popularity and accessibility of internet-based services such as electronic mail and the world wide web. At the same time the CD-ROM became the standard for distribution packaged software (replacing the floopy disk). This allowed large information to based software packages such as encyclopedia to be cheaply and easily distributed. As a result, educators became more focused on use of the technology to improve student learning as a rationale for investment. Today computers in schools are both a focus of studies in themselves (technology education)and a support for learning and teaching (educational technology), Rationale can be presented for both computer literacy.

And using computer as a part of educational technology .It has been argue earlier that ICT is a mediator of learning as a component of the learning environment .It is generally agreed that the education in the unique instructional characteristics of computers needs to be exploited (committee on development in science of learning 2000). There are four distinct characteristics of computer technology which have been clear implication or using computers in classroom: logical programming, interactive control, graphics and audio output, and information processing. There are many ways in which characteristics. could be used and have been shown to support students and teachers in improving learning outcomes and increasing productivity. The degree to which each of these should be applied will depend on array of variables such as the developmental age and personal characteristics of the student, the characteristics of the learning environment, and the nature of the curriculum content.

III. PROVIDING THE INFRASTRUCTURE

The infrastructure requirement may be view in terms of the electronic resources, hardware , users, and implementation. The relative lack of good quality software and associated courseware is well documented and is being attended to by

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software producers and educators throughout the world' The problem associated with hardware are mainly lack of it, however there is still major problem with the appropriateness of the hardware used. The use of inappropriate hardware. The choice and distribution of hardware and software are crucial to the success of computer use in schools, .In the establishment of the computers place in the school curriculum, the school needs to carefully consider the establishment of library of software able to support the use of ICT in the ways established in the schools computing philosophy. Schools with a small computing resource would probably need to buy software likely to have a wide use in the school. Many packages are of limited use and can only be used for a small number of functions within a limited age group. Some packages require individual access to be of use to the teacher. These may best be used in schools with more resources. Some packages are more easily integrated into curriculum than others which may require a degree of teacher involvement ,.And preparation. Many teachers prefer to use software which requires little teacher preparation and planning .In such instance the software can often determine the content of subsequent lessons rather than teacher or the planned curriculum. When a teacher is made to plan the ways in which the computer will be used. It is likely that the use will be more applicable to the curriculum and more useful to the teachers and students

IV. ELECTRONIC RESOURCES'

IF the aim is to provide more student-directed learning experiences, then students need to be provided with access to extensive sets of resources which is only feasible using predominantly electronic resources. These resources will consist of data files and software applications (program) that may be distributed online or on disc. Therefore, schools systems needs to provide teachers and students with ready and easy access to the resources. Increasingly, this access will be online, particularly for data files and while there is a huge quantity for such resources there are two major problems:

1, Accessing high quality resources.
2. Choosing appropriate resources.

V. NETWORKING

The networking of educational technology resources benefits students, teachers, and schools by facilitating information technology learning activities, giving ready access to software.
Allowing a variety of communications, reducing cost of equipment, increasing processing power, and facilitating the management of student learning (CRADLER &BRIDGORTH 2002).

Three categories of network scenarios should be considered in the use of computer networks in schools.
1. Intra-school networks
2. Inter-school networks'
3. External networks(internet)

VI. HARDWARE ORGANIZATION OR ADEQUATE ACCESS

There are a number of methods which can be used to distribute access to a school computer/ ICT systems. This depends on the number of facilities available.

LABORATIORY: A group of computes/ICT equipment are made available in a central location which may be booked by a teacher. This may be dedicated classroom, part of the library or a part of a learning resource Centre.
MOBLIE TROLLEYS.A desktop computer/ICT equipment can be put on a trolley which a teacher may book and wheel into the normal classroom.

MOBILE LABORATORY: A number of reasonably portable computers/ICT equipment (ideally) notebook or palmtop size computers) maybe available for a teacher to book For a lesson , The computers/ICT equipment are brought in and set up for the lesson and returned at the end.
CLASS ROOOM COMPUTERS, One or more computer(s). /ICT equipment maybe allocated permanently to a teacher classroom.

IMPACT ON THE LEARNING ENVIRONMENT
ICT has the following impact on learning environment.

INVESTIGATING REALITY AND BUILDING KNOWLEDGE
ICT allows student to investigate more thoroughly the real world. They can more readily access information sources outside the classroom and can be use tools to analyse and interpret such information. Information may be accessed through online systems or through data logging systems.

ACTIVE LEARNING AND AUTHENTIC ASSESSMENT.
IN many classroom situations it is difficult to allow students to be sufficiently active as participants. Typically, students are often passive, spending a lot of time listening or reading. It is well known that students are more likely to be interested and attentive and will achieve a wider range of learning outcomes If they can be active. Their engagement with the curriculum will increase as they are afforded opportunities to create their own information and represent their own ideas. Computer software can be used to provide students with learning experience where they are interacting with the computer system.

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ENGAGE STUDENTS BY MOTIVATION AND CHALLENGE

The interactive and multimedia nature of modern computer systems has provided the opportunity for software developers to create increasingly more stimulating features. Computer systems do provide the opportunity to create a wide range of interesting learning experiences. This is likely to help maintain student interest and interest in a wider range of students (CRADLERBRIDGFORTH, 2002). The interactive and multimedia features within software can be used to help student grapple with concepts and ideas.

PROVIDE TOOLS TO INCREASE STUDENT PRODUCTIVITY

In the past students have spent a lot of time doing repetitive , low-level tasks particularly involving writing, drawing and computation. While it may be necessary for student of develop this. Skills at some time on most occasions, they are pre-requisite to some higher level task. Unnecessary repetition of low –level ` learning activity. Many computer applications provide tools to support students in quickly completing these lower level tasks so that they can focus on the main purpose of the activity. Word processors, graphics packages, database packages, spreadsheets and other software support the performance of students.

STUDENT LEARNING

There are many potential uses for computers in the learning process. In some situations changes in relevant industries makes computer use in school imperative. For example, to provide course in music, technical drawing, statistics and business which do not incorporate computer use reduces the relevancy of the course to the real world. Here the rationale cries out from the work place but needs to be responded to with carefully impact of ICT on learning & teaching.

MANAGEMENT OF LEARNING EXPERIENCES.

The management of high quality educational programmes requires and generate large quantities and types of data. Teachers face many management problems which when analysed could be suitable for a computer solution. There are many such tasks which may be both time consuming and tedious for which teachers should consider a computer solution. Such tasks include the : the organization of assessments, the maintenance of library functions. The preparation of reports and organization of events. There are many school management packages which will complete tasks such as these and thereby free up substantial amount of time for other more important tasks. Schools should make use of the opportunity to continually provide more appropriate solutions to the dynamic problems associated with the provision of schooling.

IMPACT ON THE CURRICULUM

Earlier it was argued that there is a two-way relationship between ICT and the curriculum where ICT maybe used to assist in conveying the curriculum but at the same time may change the content of the curriculum. Further research has shown that the effectiveness in the use of ICT to support learning is a function of the curriculum content and the instructional strategy such that when appropriate content is addressed using appropriate strategies students and teachers will benefit(CRADLER &BRIDGFORTH, 2002)The impact of ICT on curriculum content may be viewed in terms of :
Declarative knowledge –describes objects and events by specifying the properties which characterise them.
Procedural knowledge- focuses on the processes needed to be obtain as a result.

Most educators would perceive the impact of ICT on curriculum to be positive. With the use of ICT students can use more primary source material and be encouraged to address real problems and develop analytical and interpretive skills. The classroom can be transform into a learning community making it possible for many more people to be a part of the learning process in an open and continuing dialogue. While the impact will be evident on almost all disciplines of learning, the degree will vary substantially (BECTA 2002).

VII. IMPACT ON TEACHERS AND PEDAGOGY

The impact on teachers varies although impact of ICT on teachers and the strategies they employ to facilitate the environment are critical.
The impact on teachers varies although some general areas of impact may be identified as
1 The balance of roles they play with a perceived risk of reduced influence.
2. Providing greater access to information, leading to increased interest in teaching and experimentation (CRADLER &BRIDGFORTH, 2002).
3.Requiring more collaboration and more communication with teachers, administrators and parents(CRADLER &BRIDGFORTH, 2002)
4. Requiring more planning and energy,
5. Requiring the development of skills and knowledge of ICT, and
6. Providing more time to engage with students, leading to greater productivity (CRADLER &BRIDGORTH, 2002).

The impact on pedagogy can be summarized as being strategies that are
1.more learner-centred,
2. more cooperative and collaborative,
3.more active learning and

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4. based on greater access to information and sources of information.

VIII.   CONCLUSIONS.

The use Of ICT   has led to easy programming and processing, ICT has helped the schools to eliminate waste and increase performance. The huge manpower spent has been drastically reduced with ICT thereby enhancing overall management procedures,. Use of computers has added great speed and accuracy to each task of school administration. It is also more convenient now to store large quantities of information on small and more convenient hardware like disks, pendrive and compact discs. Due to the changes and growth   , every society is now dependent on ICT to fast track such growth parameters.

Therefore, the curriculum design in every society should take into account the necessary technological input require to develop the society. ICT is a major agent of change in any Society.

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