

Information Technology Education In Higher Institutions Of Learning In Nigeria: Industry Oriented Approach.

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ABSTRACT: Every business environment today is influenced by information technology – ranging from production, sales, service delivery, shopping, banking and telecommunications, to mention but a few. Consequently, there is a growing need for highly trained and skilled personnel to take up and continue in the trend of managing not only the present technologies but also to be ready to adapt to the ever growing development in the world. Given the level of investment and development expected in the Nigerian power, automobile, oil/gas, agriculture and small & medium enterprises(SMEs), it is essential that the curriculum used by Nigerian educational institutions be tailored towards industry needs by laying a sound information technology framework through the introduction of relevant course contents, strengthening existing teaching and training methods. This is Critical. The purpose of this research publication is to examine the current level of information technology education in the Nigerian Institutions of higher learning, exploring industry needs and requirements, considering factors facing training institutions and possible recommendations, bearing in mind the fact that, the employability of our graduates depends on their abilities and feedback from industry as key indicators of their value.

1 INTRODUCTION

Today, most business environments have a high-technology status, thereby introducing a lot of complexities and challenges. It is noticed that activities are clustering around projects with team efforts that span organizational lines comprising a brand spectrum of personnel, support groups, sub-contractors, vendors, partners and government agencies with varied skills and expertise. For instance, the proposed plans by General Electric to bring heavy machinery manufacturing business to Nigeria and the planned construction of a private refinery by Dangote Group and others lining up to invest in modern Power Plants with global standards are good news for the Nigerian economy. The recent roll out master plan by the Federal Government to open up investments in automobile industry in the country is a step in the right direction. Telecommunication industry keeps expanding on daily basis connecting the remote areas in the six geopolitical zones. All these require high level of team work to kick start and sustain these projects to achieve the expected need of investors. These projects require sophisticated and high technology skills and teamwork and this is typical for many modern projects across the globe. What this simply means is that, managing or operating in such technology-based businesses requires the followings:

- I. High task complexities that must incorporate different segments in order for a whole system to function just as a unit.
- II. Fast-changing market. (Daniel, E. 2008) 'The rate at which we are turning the impossibilities into possibilities is accelerating and will continue to do so because technological change is now a positive feedback loop.' Before now, it took years for a new technology and product to be introduced in the market. But today, it takes between six months to one year and sometimes even less. The driving force behind this is information technology. Marketing strategies keep changing. All these and many more business evolutions point to the fact that, for Nigeria to remain in this kind of a competitive market, a lot need to be done in the area of information technology education and it is a big chal-

lenge to Information Technology educators.

- III. Intense competition: Every product in the market is seriously passing through a stiff competition which calls for an effective and innovative approach to business management and operation using modern technology.
- IV. Need for skilled personnel: There is a strong need trained manpower with relevant skills and professional abilities to deal with anticipated organizational conflict, power and politics. This simply means that, the upward trend of new technologies is irreversible because our daily dependence on modern products and services has become our way of life. This therefore raises a big and a critical question – How can educational institutions keep the pace in preparing students or graduates for such technology leadership positions in the nation's critical infrastructures and by extension the nation's economy?

1.1.Education

The meaning of education:

(Wikipedia) 'Education is a form of learning in which the knowledge, the skills, and habits of a group of people are transferred from one generation to the next generation through a teaching, learning or research'. Education has been seen by experts to be a tool for transformation. The second major theme or focus of the international community's vision on education has been on 'development' with emphasis on 'society's development. This implies that education is the act of developing a person, and in turn creates a developmental effect in the society where the person lives. If this is true, then educators and educational institutions should have a clear vision and mission, bearing in mind that the personal and the general societal development depend solely on them. This is the more reason why United Nations and UNESCO invest so much in education in order to develop the human capacity necessary to build a prosperous society. In the same vein, all our educational institutions should key into the vision and mission of what education really portrays. Education is one of the principal means to build 'the defense of peace' in the minds of men

and women everywhere. This implies that human capacity building through knowledge and skills acquisition brings about self-realization, self-value and consequently promotes self-esteem. Hence, such a man or woman will naturally attach values to his/her life and of course the lives of others. This confirms the core products of education - self-development and the societal transformation. The reason is that, such a person is well be informed. (Escor T. 1993) 'A misinformed or half-informed person is a danger to the society'. In the above context and connotation, it implies that a wholesome informed person is useful to himself and the society.

1.1.The objectives of education:

In support of a dynamic educational system the US president made a strong case to American educational administrators. (President Obama, 2010).I am calling on our nation's governors and state education chiefs to develop standards and assessments that don't simply measure whether students can fill bubble on a test, but whether they possess 21st century skills like problem solving and critical thinking and entrepreneurship and creativity.

The major objectives of education are listed below:

i.Skill/capacity building:

Universities and Colleges should focus on inculcating skills into the students in their institutions within the specified period of time. For this to happen, they need committed educators to ensure that students admitted into their institutions are appropriately mentored to confront the challenges in their chosen field of study. Students on graduation should have a good percentage of skills that make them to attach more values to their skills (mental preparedness) and less value to degree(the paper qualification).This is the target of any serious nation that intends to compete in the global market of economy and business.

ii.Knowledge Acquisition:

(German ICT Strategy, 2010) 'Knowledge is the most important resource in the 21st Century. Business opportunities lie above all in the efficient use of knowledge and information and then translation into marketable products and services. To be able to make use of the knowledge available on the internet, it must be meaningfully collated and combined, as far as possible' Education is all about gaining and acquiring new ideas both generally and in particular subject/course of study. Institutions must discover new ways of empowering students intellectually using the IT tools and other vast online resources. Hence, they must keep all doors of academic information opened for student's access. Also, they must mandate students under their jurisdiction at that material time to explore all available possibilities provided by the institution for their good. Such students are then tested and examined under the given conditions and availability of resources and equipment. For instance, a lecturer who is handling a course in IT must insist that all tests and home work by students be submitted online either by internet or intranet. This they must do. Or, that students of networking should map the Internet Protocol(I.P.) address of the lecturer wherever he is and watch a particular video lecture and do the assignment or mini project on it and submit same online or send through sharing facility of networking. There should be a strong insistence by the lecturer that every student does it. By so doing they learn using installed

facilities and equipment.

iii.Character transformation:

Research findings by UN and UNESCO with all their experts in education unit have said that the objective of education is to 'inform' a child or a man and to promote 'development'. This means education reforms characters, which implies that, education is a process of revolution, bringing about both a social and psychological transformation in a man. Development as an objective of education means the process of moving from one stage to another stage with incremental changes.

1.3 The Measurement of education:

There have been a lot arguments as regards the standard measurement for teaching quality in higher educational institutions. Basically, because students write their examinations within the departments. This is to say that there is nothing like public/external examinations unlike the post primary institutions. Teachers and Educators in higher institutions over the years have presumed to be doing well based on the above-stated reasons. But recently, the ranking system of universities nationally, continentally and globally had clearly provided a common tool to measure the ability and capacity of each educational institution. So we are no more in the dark. And the generally accepted indices for measurement are clearly stated such that each university or college can freely use the modalities or indices to measure it.

- I. Graduate's performance in Industry: The linkage between the graduate and industry experience is an indicator of the quality of education in higher institutions. It is a clear and obvious by a common experience in the job market that, most graduates are not employable. This means, that a graduate is unable to use the expected skill to solve a problem or problems in industry. This shows that, there is a big gap between the learning quality and the market performance.
- II. Research Interest/ability: A greater number of graduates shows a little interest in research activity. It is an indicator of the quality of the foundation laid at the initial level of university education.
- III. Prestige: It is observed that the claim of being a product of a particular higher institution of learning is another indicator of the measurement of the quality of educational activities going on there. Study has shown that graduates always identify with their Alma Mata due to excellence.

2.0.Information Technology.

Definition: Information technology, often shortened as IT is the application of electronic or digital devices combined with communication gadgets to collect, store, process data into information which can be transferred or shared for the purpose of decision making aimed at making life very easy and meaningful. It is a modern tool that has revolutionized all sectors of human life. It is a perfect tool for driving the modern business, economy and government. Information technology consists of many components. And these components make the wide application very possible. This span from system analysis to application development, web programming, Database management, network administration, Cyber security/forensic Science among others.

2.1. Specific careers in information technology:

The wide application of information technology is as a result of many components that make up this modern tool. The following are the key areas of specialties:

i. Information technology consultant/system analyst

An IT consultant works in partnership with clients, advising them on how to use information technology in order to meet their business objectives or overcome problems. Consultants work to improve the structure and efficiency of an organization's IT systems. Hiring consultants to perform specific functions over an agreed period of time is often referred to as 'outsourcing'. IT consultants may be used to provide strategic guidance to organizations with regard to technology, IT infrastructures and the enablement of major business processes through enhancements to IT. They can also be used to provide guidance during selection and procurement as well as providing expert technical assistance, and may be responsible for user training and feedback. IT consultants may be involved in sales and business development, as well as technical duties.

ii. Cloud Architect

A Cloud Architect has demonstrated proficiency in the technology architecture that underlies cloud platforms and cloud-based IT resources and solutions, and has mastered the hands-on application of design patterns, principles, and practices used to engineer and evolve such environments. Possess a good degree of skills in manipulating servers such that those virtual servers do not physically exist and can therefore be moved around and scaled up (or down) on the fly without affecting the end user. At present, cloud computing is one of the most promising avenues for ICT providers and users. It offers user enterprises a way to obtain customized storage capacities, computing power and software via the internet for flexible use to meet needs. The fees charged depend on functional scope, utilization time and number of users. Companies can save on costs through economies of scale.

iii. Computer Forensic Investigator/information or cyber security

He is also referred to a network Security Specialist or a computer security specialist. He is a kind of computer administrator that specializes in protecting a company's data and other information. Network security specialists build firewalls, install anti-virus software on servers and computers within a network, and monitor networks for breaches in security points. Network security specialists also manage the compromise of sensitive information concerning cyber-attacks including viruses, worms, and other destructive software devices that are able to get through firewalls. Anti-virus software continues to get more and more sophisticated as computer predators get more creative and more destructive. So they have a sound networking training and experience.

iv. Mobile application developer.

In the world of mobile instruments, these are experts in IT who write programs or application software for low-power handheld devices, such as personal digital assistants, enterprise digital assistants or mobile phone like smartphones, etc.

V. Web Developer

Web developers are jacks of all trades. They create web pages, web applications and web contents, but their skill set requires them to have excellent understanding of what makes a good operating system, what the average surfer finds visually stimulating and how to optimize sites for mobile tech, among numerous other skills. They also need proficiency in Web languages, like HTML, PHP, PERL and JavaScript.

VI. Software Engineers

Software engineers are IT experts who are behind all the programs we run on our mobile devices and personal computers. They can be in-house designers/developer or off-the shelf application developers.

VII Data Modelers/Database Administrators

These are IT experts who specialize in the handling of vast data of organizations and therefore determine the logical structure of such database and fundamentally determine in which manner [data](#) can be stored, organized, and manipulated. They use popular database management systems (DBMS) such as Oracle, MySQL, Sybase, etc.

VIII. Network Administrators

These are specialists in IT who are efficient in the handling of networking with the help of network devices and software to connect and sustain connectivity so as to enable clients have access to the server for information. These are Cisco trained network engineers and personnel.

IX. Server Administrators

These are IT personnel whose duty is to monitor servers and ensure the real-time functioning of the platform. They also ensure that unauthorized and unauthenticated users are not granted access to the information in it.

TEN TOP JOBS IN INFORMATION TECHNOLOGY.

s/no	IT field	ranking	salary
1	IT consultant	1 st	\$96,000.00
2	cloud architect	2 nd	\$112,000.00
3	Cyber security/forensic	3 rd	\$64,000.00
4	Health it specialist	4 th	\$90,000.00
5	Mobile app developer	5 th	\$89,000.00
6	Web developer	6 th	\$89,000.00
7	Software engineer	7 th	\$88,000.00
8	Information t. vendors manager	8 th	\$84,000.00
9	Geospatial professionals	9 th	\$103,000.00
10	Data modeler	10 th	\$100,000.00

T.A1. Ranking of IT Professionals in the US

2.2. Evaluation of the level of information technology education in Nigeria.

A general experience and closed observation of the level of information technology in Nigeria reveal the followings:

- I. Absence of software development contribution : There are no good effort of individuals or groups that are

engaging in the development of software used in the areas that IT is actually implemented. This is why we see 'off-the-shelf applications' flooding Nigerian market. Software applications used in banks, telecom firms and other sectors are imported. This is a clear factor to assess the level of information technology impact in the country. A record shows that about 99% of software products used in Nigeria are imported. This is not good enough for a country that wishes to catch up with her counterparts elsewhere in the world.

- II. Low participation of Information technology professionals in key sectors of the economy. This problem contributed to the enactment of the local content Act, mandating Nigerians to be engaged in all key sectors of economy. But how will this happen when there are no skilled personnel to participate in such areas ?
- III. Low internet utilization: Google Africa reported that Africa has only 16% of internet utilization in the global ranking. Breaking down into all the countries gives Nigeria less than 3%. It is an indication of a negative index of information technology in Nigeria's higher institution and by extension the country.

3.0. Application of IT in Industry:

The fact that information technology has a wide application is not an over statement. But this publication will focus only on a few selected critical areas that IT is paramount and essential, These are:

i. Telecommunication

Mobility and the growing need for information in the modern knowledge society call for increasing transmission capacities. Spectrum and performance needs are increasing for mobile wireless applications as rapidly as in the cabled sector. The application of IT in telecommunications industry is enormous such that it is rather difficult if not impossible to separate IT from telecommunications. IT application starts from installations to deployments and maintenance. Configuring, deploying, testing, maintaining, monitoring, and troubleshooting telecommunications network components of a moderately complex nature to provide a secure, high performance network, including services for core LAN/WAN, VOIP(voice Over Internet Protocol), QOS (Quality of Service), COS (Class of Service), (VLAN's) Virtual Local Area Network, SBC's (Session Border Controller) and SIP(session Initiated Protocol) requires skilled capacity in information technology. Implementation of routine telephony solutions and project plans through the use of applications, which may include Cisco Call Manager, Unity voice Mail and Cisco emergency are all core IT technology. In Nigeria, with an estimation of about one hundred and seventy million population (170,000,000), we have a booming market of Telecommunications with MTN, Globacom, Airtel and Etisalat as major with the following information on their subscribers:

INSTALLED CAPACITIES OF GSM IN NIGERIA

MTN	GLO	AIRTEL	ETISALAT
55,238,430	25,019,863	21,591,904	15,303,647
TOTAL = 237,488,111			

T. A2. Installed capacity of GSM firms in Nigeria.

CONNECTED LINES OF GSM IN NIGERIA.

MTN	GLO	AIRTEL	ETISALAT
55,238,430	25,019,863	21,591,904	15,303,647
TOTAL = 237,488,111			

T. A3. Connected lines of GSM firms in Nigeria.

ACTIVE LINES OF GSM IN NIGERIA.

MTN	GLO	AIRTEL	ETISALAT
55,238,430	25,019,863	21,591,904	15,303,647
TOTAL = 237,488,111			

T. A4. Active lines of GSM in Nigeria.

TABLE SHOWING ESTIMATED IT JOB PLACEMENT BY TELECOM FIRMS IN NIGERIA.

NAME	NET-WORK ENGINEERS	DATA-BASE EXPERTS	IT SECURITY	WEB-MAS-TERS	SERVER ADMIN-ISTRATORS	SYS TEM ANA-LYST S
TELECOM FIRMS	250	340	225	160	130	30
TOTAL = 1135						

T. A5. Tables showing estimated IT staff strength in Telecom firms.

Implication:

The above data, though estimated, means that as the various telecom firms carryout expansions by installing base stations, creating mobile centers and core centers across the nation's cities and villages, then more of different professionals in information technology will be absorbed into the service. Hence, it is necessary that capable and skilled man power be produced by training institutions.

ii.Banking:

The application of Information technology in banks has been necessary and indispensable even before the advent of cashless policy of the government. With the implementation of the policy, Information technology application in banks becomes not only necessary but mandatory. Imagine the number of banks in our country and the requirements of IT experts needed in vital units of the bank. These include: The Web application experts to monitor online and inter-bank transactions, the cyber security experts to protect customers and bank's information and core network engineers to monitor and sustain the connectivity of the national network system of the bank due to the level of traffic that is being experienced on daily basis as a result of online banking system with the policy of cashless economy.

ESTIMATED DATA OF IT STAFF IN FINANCIAL INSTITUTIONS

NAME	ESTI-MATED NO OF WEB MAS-TERS	ESTI-MATED NO. OF NET-WORK ENGI-NEERS	ESTI-MATED NO OF DATA-BASE STAFF	ESTI-MATE. NO OF IT SE-CURI-TY STAFF
BANK S	150	236	206	80
TOTAL = 672				

Implication

The above data, though estimated, implies that, as the various banking firms continue to expand by opening more branches across the 36 states and towns in the country, then more of different professionals in Information Technology will be absorbed and added into the service. Hence, it is vital that the training institutions do get the feedback from banks as regards the specific skills needed to be demonstrated by information technology graduates.

iii. Medical Care:

Health IT is a blossoming field, especially with major changes going on in healthcare due to the Affordable Care Act and the gradual transition to electronic health records. Health IT specialists will mix computer knowledge with record-keeping skills. Core Information technologists are needed in medical field to carryout researches using high-tech equipment combined with mathematical and statistical models to find solutions to the challenges plaguing health sector globally. UN, UNICEF and UNESCO are doing their best in investing in IT so as to help uncover methods of attacking diseases and parasites threatening the world population. So, this will require experienced IT professionals who have interest in the medical field to invest their skills to do research using all available IT and mathematical tools. (Davies 1991) 'The process for obtaining systematic knowledge and technology which can be used for the improvement of the health of individual groups. It provides the basic information on the state of health and disease of the population; it aims to develop tools to prevent and cure illness and mitigate its effects and it attempts to devise better approaches to health care for the individual and the community.' Applications of computer models go a long way to assist uncover new things in the medical findings. (Hunter and Long 1993).Health services research investigates the outcome of medical interventions from social, psychological, physical and economic perspectives. It has also been cogently argued that health services research should be concerned with the evaluation of the health sector in the broadest sense and not limited to health services alone, showing and proving the fact that Research in medicine or health is multi-disciplinary. Advances in the computational modeling and simulation of complex biological systems are transforming biological research from a *qualitative, descriptive* science to a *quantitative, predictive* science. Health research should focus on the design and efficient implementation of computational capabilities for the analysis of data from high-tech experimental technologies, the ab-

straction of models from this data, and the predictive simulation of these models. Beyond the validation of experimental observations, these simulations enable the design and prediction of the outcome of new experiments. This is an essential part of the scientific discovery cycle aiming at the development of technical approaches to bioremediation, bioenergy production, and climate management.

iv. Education.

Our education system relies on core sets of standards-based concepts and competencies that form the basis of what all students should know and should be able to do. Whether the domain is English language arts, mathematics, sciences, social studies, history, art, or music, Universities should continue to consider the integration of 21st-century competencies and expertise, such as critical thinking, complex problem solving, collaboration, multimedia communication, and technological competencies demonstrated by professionals in various disciplines. This can only be achieved if we apply the modern technology in class rooms. That is the application of Information technology. Using online resources, simulation and models. Classrooms should be equipped with the 21st century educational gadgets like interactive boards and educational software that will motivate and attract our students to develop the courage and passion to study even in the mathematics class. Today we have online education(e-learning) and all other ICT tools that have been brought into the education system with aim of improving the methodology and the process of learning.

V. Manufacturing.

With the doors of high –tech business tracing their ways into the country for the purpose of investment, what should come to the minds of the Higher institutions and educators should be the fact that, these people will come with the modern tools for the high-tech business. General Electric is coming with modern Information Technology hardware and software to open up the manufacturing opportunities in Nigeria that will serve as a channel to the continent of Africa and beyond. The private refinery project, the automobile industry and the expected sale of Warri, Kaduna and Port-Harcourt refineries to private firms mean that those firms will surely come with new technologies as obtained elsewhere. These technologies will certainly be built on the Information Technology platform.

4.0.Challenges:

Challenges confronting effective Information Technology education in higher institution of learning are enormous. A few of them are discussed below:

i. Insufficient skilled Information Technology Staff:

Most of those institutions offering information technology do not have sufficient man power to deliver enough credit hour courses that will provide students a good access to information technology skills needed in Industry. A situation where a department lacks a competent staff in programming language or in database. It means, that graduates in such a department will lack some specific skills as an information technologist to function in Industry or even in the university / research institute.

ii.Lack of Equipment:

Lack of adequate equipment and modern gadgets needed to appropriately deliver the course contents of information technology is a great impediment. This course is practical oriented

and it must be approached as such. The theoretical lectures must go hand in hand with laboratory practical(hand – on – desk) approach. The unavailability of the computer hardware and its related accessories, the computer software and its associated applications and the simulations both logical and physical in the laboratory will make effective learning impossible.

iii. Outdated Curriculum:

Most of the curricula or course contents still in operation in higher institution in Nigeria are not in line with the current realities as regards the conformity to solving real life problems. Some courses require breaking down to more specific units with the target of creating a specific skill in students/graduates. Some courses carry so many units that are not relevant to that particular field of study. At the end of the day these graduates come out irrelevant in industry.

iv. Lack of Policy Implementation:

If there is no clear-cut policy or a strong commitment to implement already formed policy on information technology by the government or an institution regarding the objectives on the training of information technology graduates, then this will be a problem. It is said 'a traveler that does not know his destination will be dropped anywhere'. Hence lack of road-map is a challenge and it leads a country to nowhere.

v. Lack of Fund:

Lack of funds to implement effective information technology training is seen as the greatest set back. This will impede staff training. This will pose a serious set back in procurement and maintenance of the needed gadgets and their related accessories.

vi. Student's Negative Attitude:

Attitudes of students admitted into the department of information technology can contribute to inability to meet the objectives of information technology training. If their intension is just to come and collect the certificate without acquiring the necessary skills expected, then they should not be awarded at all.

vii. Lack of Basic Infrastructure:

insufficient or lack of some basic and critical infrastructure like power supply and routine maintenance culture are hindrances to effective information technology education in higher institution of learning. Universities and Colleges having short supply of power or electricity stand a risk of missing out the opportunities of practical and researches. Generating sets can never provide enough allowance for students and lecturers to have sufficient time to carry out detailed practical and researches. This is the fundamental challenge.

viii. Lack of Adequate Technical Supports:

If there are insufficient or no technical support staff in the laboratory to help and complement lecturers, then the actual target of skills acquisition will be defeated. Lecturers alone may not be able to have sufficient time to follow up students in the practical which is the most effective medium of acquiring skills. They are called laboratory technologists or laboratory attendants. If they are not available then students and lecturers will have a missing link between the previous and the next lessons.

5.0. Recommendations:

Rising from the above –mentioned challenges, the following recommendations are made:

i. Re-structuring of curricula:

There should be a constant re-structuring of the university's curricula or course contents with a view to aligning them in perspective of what are obtained in other universities as well as what are obtained in the industry. This is why industry feedback is very crucial.

ii. Lecturers/educators capacity building:

As technology changes, administration in higher institution must be flexible to move along that direction. By this I mean, lectures must go for training in other to inject new ideas into the learning system. The choice of training should be geared toward acquiring skills. They must see this as a task in other to fulfill their professional mandate. Funds should not be a problem. The National University Commission (NUC) and the relevant supervisory bodies must ensure that lectures are given the platform to obtain all necessary training so that they can meet up with their counterparts globally. This requires commitment and strong will.

iii. Equipment/Infrastructures:

The government, industry and partners must ensure that institutions of higher learning lack no basic learning equipment and infrastructures. Heads of institutions must prioritize their spending such that preference is given to gadgets and equipment. Most times, government do not have direct responsibility to procure all these basic items, It therefore means, head of institutions have to see the need before prioritizing. In the same vain, old equipment must always be replaced with the modern ones. Industry must also give a helping hand. If they are expecting some quality products, they should also help in setting the pace and making learning environment conducive to produce such expected quality products. Electricity which is the fundamental infrastructure should not be compromised in higher institutions by the government if the best is expected from the ivory tower.

iv. Internship:

The practice of Internship is a vital link between the training institution and the industry. Schools(training institutions) should establish cordial relationships with industries where students at different stages of their trainings will be participating in internship programmes. This should be counted as some credit course for students. By so doing, they will have the applied knowledge of what they have done in the classroom.

v. Exchange Programme:

This is the practice where two or more institutions agree to allow both students and educators visit their schools and spend some time(ranging from one to two years period)for the purpose of learning with the existing facilities and staff on each of the schools. Here the method of technology transfer will be easy. Educational institutions in Nigeria are encouraged to make internship programmes parts of their course contents. It could be organized nationally, internationally or both.

Glossary

IT	-	Information Technology
ICT	-	Information & Communication Technology
IP	-	Internet Protocol
UN	-	United Nation
UNESCO	-	United Nation Educational Science and Cultural Organization
HTML	-	Hypertext Markup Language
PHP	-	Hypertext Preprocessor
DMBS	-	Database management System
VOIP	-	Voice Over Internet Protocol
QoS	-	Quality of Service
COS	-	Class of Service
VLAN	-	Virtual Local Area network
LAN	-	Local Area Network
WAN	-	Wide Area Network
SBC	-	Session Border Controller
MTN	-	Mobile Telecommunication network
GLO	-	Globacom
GSM	-	Global System For Mobile Telecommunication
UNICEF	-	United Nations International Children Education Fund

6.0 Conclusion

Colleges and Universities should come to a realization that, identifying meaningful and measurable objectives in information technology education would help provide the motivation necessary to improve teaching and learning. The high quality graduates is one of the crucial objectives of their academic exercise and the quality of graduates must be ascertained by the market performance (Industry).

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