
Human Resources and Technology: Education in the Days of Google, Wikipedia, Facebook and Twitter

By

EMEKA MADUEWESI, ESQ.

*L.LM, Intellectual Property and Technology Law,
Google Document Review Attorney (Adecco),
Mountain View, California, CA.*

Abstract

The purpose of this paper is to discuss the transformative potentials of Information and Communications Technology and social networking in the context of the challenges facing higher education and human resources development in Nigeria. All over the world, businesses, both large and small, are undoubtedly benefiting from consumers shift to e-commerce and new media outlets such as social networking sites as a way to obtain information. This paper will examine the impact of information technology in the learning process and its potential to support deep and meaningful learning. The paper will seek for a restructuring of the learning experience as presently delivered and discuss the impact of proper education that will combine traditional teaching methods with new media for optimal development of Nigeria's human resources. The paper will also discuss the financial benefits of information technology powered education through monetization of intellectual property and other intellectual work products. The paper will conclude by asserting that Nigeria's human resources development will suffer stunted growth and produce unemployable graduate unless conscious effort is made to blend traditional learning methods with offerings from new technology.

A. Technology and Human Resources

The Web definition summarizes technology as the application of scientific knowledge for practical purposes, and the machinery and equipment developed from such knowledge. The Web defines Human Resources relevant to our topic as the

personnel of a business or organization especially when regarded as a significant asset. This definition is synonymous with "Manpower", which is the supply of personnel available or engaged for a specific job or task.

B. Information and Communications Technology

All over the world, Information and Communications Technology (hereinafter referred to as "ICT") is transforming the world of education. A major shift in the way we live, learn and work began with the arrival of the information society, with students using computers at home and school to do homework. A few years ago, however, models that enhance and change the way that classroom education operates started to challenge the traditional model of classroom instruction.

The jury is out and the verdict is that ICT revolution has brought in its wake an education revolution that has changed the way instructors teach and students learn. Software-based learning programs and specially equipped computers are already providing hands-on learning opportunities that emphasize exploration, problem solving and creativity to children.

Online learning applications allow students in remote areas to access a wide range of educational resources, with instructors making use of advanced materials from digital libraries. Powerful networks enable students, classrooms and teachers to interconnect. Staging tools provide the basic structure to manage and deliver courses online.

Course content is disseminated through course delivery tools like online videos, podcasts, etc. Course collaboration tools allow people to work together and interact with their instructor. Web conferencing and web based simulations can be used to create rich course communication and assessment and learning tools enable testing and prevent plagiarism.

C. How do You Acquire, Protect and Enjoy Technology?

The high-level first step to technological innovation or acquisition is to identify the problem that needs to be solved. Think of or imagine all available solutions. You then conduct original research on the subject or engage in Reverse Engineering of existing solutions. When your labor bears fruit, the copyright law or patent law provides for how to protect your intellectual property. You may also hide it from the public as trade secret. You may enjoy your intellectual property by monetization through licensing or direct sales to consumers. This is very high level and beyond the scope of this paper. This paper will discuss the very elementary levels of cultivating educational changes using technology to meet the growing needs of 21st Century learners and the role of various stakeholders in affecting those changes.

How ICT is Impacting Learning in North America - EDUCAUSE Report

EDUCAUSE, an organization that focuses on information technology in education have, for the past few years, been surveying students across North America to understand what is happening with ICT in the universities. In 2010, EDUCAUSE CENTER FOR APPLIED RESEARCH released a report titled, "The ECAR Study of Undergraduate Students and Information Technology. 2010." This links to the full report -<http://net.educause.edu/ir/library/pdf/ERS1006/RS/BRS1006W.pdf>. which I will encourage you to read so that you will appreciate the trends more. We will discuss only the highlights of the survey.

This 2010 survey highlighted the use of information technology in universities in North America today. It shows that there has been an increase in the use of laptops as opposed to desktop computers by students. Social media site usage has risen with Forty-two percent of students reporting that they had uploaded video to social media sites and Thirty-six percent saying that they had contributed to a blog. Over Eighty percent used social media networking (like Facebook) and Forty percent used a VOIP service (like Skype) on their computer. The use of Internet capable mobile devices was also increasing. Only Twenty-five percent of the students said that they do not own and do not plan to purchase an Internet capable mobile device in the next 12 months.

The study also looked at the use of social networking websites by age, and how that had changed since 2007. The usage has continued to increase and, significantly, in older age groups there has been a more rapid increase - people above the age of 25 are increasingly adopting online social networking.

The survey looked at Instructor use of technology in courses. Only Fifty-one percent of students felt positive or very positive about the course management system used in their university. Many instructors continued to use teaching methods (hat did not incorporate information technology at all. Only Forty-Seven percent felt that instructors used information technology effectively in their courses. Increasingly, instructors are making course materials available online so that it is easier for a student to avoid coming to class. Sixty four percent of students disagreed that they skipped classes when materials were available online.

About half of the students believed that information technology improved the courses that they were taking while most preferred a 'moderate' level of ICT usage in their courses. The use of information technology by students in their daily lives was increasing, and while many instructors are using ICT effectively in their courses, it appears that many are not, revealing significant opportunity for improvement.

Since online degrees are becoming more popular, the survey discussed new forms of distance learning and whether it is possible to achieve acceptable levels of academic quality in online courses. The survey looked at how students evaluated the online courses, what the experience of the professor was and the customer service and administration that is required to deliver online degree. The survey showed that online learning continues to grow and it expects that it will become an increasing proportion of the educational market.

3. Free Online Resources That Will Impact Education in a Short Term

A. Google

Google is an American multinational corporation that provides Internet-related products and services, including Internet search, cloud computing, software and advertising technologies. Google began in January 1996 as a research project by Larry Page and Sergey Brin when they were both PhD students at Stanford University in California. Originally, Google ran under the Stanford University website, with the domains google.stanford.edu and Stanford.edu. The company also offers online productivity software including email, office suite, and social networking. Google's products extend to the desktop as well, with applications for web browsing, organizing & editing photos, and instant messaging. The company was founded on a flat organization with a collaborative environment. Google leads the development of the Android mobile operating system, as well as the Google Chrome OS browser-only operating system found on specialized netbooks called Chromebooks. Google-owns sites such as YouTube, Blogger and Orkut. In 2011, Google acquired Motorola Mobility for \$12.5 billion.

B. Twitter

Twitter is an online social networking service and microblogging service that enables its users to send and read text-based messages of up to 140 characters, known as "tweets". Founded in March 2006 by Jack Dorsey, Noah Glass, Evan Williams and Biz Stone. Twitter was launched July of same year. The service rapidly gained worldwide popularity, with over 500 million active users as of 2012, generating over 340 million tweets daily and handling over 1.6 billion search queries per day. Since its launch. Twitter has become one of the top 10 most visited websites on the Internet: described as "the SMS of the Internet." Unregistered users can read tweets, registered users can post tweets through the website interface. SMS, or a range of apps for mobile devices. Twitter has been cited as an important factor in the Arab Spring and other political protests.

C. Facebook

Facebook is a social networking service launched in February 2004, owned and operated by Facebook, Inc. Facebook was founded by Mark Zuckerberg with his college roommates and fellow students Eduardo Saverin, Andrew McCollum, Dustin

Moskovitz and Chris Hughes. Users must register before using the site, after which they may create a personal profile, add other users as friends, and exchange messages, including automatic notifications when they update their profile. The website's membership was initially limited by the founders to Harvard students, but was expanded to other colleges ' in the Boston area, the Ivy League, and Stanford University. As of June 2012, Facebook has over 955 million active users, more than half of them using Facebook on a mobile device.

D. Skype

Skype is a proprietary voice-over-Internet Protocol service and software application originally created in 2003 by Swedish entrepreneur Niklas Zennstrom and his Danish partner Janus Friis. It has been owned by Microsoft since 2011. The service allows users to communicate with peers by voice, video, and instant messaging over the Internet. Phone calls may be placed to recipients on the traditional telephone networks. Calls to other users within the Skype service are free of charge, while calls to landline telephones and mobile phones are charged via a debit-based user account system. Skype has also become popular for its additional features, including file transfer, and videoconferencing. Skype has 663 million registered users as of September 2011.

E. The Khan Academy

The Khan Academy is a non-profit educational organization created in 2006 by Bengali-American educator, Salman Khan, a graduate of MIT and Harvard Business School. With the stated mission of "providing a high quality education to anyone, anywhere", the website supplies a free online collection of more than 3,300 micro lectures via video tutorials on mathematics, history, healthcare and medicine,finance,physics,chemistry,biology, astronomy, economics, cosmology, organic chemistry, American civics, art history, macroeconomics, microeconomics, and computer science.

The Khan Academy started with Khan remotely tutoring one of his cousins interactively using Yahoo Doodle images. Based on feedback from his cousin, additional cousins began to take advantage of the interactive, remote tutoring. In order to make better use of his and their time, Khan transitioned to making YouTube video tutorials.

All videos are hosted on YouTube are available through Khan Academy's own website, which also contains many other features such as progress tracking, practice exercises, and a variety of tools for teachers in public schools. Logging into the site can be done via a Google or a Facebook account for those who do not want to create a separate Khan Academy account.

The project is funded by donations from several people, including significant backing from the Bill & Melinda Gates Foundation and Google. In 2010, Google gave the Khan Academy \$2 million to create more courses and to translate the core library into the world's most widely spoken languages. Khan Academy has eclipsed MIT's Open CourseWare (OCW) in terms of videos viewed. Its YouTube channel has more than 175 million total views, compared to MIT's 40 million. It also has twice as many subscribers, at more than 369,000.

F. Wikipedia

Wikipedia is a free, collaboratively edited, and multilingual Internet encyclopedia supported by the non-profit Wikimedia Foundation. Its 22 million articles (over 4 million in English alone) have been written collaboratively by volunteers around the world. Wikipedia was launched in January 2001 by Jimmy Wales and Larry Sanger. Sanger coined the name Wikipedia, which is a portmanteau of wiki (a type of collaborative website, from the Hawaiian word wiki, meaning "quick") and encyclopedia. Almost all of its articles can be edited by anyone with access to the site, and it has about 100,000 regularly active contributors. As of August 2012, there are editions of Wikipedia in 285 languages. It has become the largest and most popular general reference work on the Internet, ranking sixth globally among all websites and having an estimated 365 million readers worldwide. It is estimated that Wikipedia receives 2.7 billion monthly page views from the United States alone.

G. Web 2.0 Guru Wikispaces

Web 2.0 Guru Wikispaces (<http://web20guru.wikispaces.com/>) is an indispensable resource for any serious person who is interested in integrating technology in a 21st Century Classroom. The site has a long directory of free technology resources for 21st Century Education. You must also read the article, "Defining a 21st Century Education <http://www.centerforpubliceducation.org/Learn-About/21st-Century/Defining-a-21st-Century-Education-Full-Report-PDF.pdf>.

4. Availability, Accessibility, and Connectivity

From the forgoing, one can confidently say that education in the days of Google, Wikipedia, Facebook and Twitter is all about availability and accessibility of useful information, and connectivity of individuals or social networking. These are purely information technology companies that can facilitate learning because the business model either involves storage of very useful information, or enables people to connect and discuss in real time.

5. What is Our Problem?

The objectives of ICT development concept are to develop a society based on knowledge and intellectual potentials and to improve the quality of people's lives. The adoption and development of new technologies invariably required a large pool of multi-

disciplinary professionals who could combine an in-depth knowledge of technologies with an innovative approach to improve productivity and competitiveness.

Despite the Availability of all these online learning tools and sources of information, Nigeria has been struggling with a dearth of technical talents to build, maintain and grow new technology-driven companies. We are not producing enough students with skills in mathematics and sciences, a prerequisite for real computer science education. Development of information technology is a key factor to fostering economic development. Expanding computer science training provides unique opportunities for economic mobility and sustained employment for a large cross section of graduates.

In view of the rapid global transformation into a knowledge-based economy, the problem of shortage of qualified human resources in the ICT sector is a serious problem for both developing and developed countries. Developing nations face major challenges to transform into a knowledge-based economy and develop e-commerce for their internal as well as external trade. Issues such as technology, infrastructure, legal system, management and security warrant our due consideration. Nigeria is not immune to these problems. The availability of high levels of skills of labor force and management is therefore of critical importance and require concerted efforts of all stakeholders, particularly the governments, the private sector and international organizations.

6. Integrating ICT into the Learning Process

The use of ICT in schools and institutions of higher learning entails three components: content, delivery mechanisms and front-end infrastructure.

A. Curricula Content

The creation of high quality, interactive teaching material is the key to unlocking the potential of ICT usage in teaching. Uniform and consistently high quality learning can be ensured even in remote, far-flung areas once high-quality content is created.

B. Delivery Mechanisms

Delivery of content over long distances needs communication infrastructure in the form of broadband connectivity, such as fiber-optic lines, cable TV, satellite links and equipment, etc.

C. Front-End Infrastructure

These include computers, network resources and facilitators. Also, teachers in schools using interactive learning technologies must first be trained in their usage.

Full integration of ICT into the learning process should be optimal and collaborative, and project-based learning can make up a solid strategy for ICT-enhanced education. ICT available in a school can also be used to offer continuing training to ICT workers themselves to enhance and update their skills.

7. Human Resources Development (HRD) Required for ICT

Human resources for ICT may be classified, based on the occupational structure of the ICT profession, into hardware professional, software professional, managerial personnel, marketing and sales personnel, services and support personnel. Another classification .of may be into ICT developer, ICT programmer, Operator and Technician.

Development of human resources in the ICT sector will be based on two kinds of approaches: responding to market demand (demand driven) and generating skilled human resources (human driven). In laying down an ICT policy, the following basic factors should be taken into account: (a) Human resources in terms of computer knowledge; (b) The situation regarding computer hardware; and (c) Computerization of industries.

However, an initial investigation into our attitude to HRD for knowledge-based economy shows that our large scale "computer science" programming tends to be vocational in nature, with focus on using computers as a productivity tool (keyboarding, MS Office, website design) or optimization of hardware (Cisco Academy). Curricula with a focus on genuine computer science - the design/development of computer software - are rare and small scale.

How do we use the tools provided by these free online platforms to develop our human resources? How do we prepare all aspects of our future ICT sector - software, hardware, management - for both our local needs and the international labor market? How do we ensure that our graduates are employable globally as soon as they step out of our schools?

8. What do You Have in Your House - School ICT Infrastructure

A school's readiness in terms of ICT access can be broken down to different components: number and type of computers available, physical access to the technology, diffusion of the network, access to and organization of electronic content, and quality and speed of connectivity. In general, the diffusion of ICT is driven by unit cost per pupil. Computers tend to be adopted first at the university level, then by the secondary school system, and Finally by primary schools.

In the current scenario of a global scramble for high-tech workers, a country needs to develop its own vision in the global ICT human resources market. This can be done based on the current and expected growth of the ICT industry in the country, the need for qualified human resources for e-governance initiatives and the global demand-supply gap. Given such a vision based on an assessment of the comparative advantage that a country

has in this field, the next task is for the universities, the government and industry to work out a joint strategy to achieve the vision.

What do you have in your schools and universities? If you have nothing, that makes it easy; we start from the scratch. If you think you already have something, we conduct an audit to ascertain what you have before we can recommend what you need,

9. What Shall We Do -

A. Role of the Government in HRD for ICT

The policy focus of the Nigerian government for development of human resources for information technology should be to develop ICT culture in Nigerian society. The education and training delivery system should be expanded, not only to produce highly qualified and technically competent workforce, but also to provide training and retraining opportunities to the existing workforce.

The first step is to equip our secondary school leavers with more than basic ICT culture. The state's education ministry should spearhead the development of innovative school models that emphasizes computer science and technical education within a strong overall academic program aimed to benefit a wide range of students. By integrating computer science and modern technology, the schools will enable students to graduate with a strong knowledge of programming—and the related learning, thinking and reasoning skills that can be applied to a variety of post-secondary options. This would enable ICT-literacy in the country and help to actualize any vision we have of becoming an ICT-based and knowledge-driven economy.

B. The Seven Point Agenda

That having been said, let us suggest what the role of the government should be in developing our human resources to be ICT compliant,

1. The government should make strategic investments in education and training that cannot be made by industry or private sector and which are necessary to enable feasible private investments or loan funding, particularly in higher technical education.
2. The government should lead in the creation of high quality, interactive teaching materials, utilizing the private sector to the extent feasible. This is the key to unlocking the potential of ICT usage in teaching, and a uniform and consistently high quality education can be ensured once high-quality content is created. Government should undertake the task of broadly defining what is required, and invite private sector participation in creating high quality interactive material.
3. The government should establish institutional mechanisms for taking necessary decisions regarding the syllabus, credentialing of teachers, best teaching method, etc.

in consultation with industry. While the involvement of government in this activity is obviously necessary, the precise nature of tasks that it should take on directly and those that should be outsourced to the private sector needs careful evaluation. The government should evolve mechanisms to certify content of acceptable quality for usage in the schools and universities.

4. Since the delivery of content over long distances needs communication infrastructure in the form of broadband connectivity involving fiber-optic lines, cable TV, satellite links and equipment, the government should evolving a suitable policy framework for telecommunications to make such connectivity available at affordable, or even subsidized, cost to educational institutions.
5. Government should encourage research and innovation in the use of wireless broad band technologies in education, as this could greatly help remote rural areas.
6. Government should be involved in the procurement and creation of front-end infrastructures. The cost of these technologies and the ability of students to pay for them or access bank loans that can be repaid after getting a job need to be carefully assessed at every level to ensure that, to the extent feasible, the diffusion of these technologies is self-sustaining.
7. Governments should pass enabling legislation that will create a safe and secure online space for learning and e-commerce. The National Assembly should pass legislation covering such areas as access (the Universal Access Act), computer crime (the Computer Crime Act), electronic funds transfer (the Electronic Funds Transfer Act) and data protection (the Data Protection Act). These laws should Jay down adequate legal framework for Nigerians to enjoy with confidence, like the rest of the world, the benefits of ICT-driven economy.

10. What Shall We Do - Role of the Private Sector in HRD for ICT

Given the high cost and rapid change involved in the creation of human resources for the information and communications sector and the limitations of government initiatives (despite their importance), the role of the private sector in HRD becomes **particularly** crucial. Traditionally, industry has looked upon the government and the university system to create the human resources needed for its own growth. Various factors indicated earlier have led to a fair degree of clarity, both in government and industry, that private sector involvement is critical in bridging the current and future gaps.

Nigerian universities should seek for greater collaboration between (he industry and educational institutions (mostly universities and polytechnics). The companies should enter into ICT training as a strategic business decision to support their products or as an

independent business activity. For example, Motorola set up a centre for research at Beijing, China. Cisco set up a Regional Academy of Training, and IBM earns about 8 per cent of its revenues from training. Several other major ICT companies - SAP, Oracle, Peoplesoft, Microsoft and others - have established large chains of training institutions either directly or through partnerships and alliances.

Apple Computer International launched Macademia Soft Corner, a multimedia learning and education centre that will impart hardware, software and Internet offerings to enhance education at the primary and middle levels. The program provides one computer with Apple software for each child, a high-tech theatre, an adventure course, a reference centre and an arts and crafts room.

Google has a whole suite of free applications for education and a Google Certified Teacher Program. Information technology companies in India have aggressively pursued education and training at the college level for the past several years. Most of these initiatives are local in nature and depend on the institutions, individuals and companies involved. Nigerian companies should learn from them. Let me quickly add that the whole field of ICT education is in a state of flux and rapid innovation. Sharing of experience in terms of different models of public-private partnerships or of liberalization of education policy could be one major area of interest and could help accelerate spread of ICT education in the most cost-effective manner.

11. Monetizing Your Intellectual Property

Some universities in the United States generate more than a billion dollars per year in licensing revenues from intellectual property and other work product. However, not all educational institutions effectively monetize their intellectual property, Monetization can give every university the ability to:

1. Reduce dependence on government funding for research and development;
2. Increase the total amount of funding available;
3. Acquire unrestricted funding in the form of licensing revenue;
4. Turn inventions into products to benefit the public;
5. Reward faculty members for their efforts;
6. Encourage faculty members to invent by sharing licensing proceeds with them and their departments.

Patent

A patent is a form of intellectual property. It consists of a set of exclusive rights granted by a sovereign state to an inventor or their assignee for a limited period of time in exchange for the public disclosure of an invention. The exclusive right granted to a patentee in most countries is the right to prevent others from making, using, selling, or distributing the patented invention without permission. Patents protect processes, procedures and products.

Copyright

Copyright is another form of intellectual property (like the patent, trademark, and trade secret) applicable to any expressible form of an idea or information that is substantive and discrete. It is a legal concept, enacted by most governments, giving the creator of an original work the exclusive rights to it, usually for a limited time. Generally, it is "the right to copy", but also gives the copyright holder the right to be credited for the work, to determine who may adapt the work to other forms, who may perform the work, who may financially benefit from it, and other related rights. Copyright is the most common form of intellectual property and covers the works of writers, authors, musicians, artistes, artists, performers, etc. As an intellectual, you may produce E-Books, Audio Books, Videos of your knowledge. Copyright law protects these and you may monetize your products by direct marketing to consumers through online sources, or licensing others to market them for you,

12. Conclusions

Without an educated, ICT-savvy populace, no community can reap the benefits of a knowledge-based society or participate in it effectively. Students need to be taught from the earliest age possible to use ICT to enhance and improve their learning experiences. ICT need to be properly harnessed to improve the learning process itself. Teachers must be trained to use the Internet and computers as tools for the students benefit; this training is central to effective usage. Curricula must be redesigned to encourage the use of ICT in the pursuit of problem solving, group learning and research.

The key enabling factor to stimulate rapid growth of ICT is the availability of a world class ICT Infrastructure, which includes telecommunications and data networks facilities, national databases and technology parks. Despite the enormous potentials of these technologies to offer high quality, cost-effective education, the opportunities presented here are distinguished by the extent to which they remains unused, misunderstood and underestimated. Schools must integrate ICT into their learning processes. We need the government to step in to help articulate the vision and provide the funds. We need the universities to collaborate with the private sector to create the curricula that will make our graduates employable. Most importantly, we need you, our human resources.