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## **Gender Digital Divide: Comparative Assessment of the Information Communications Technologies and Literacy Levels of Students in Nigeria**

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**Abstract:** The Information Communications Technologies (ICTs) are driving development. Their adoption and integration has become imperative for national development. This study investigated for comparison the ICTs literacy levels of boy and girl-students of senior secondary Grade III in Nigeria, using Enugu State as the case study. Although, ICTs literacy levels were generally poor, the boy-students were better all-round than the girl-students in ICTs literacy parameters tested, namely, ability to process words, access the web for browsing and managing web contents, thereby establishing existence of gender digital divide in the system. The implications of the poor literacy levels and the observed gender digital divide for development were given and recommendations were proffered for narrowing the divide.

**Key words:** Gender digital divide, information communication technology, literacy levels

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### **INTRODUCTION**

Globalisation is fast integrating the world economies through trade, financial flows, exchange of technology and information and the movement of people into a globally homogenising market. It is powered by information and driven by Information Communications Technologies (ICTs). Access to and wealth of information now depends on and is defined by the level of ICTs-compliance, which also reflects the level and speed of development of people and nations. The ICTs-compliant technologically advanced countries are the information-haves or information-rich, while the less technologically advanced countries are the information haves-not or information-poor (Quattara, 1997; Madu, 2006; Eneh, 2008a, b; Rowe, 2002).

This digital divide or gap in ICTs-compliance between the people of nations underscores the exclusion or marginalisation of the information haves-not and information-poor developing countries from the global market system by the information-haves or information-rich developed countries. This disparity in access to ICTs also exists between groups of people within the same country, as well as between men and women (gender digital divide). Factors influencing digital divide include one or more social or cultural identifiers, such as income, education and literacy levels, race, ethnicity and gender (Gorski and Clark, 2001; Parthasarathy, 2003; Liff and Shepherd, 2004; Tarasiewicz, 2004; Eneh and Owo, 2008).

Scholars have reported on the development dependency of African countries, which clearly and by

far lag behind the rest of the world in terms of development. Africa's overall growth in trade is far below the growth for other developing regions. At the moment, Africa represents only 5% of the world market, despite hosting the world's greatest reserves of mineral resources (Zaidi, 2005; Nkamnebe, 2010; ADB, 2007; ECIPE, 2007; Radebe, 2009; Luiz, 2006). There is increasingly strong evidence that progress in meeting the Millennium Development Goals (MDGs) targets by many African countries is not on track (MDG Africa Steering Group, 2008). By 2007/8 human development rating of the United Nations Development Programme (UNDP), most countries in SSA ranked very low (UNDP, 2007). Most countries in the sub-Saharan Africa (SSA) are rapidly expanding educational facilities. Still, such efforts fall short of the manpower requirements of these economies. Moreover, the type of education being imparted to the majority of the school and college children is ill-suited to the development needs of such countries (Jhingan, 2007).

Arguably, information is one of the critical forces that drive development. The contemporary information society that emerged from the information revolution is sustained by the advancements in computer, media/broadcasting and telecommunications technologies. Thus, the prevalence of digital divide defines the pattern of development across the globe (Burch and Grudnitski, 1986). To be able to actualize such promise within the information driven milieu, governments in developing countries are taking measures to promote the adoption and integration of ICTs, which have been recognized as primary wealth creating assets (Moodley, 2002;

Castells, 1996; Evans and Wurster, 2000; Fine, 1998; Passerini and Wu, 2008) and could provide the tool for the region to experience some kind of leapfrogging in her developmental trajectory (Dholakia and Kshetri, 2009; ILO, 2001; Dutta *et al.*, 2004).

This is consistent with the long held orthodoxy that one of the key catalysts in the attainment of MDGs is inclusive access to and effective use of ICTs by the entire populace of every country on the globe (Mutula, 2005). The compelling nature of ICTs is such that the computer has succeeded in traversing every facet of human endeavour. It is this infusion of the computer into human activity, plus advances in the telecommunications arena, especially digitization, that characterizes the information revolution. This present revolution has transformed the world into a global, knowledge-based society, referred to as the information society (Jimba, 2000).

The aggravated and indiscriminate adoption and usage of ICTs by some developing countries is a strategy to address the development challenges of marginalisation and exclusion from the competitive global market system driven by globalization and powered by the ICTs. This informs reported rise in the consumption of ICTs in developing countries. Some developing countries in Africa appear to be in a haste to provide public access to ICTs in the belief that it will contribute in instigating social and economic development or in narrowing the digital divide. The 2006 global e-readiness rankings of countries by the Economist Intelligence Unit ranked some African countries-South Africa 35th, Egypt 55th, Nigeria 60th and Algeria 63rd - an indication that Africa is waking up to the broadband race (Gomez *et al.*, 2009; Nkamnebe, 2010; Mutula, 2005).

Atkins, in Mutula (2005), reported a World Bank publication that the digital divide between rich and poor nations is narrowing fast, telecommunications services to poor countries were growing at an explosive rate and the digital divide was rapidly closing. The Report was based on the premise that people in the developing world were getting more access, especially to cell phone communications, far faster than they got access to new technologies in the past. However, such reported growth has not captured quality of access, adequacy of content, effective usage and affordability of access (Mutula, 2005). Arguably, the gap between the developed and developing countries in terms of quality of access to service and access to quality ICTs products is widening. For instance, the Infostate gap between countries varies from 8 to 225, with SSA occupying the lower rung (International Telecommunication Union, 2005).

Part of the measures of the Nigerian government to promote the adoption and integration of ICTs is provision for Computer Education in Basic to Senior Secondary education curriculum. Two (2) periods per week are allotted to Computer Education in the curriculum for all schools-private or public, boys' or girls', special science or others (FRN, 2004).

Scholars have reported on gender digital divide (Lawley, 1993; Huyer and Sikoski, 2003; Gorski, 2002; Losh, 2003; Madu, 2006). But, studies are scanty on gender digital divide between the boy- and girl-students of secondary schools. This study, therefore, is a comparative assessment of the ICTs literacy levels of the boy-students and girl-students of Senior Secondary Schools in Nigeria. Specifically, the study sought to:

- Assess the ability of girl-and boy- Grade III students of public secondary students to process words
- Assess the ability of the students to access the web for browsing
- Assess the ability of students to manage web contents
- Compare the ICTs literacy levels of the boy-students with those of the girl-students
- Ascertain the factors responsible for any gap
- Recommend ways of bridging the gap

To guide the study, the following research questions were formulated:

- What are the ICTs literacy levels of girl-and boy-Grade III students in some selected public secondary schools in Enugu State of Nigeria?
- How do the levels for boys compare with the levels for girls?
- What are the factors responsible for any gap?
- How can the gap be bridged?

The study is justified by the critical role of ICTs literacy in development and particularly by the fact that ICTs literacy is needed by the school leavers to enable them fit into their ultimate markets of the higher institution of learning and the job market, both of which are increasingly becoming ICTs-dependent (Eneh, 2010). Besides, ascertaining the ICTs literacy levels of the students will form an assessment of the implementation of the curricula of basic to senior secondary schools in Nigeria, which provide for Computer Education and allot two periods per week to it.

The Information Communications Technologies (ICTs) are those goods, applications and services that are

used to produce, distribute, process and transform information. They comprise diverse telecommunication, television and radio broadcasting equipment, computer hardware and software, computer services and electronic media. ICTs are available data storage, retrieval and transmission devices or knows-how for conveying information and signals in their meaningful or useable states to those who use them for research, policy action and decision-making. On its part, information notifies, stimulates, surprises and reduces uncertainties. It creates energy in the recipient, modifies for changes in behaviours and attitudes of the audience. Scholars use transmission devices for the reception of knowledge and intelligence (Mogu, 2006). People use ICTs for even simpler purposes, including business, social activities, sports, blog, conference telephone discussion, fun, among others (Eneh, 2010).

ICTs have become widespread and are powerful tools for social and economic development. They help people access, store, share, transfer and apply information to human endeavours. They have the potential to improve the delivery of services, increase productivity, raise living standards, transform economies and develop opportunities, as they may exist in education, governance, environmental and health management, financial services and the private sector. They can influence or redress the imbalances in society by the way they are designed, produced and used and may widen and deepen the gap between the information haves and have-nots as economies have become more and more information-based (Lawley, 1993; Epodoi, 2003; Huyer, 1997).

Human capital development is the process of acquiring and increasing the number of persons who have the skills, education and experience which are critical for the economic and political development of a country. It is associated with investment in people and their development as creative and productive resources. Human capital development is aimed at solving these two problems, which are interrelated in the sense that the existence of surplus labour is, to a considerable extent, due to shortage of critical skills. Physical capital becomes more productive if the country possesses sufficient human capital. Developing countries are characterized by low labour efficiency, factor immobility, limited specialization in occupations and in trade and deficient supply of entrepreneurship and customary values and traditional institutions that minimize the incentives for economic change. The slow growth in knowledge is an especially severe restraint on progress. There is low economic lot for the population because there is little knowledge of available natural resources, alternative

production techniques, the necessary skills, the existing market conditions and opportunities and the institutions to be created to economize efforts for economic rationality (Jhingan, 2007).

Jhingan (2007) also submits that it is people with secondary education that provide the critical skills needed the most for economic development. They are the officers and non-commissioned officers of an economic and a social system. A small percentage goes on to university education, but the numbers required from the university are so small that the average country of up to five million inhabitants could manage tolerably well without a university of its own. The middle and upper ranks of business consist almost entirely of secondary school products, who are also the backbone of public administration. This further informs the criticality of ICTs knowledge of secondary school leavers to the development of the country in the information age.

Ukeje (1984) posited that education is a process society establishes to assist the young to understand the heritage of the past, to participate productively in the society of the present and to contribute to the future. In the process of education, one learns or acquires a change in behaviour or ordinary knowledge, a skill or an attitude. This process through which man acquires a change in behaviour addresses the pertinent questions of (1) what to educate? (Content or curriculum), (2) why educate? (Reasons for education or educational philosophy), (3) how to educate? (Method for education or educational methodology) and (4) whom to educate? (Recipients of education: the child or educational psychology, or the citizen or educational sociology).

Accordingly, Computer Education is a process of acquiring computer knowledge, skills, attitudes and behaviors for the overall development of the individual and for the general good of the society. It is the process of computer teaching and training for the purpose of developing the academic, physical and mental, moral, spiritual ability of the individual in order to sharpen the personal intellect of man. The process transforms every aspect of man's personality with a view to modifying, changing, developing, re-orientating it from its former analogue to digital state in line with the demands of the globalising world of education and commerce (Wogu, 1994; Inoma, 2001; Onigbo, 2003).

Digital divide is the gap in access to or compliance with ICTs or information. It could exist between nations, among people in a society and/or between men and women (gender digital divide) (Madu, 2006). Gender disparity affects the female input in socio-economic development in Nigeria. The ratio of women participation

in economic pursuit is very slim, as reflected in the great disparity in employment ratio, participation in politics and access to facilities (bank loans, land and property).

**MATERIALS AND METHODS**

The study aimed at comparing the ICTs literacy levels of the boy- and girl-students of public secondary schools in Nigeria. It targeted Enugu State, which is one of the 36 States in Nigeria and has a population of about 3,257,298 (FGN, 2007), made up of the Igbos of the Southeast of the country. They attach a great deal of importance to education. Basic to senior secondary schools and various tertiary institutions are widespread in the State. The final-year or senior secondary Grade III students were reached for participation in the study because they should have assimilated the content of Computer Education in the Basic to senior secondary school curriculum.

This investigation was limited to 5 Boys’ and 5 Girls’ Senior Secondary Schools. The only 2 Special Science Girls’ Secondary Schools and 2 Special Science Boys’ Secondary Schools were involved because of the strategic role they are supposed to play in building science, engineering and technology skills of their students. Other 3 Boys’ and 3 Girls’ schools were randomly sampled by dividing into 3 groups the alphabetical list of the Boys’ schools and the Girls’ schools and picking the first school in each group. The list of schools had been obtained from the Pos-Primary Schools Management Board (PPSMB), Enugu, which is the Enugu State Government Board in charge of the management of all the secondary schools in the State.

Similarly, the alphabetical list of the names of the students of Senior Secondary III of each of the public and private schools was sub-divided sequentially into 25 groups and the first name in each group was selected for the practical test. Thus, there were 25 students per school; 125 from Boys’; 125 from Girls’ schools and 250 students for the 10 selected participating schools.

Using laptop, the selected students were practically tested in word processing, ability to access the web for browsing and to manage web contents. Discussions were held with the students as well as the representatives of the authorities of their schools to clear some information and to elicit more information on the factors responsible for gaps in ICTs literacy levels. The ICTs literacy levels of the Boys’ schools were compared with those of the Girls’. The data obtained were collated and analysed, using statistical tables, percentages and averages.

**RESULTS AND DISCUSSION**

Out of the 125 boy-students sampled, 46 (36.8%) could process words. Of the 125 girl-students sampled, 11 (8.8%) could process words. Both ratios of students with word processing ability were poor, but much worse for girls (Table 1). This finding is in line with the submission of some scholars that the majority of people in developing countries belong to the late majority group of ICTs adopters because they are skeptical, traditional, of lower economic status and lack the supporting infrastructural facilities (Kombol, 2006). It also aligns with the report by Madu (2006) that Nigeria, as a patriarchal society, faces gender digital divide, whereby men are in the forefront of educational and ICTS business opportunities in Nigeria, such as Internet cafes and kiosks, popularly known as Business Centres in the country. Only a few women patronize these centres for browsing and work in them merely for a living as word processors, receptionists or tariff collectors, but not as computer scientists or technicians or decision makers.

**Students’ ability to access the web:** Sixty-two of the 125 (48.8%) boy-students could access the web for browsing, while 34 of the 125 (27.2%) girl-students could access the web for browsing (Table 2). The fair figure (48.8%) may have to do with high rate of internet scam among the youths and teenagers, which mostly involve boys. Tofojomo, (2006) opined that the proliferation of cybercafés in most metropolitan cities in Nigeria attracted varied clientele, including the young, who do not maximize the use of the internet positively for educative purposes, but for scam.

**Management of Web contents:** Only three (65) of the 125 (52%) of students of boy-students could manage web contents, while 22 of the 125 (or 17.6%) of the girl-students could manage the web contents. Although, the boy-students did better than the girl-students, the figure for boy was frighteningly low and that of the girls was daunting in the information milieu in which ICTs drive globalization for development and national integration (Table 3).

Table 1: Word processing ability of the students

Comparison	Boys	%	Girls	%
No. of students with word processing ability	46	36.8	11	8.8
No. of students unable to process words	79	63.2	114	91.2

Source: Field work in 2009

Table 2: Number of students who could access the web

Comparison	Boys	%	Girls	%
No. of students able to access the web	61	48.8	34	27.2
No. of students unable to access the web	64	51.2	91	72.8

Source: Field work in 2009

**Table 3: Number of students who could manage web contents**

Comparison	Boys	%	Girls	%
No. of students able to manage the web content	65	52	22	17.6
No. of students unable to manage the web content	60	48	103	82.4

Source: Field work in 2009

Although, the finding agrees with higher participation of boys in Internet scam (Madu, 2006), it is in sharp contrast to the recent reported rise in the consumption of ICTs facilities in Sub-Saharan Africa (SSA) attributed to the region's great quest to fight poverty and to embrace globalization through the acquisition of ICTs facilities in line with the long held orthodoxy that one of the key catalysts in the attainment of MDGs is inclusive access to and effective use of ICTs by the entire populace of every country on the globe (Mutula, 2005) and the 2006 global e-readiness rankings of countries by the Economist Intelligence Unit ranked some African countries, which positioned South Africa as 35th, Egypt 55th, Nigeria 60th, Algeria 63rd (Mutula, 2005) - an indication that SSA is waking up to the broadband race. It goes to prove that acquisition is not utilization, neither does improved access to ICTs amount to effective use of ICTs facilities. Many ICTs artifacts litter offices and deface the environments in SSA. They have been acquired, but potential users are hardly trained to use them.

The report on increased access to ICTs in developing countries was based on the premise that people were getting more access, especially to cell phone communications, far faster than they got access to new technologies in the past. Such reported growth in access may not have considered the quality of ICTs facilities accessed. Most of such growth seems not to have captured quality of access, adequacy of content, effective usage and affordability of access (Mutula, 2005). The gap between the developed and developing countries in terms of quality of access to service and access to quality ICTs products is widening. For instance, the Infostate gap between countries varies from 8 to 225 with SSA occupying the lower rung (International Telecommunication Union, 2005).

**School ICTs environment and ICTs literacy:** Four of the sampled 10 or 40% of public senior secondary schools had functional Computer room/laboratory. Others (60) had not. Computer facilities provided by government for some public secondary schools were not installed because of insecurity in schools, which lacked in security budgets and measures, such as fence/gate (Table 4). This supports the claim of increasing acquisition of ICTs facilities (Mutula, 2005), which are not utilized for lack of training and/or poor quality of facilities, which lead to abandonment (Jhingan, 2007).

**Table 4: Number of schools with functional computer room/laboratory**

Comparison	Public schools	%
No. of schools with functional computer room/Laboratory	4	40
No. of schools without functional computer room/Laboratory	6	60

Source: Field work in 2009

**Table 5: Distribution of students on ICTs literacy and home background**

Comparison	%
% of ICTs literate students with computer facilities at home	72
% of ICTs literate students without computer facilities at home	28

Source: Field work in 2009

**Table 6: Availability of qualified computer teachers in senior secondary schools**

% schools with qualified Computer teacher	90
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Source: Field work in 2009

**Table 7: Added reasons for deficient computer facilities and poor ICTs literacy levels of the students**

No.	Reasons
1	Frequent electric power failure
2	Rural location and ownership
3	Insecurity for facilities
4	Lack of support from PTA

Source: Field work in 2009

**Home ICTs environment and literacy:** Seventy-two percent of the ICTs literate students had computer facilities at home, which had disposed them to favourable home computer study environment and an edge over their counterparts (Table 5). The rest of the ICTs literate students (28%) had taken advantage of the cybercafés in cities to acquire computer literacy. This finding supports earlier submission by Walberg and Paik (1997) that home environment has substantial effects on academic learning of students through home-based reinforcement, home instruction, homework and other educational and psychological activities.

**Quality of staff and students' ICTs performance:** Ninety of the sampled 10 public senior secondary schools had qualified Computer teachers (Table 6). The figure is encouraging and could form the starting point for computerizing the senior secondary education system in Enugu State and Nigeria. With the personnel on ground and facilities acquired (Mutula, 2005), only installation, security and training of the instructors needed to be addressed in order improve the situation.

**Reasons advanced for deficient computer education:** Most frequently occurring reason for deficient computer facilities and poor ICTs literacy levels was frequent electric power failure. Following it was location of school in rural areas which had no electric facilities, insecurity of installed computer facilities in public schools and lack of support from the Parent-Teacher Association (PTA) (Table 7).

Incessant electric power failure has posed a serious threat to development in Nigeria. Secondary schools hardly have electric power generating set. Even if they come by one, they are unable to afford diesel for powering the set. Worse still, there often is occasional artificial scarcity of petroleum products in Nigeria. Ironically, Nigeria is the sixth largest exporter of crude petroleum oil in Africa and the seventh largest producer of the natural resource in the world (Eneh, 2000).

Some senior secondary schools are located in rural areas without electricity power supply. Although, the (rural) community-initiated public secondary schools have dual ownership of the state and the rural community, such schools receive relatively less support from the host community or PTA because of biting rural poverty. The government is often expected to carry the load of running the school alone. With increasing budgetary constraints in the face global economic meltdown, government is unable to meet up.

Insecurity for computer facilities was an issue in public senior secondary schools. Although, the government provided computer facilities for some secondary schools, those facilities have not been installed because of insecurity in schools. Theft is often reported in public schools, most of which lack in security budgets and measures. Most schools have no fence/gate.

**Limitations of the study:** The people of the targeted State are ethnically Igbos, known for hardwork and resourcefulness, with skilled manpower available in almost every field of endeavour. A great deal of importance is attached to education in the State. Basic to senior secondary schools and various tertiary institutions are widespread in the State, owned by public and private organizations (Enugu State Government, 1998). Not just that there are over 400 ethnic groups with their peculiarities in Nigeria, the study targeted only the senior secondary Grade III students, thereby imposing some limitations on the generalizability of the findings.

**Implications for development:** Poor ICTs literacy levels of senior secondary Grade III students have serious implications for development in Nigeria and other developing African countries. Poor ICTs compliance leads to slow rate of learning, which could be partly responsible for high rates of school drop-out and incompletion observed in Nigeria (Inoma, 2001) and high rate of failure in the Senior Secondary Schools Examinations (SSSE) conducted by the West Africa Examinations Council (WAEC) and NECO conducted by the National Examination Council. Poor educational performance is assuming an embarrassing dimension in the country. Only

32.54% of WAEC candidates obtained credit passes (grades 1-6) in 1998, 23.70% in 1999, 10.81% in year 2000, 26.07% in 2001, 24.57% in 2002 and 24.53% in 2003 (Eneh and Eneh, 2009).

Secondly, ICTs illiteracy constitutes a serious threat for the senior secondary school leaver because either ultimate destination of job market or higher educational institution is increasingly becoming ICTs-dependent. This might be partly responsible for the rising rate of dysfunctionality and unemployability of school leavers and graduates in Nigeria (Eneh, 2009a, b).

Thirdly, in the information milieu, ICTs adoption and integration is sine qua non for meaningful development strides in developing countries. Lagging behind in ICTs literacy increases development despondency of these countries, further widens the gap between the countries and the information-rich developed countries and enhances the marginalization and exclusion of the developing countries from the global market economy driven by globalization and powered by ICTs (Nkamnebe, 2010).

The observed gender digital divide, if unchecked, will worsen the socio-cultural dichotomy, which affects the female input in socio-economic development in Nigeria. The ratio of women participation in economic pursuit is very slim, as reflected in the great disparity in employment ratio, participation in politics and access to facilities (bank loans, land and property) (Owo, 2010).

## **CONCLUSION AND RECOMMENDATIONS**

The study investigated for comparison the ICTs literacy levels, in terms of ability to process words, access the web for browsing and managing web contents, of boy-and girl-students of senior secondary Grade III in Nigeria, using Enugu State as the case study. The boy-students were better all-round than the girl-students in ICTs literacy parameters tested, thereby establishing existence of gender digital divide in the system.

The observed digital divide needs to be narrowed down. More awareness of the ICTs on the importance of ICTs in uplifting social standards needs to be created among girls. To bridge the observed gap, it is recommended that:

- Girl-education should be encouraged
- Security should be provided for installed computer facilities in schools
- Computer facilities acquired by government should be installed for effective use
- More computer facilities should be provided along with the space and fund for installation as well as the necessary security measures

- Staff should be trained to use the facilities
- Parents should be encouraged to provide ICTs facilities at home
- A lasting solution should be sought for the epileptic electric power supply in Nigeria
- Girls should be encouraged to use the Cyber cafes
- The business environment should be improved in Nigeria to enhance the performance of the private sector which establishes most of the ICTs business facilities in the country

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