

The Digital Divide Between Students and Lecturers: A Case Study of the Access and Attitudes Towards Information and Communication Technology (ICT) in Selected Nigerian Universities

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ABSTRACT

The study of inequality in access to and use of ICT among and within countries has over the years attracted significant attention of researchers, policy makers and the world community at large. This is for the fact that ICT has become the most important vehicle that has made the emergence of the global/information society possible and individuals or group that lack access to or unable to effectively use ICT are shut out from meaningful participation in the global society. However, little attention seems given to the emergence of inequality in the use of ICT between students and teachers especially in a developing country like Nigeria and the implications for the teaching-learning process and for the authority of the teacher as a professional that ought to lead knowledge in the school environment. The study was intended to make contribution towards empirically verifying the existence of a digital divide between students and lecturers in three Nigerian universities and to ascertain whether or not attitudes played a role in creating the divide. The findings of the study showed that both students and lecturers had access to ICT but the students were predisposed to its use than the lecturers. The study in examining the attitudes using Student's t-test statistic discovered that both students and lecturers perceived ICT as being very important and with the lecturers' perception even being superior to that of students. However, students demonstrated more interest in the use of ICT and this could be explained by the fact that the factors that encouraged the use of ICT were more favourable to the students. The factors included availability of free time; the need for social networking through use of ICT; the various ordinary level and university entry examinations undertaken by students over the years which have become mandatorily online, etc.

Keywords: Digital Divide, Access/Use, Attitudes, Students, Lecturers, University and Nigeria.

1. INTRODUCTION

The world has turned into an information society where the rate of development is dictated primarily by the quantity and quality of information that are available to the people. The single largest force propelling the information society is the Information and Communication Technology (ICT).

Today there is so much talk about the need to be a digital citizen, which means an individual that is able to relate to others using ICT- computers, mobile phones, internet, and other electronic devices. With this comes equally the concern about knowledge divide - the gap in career advancement and life chances between those who can access and utilize information and those who cannot. A universal feature of advanced and

advancing countries currently is the concept of information society, that information has become a most critical and strategic factor of production and that acquisition, management and deployment is the primary occupation or factor of production of the nations.

The United Nations in Geneva 2003 and Tunis 2005 World Summits on the Information Society (WSIS) have raised so much attention on the need for bridging digital divide in all its ramifications. This is clearly expressed in its Commitments and Action Plans. In particular, the Geneva Summit expressed the desire "to build a people-centred, inclusive and development-oriented Information Society, where everyone can create, access, utilize and share information and knowledge, enabling individuals, communities and peoples to achieve their full potential in promoting their sustainable development and improving their quality of life, premised on the purposes and principles of the Charter of the United Nations and respecting fully and upholding the Universal Declaration of Human Rights." [1]

In Nigeria, interest by students and lecturers on the use of ICT tools seem to differ. The students, from the primary to the university levels, are being made to register and at times write their examinations mandatorily online and this is giving them greater opportunity/motivation to appreciate, learn, perfect and continuously improve their ICT knowledge skills than the lecturers who do not seem to come under such compelling/motivating conditions. Coupled with this advantage for the students are their youthful attributes such as inquisitiveness, great interest in entertainment and games, very strong urge to belong to the youth culture and to connect with other youths across boundaries, all of which are readily facilitated by existing as well as emerging ICT tools.

This study about the digital gap between students and lecturers therefore:

- (a) Investigated whether or not there is a student-lecturer digital divide in terms of access to and use of ICT tools;
- (b) Compared the perception of the students and lecturers regarding the importance of ICT.
- (c) Rated the level of interest of the students and lecturers in the use of ICT.
- (d) Ascertained the factors that motivated or disposed students and lecturers towards the use ICT.

2. DEFINITION OF TERMS

Information and Communication Technology (ICT): UNESCO defined ICT as “the combination of informatics technology with other related technologies, specifically communication technology.” [2] It stated that informatics (or Computing Science) is “the science dealing with the design, realization, evaluation, use and maintenance of information processing systems, including hardware, software, organisational and human aspects, and the industrial, commercial, governmental and political implications of these” and informatics technology is “the technological applications (artifacts) of informatics in society.”

The word “*digital*”, derives from the Latin word, *digitus* (finger) and which connotes the conversion of information to binary numeric system or data technologies that deal with discrete (discontinuous) values. [3] It is used in this study to refer to all aspects of ICT available for use by individuals in their personal and professional or work situations. The word, “*divide*”, points to the gap or inequality between students and lecturers in the mastery and use of ICT.

Attitudes: There is a plethora of literature defining attitudes as a key concept of social psychology and spanning over the decades. One of the earliest and classical definitions of attitude was given by Allport who stated that it is a “mental or neural state of readiness, organized through experience, exerting a directive or dynamic influence upon the individual’s response to all object and situations with which it is related.” [4] Shaw and Wright saw attitudes as “relatively enduring system of affective evaluating concepts or beliefs which have been learned” about persons, places and objects with whom an individual is associated while Ajzen and Fishbein defined it as “A learned predisposition to respond in a consistently favourable or unfavourable manner with respect to a given object.” [5,6] The basic sense in these and other definitions is that attitudes are products of experience that have pre-condition individuals to act either in a favourable or unfavourable manner to persons, things and issues that they are associated with.

3. LITERATURE REVIEW

3.1 The Role of Attitudes towards Use of ICT (or e-Participation)

Siragusa and Dixon of the School of Education, Curtin University, Melbourne, carried out a pilot experiment with a small number of undergraduates in a higher institution setting to see how interaction in an ICT activity was affected by their “planned behaviour.” [7] The study probed into their intentions to use ICT, their attitudes towards participation in the ICT activity, “their perceived social pressure to interact with ICT, their perceived control over their capacity to interact with ICT, their beliefs about the likely consequences of interacting with ICT, their beliefs about the expectations of others regarding the interaction and their beliefs about the various factors that potentially would either help or hinder their interaction with ICT.” The study found out that the students participation was greatly motivated by attitude or planned behaviour. There was high level of participation by the undergraduates and they basically described the ICT activity as pleasant, helpful and easy, though some experienced feelings of anxiety and intimidation in the course of the ICT interaction.

Kaba, N’Da and Mbarika observed that many studies that explain the adoption and use of mobile phones in developing countries especially in Sub-Saharan Africa had focused more on macro factors while ignoring micro factors such as perception, motivation and other social variables. [8] Therefore, they investigated the influence of micro factors that directly influenced the real motivations of the phone users. They surveyed 463 mobile phone users and tested several hypotheses and found a link between “attitude toward and use of cellular phones” and mobility, group characteristics (familiarity), social influence (social pressure and social image), and the possession of resources.

3.2 Attitudes towards e-Participation in the Context of a Motivation Theory

This study of the digital gap between students and lecturers in Nigerian universities focused on the influence that motivation had on attitudes. Motivation in the human context looks at goal-orientated behaviours; actions and preferences that are based on perceived benefits and conducive environment which seem to naturally encourage the performance of an act without external force or pressure. It is possible that differences in the levels of motivation of students and lecturers result in differing levels of e-participation of the two groups.

Therefore, this study looked at the theories of motivation because such theories explain how attitudes and behaviour are formed based on the ability of action to satisfy needs. Some of the popular motivation theories are the Theory of Hierarchy of Needs by Maslow (1943), Herzberg’s Two-Factor Theory and McGregor’s Theory X and Y. [9-10] However, Vroom’s Expectancy Theory seemed better in explaining the digital gap between the students and lecturers. [11]

Vroom sees motivation as a process that governs the choices that an individual makes among alternative forms of voluntary activities and which is under the individual’s control. To make the choices, the individual carefully estimates how commensurate the expected result of the action could be compared to his or her desire or need. Consequently, motivation is a product of an individual’s expectancy that a certain effort will lead to the intended performance, the instrumentality of this performance to achieving a certain result, and the desirability of this result for the individual, known as valence. [12] The three key concepts involved in Vroom’s theory therefore are: (a) Valence - Strength of an individual’s preference for a given outcome; (b) Instrumentality - The likelihood of the action serving as a means of attaining a goal; and (c) Expectancy - Probability that an action will lead to a desired result. [13-14]

3.3 The Reality of Digital Divides

The digital divide is known to exist not only among nations but also within nations. With the nations there are divides in terms of gender, rural-urban, educational, economic and other bases. For instance, Obi in his capacity as the President of the Computer Professionals Registration Council of Nigeria cautioned against ignoring the digital divides within the country. [15] He asserted that “Digital divide should not just be looked at from the perspective of Nigeria’s position to other countries, but also from the divide that exists within the country.”

The National Information Technology Development Agency (NITDA) in its baseline survey of Nigeria came to the

conclusion that relatively, increasing number of persons are owning and using computers; the teledensity is 30 lines per 1000 persons out of which mobile teledensity is 25 per 1000 persons. [16] However, the survey revealed the following inequalities: That 71% of the men own computers as against 29% of the females; 76% of the computers are in offices as against 24% in the homes; more than half (i.e. 55%) of the persons that used computers are the very young persons of the 21-30 years age bracket; the next age group that used computers are those 31-40 years of age and they constituted 20% of the persons surveyed. This implied that 75% of those that used computers are within the ages of 21-40. Though shortly after the NITDA survey Nigeria witnessed an unprecedented growth in the use of ICT, it is unlikely that the digital gap revealed by the survey had reduced – the rapid growth of ICT might even have aggravated gap.

According to Akdogan, the “youth is the biggest group to use new ICT and especially mobile technology in the (developing) world. [17] It is relatively easier to engage them politically and make them participate with attractive online and/or mobile applications...” He discussed further that “the knowledge youth have of new ICT, their innovative use of these new technologies – that also make them connect globally to youth all around the world, their dynamism, fresh ideas and perspectives are of immeasurable value in policy making processes.”

The evidence or probability of teachers being unable to take full advantages of ICT may not be peculiar to Nigeria. Altun in the study of ICT integration in Education in Turkey, Germany, Japan, United Kingdom, and United States of America quotes the report by Willis and Mehlinger (1996) that “although the possibilities for using ICT as a tool for teaching and learning in schools had increased in recent years, much empirical research evidence demonstrate that those possibilities were not being exploited by teachers.” [18]

3.4 Criteria for Evaluation of Citizen’s e-Participation

UNESCO’s ICT Curriculum and other sources provide good evidence of the variables or factors to look for in assessing a learner’ or teacher’s participation in the digital society. [2] Also, Akdogan, and Wright and Street reported efforts by several international bodies to assess local e-governance models across the world. [17, 19] Specific reference was made to the 2008 “Digital Governance in Municipalities Worldwide Reports” of the United Nations Public Administration Network (UNPAN) and American Society of Public Administration (ASPA). The Reports covered selected 100 municipalities worldwide and listed five categories of factors which formed the bases of the evaluation. Among the categories were services (transactional services such as purchase or register, interaction between citizens, businesses and government) and citizenship participation (online civic engagement/policy, deliberation, citizen based performance and measurement).

In the study of e-participation in Istanbul, Akdogan made a case for the addition of other criteria for the assessment of citizens’ involvement in electronic governance. For instance, he advocated the inclusion of the use of mobile technology; the availability and use of social media (blogs, vlogs, miniblogs, and social network sites on municipalities’ websites which promote web-based social interaction among citizens); and customization of website tools to avoid information overload and to help “receive/access information in a meaningful way”.

The questionnaire employed by Siragusa and Dixon in their study of attitude towards ICT interactions among undergraduates focused on the (a) Intentions, attitudes, subjective norms and perceived behavioural control towards ICT; (b) Behavioural beliefs: expected outcomes and desirability of engagement with ICT; and (c) Their value systems such as whether or not they considered engagement with ICT to enhance learning, promote good education, facilitate responsibilities at workplace, and related factors. [7]

4. METHODOLOGY

4.1 Research Subjects

The universities chosen are located in the metropolitan cities of Nigeria with relatively very high availability of ICT tools and services. The findings in such metropolitan areas could help to reveal the likely highest level of ICT compliance or e-participation for the Nigerian universities, since those in the more remote areas may not have better access or use of ICT due to lack of infrastructure and facilities. The study focused on students and lecturers at the university level (which corresponds to UNESCO’s International Standard Classification of Education Level 6). [20] This Level is the second and highest stage of tertiary education according to the Classification.

4.2 Research Instruments

A structured questionnaire was used in this study. It had four sections, namely, (1) personal data (6 items); (2) access to ICT tools (2 items); (3) use of ICT tools (9 items); and (4) opinions about ICT (30 items). The section on opinions was particularly framed as a Likert Scale and further subdivided into three as follows: (a) Perception about importance of ICT (9 items); (b) Interest towards use of ICT (11 items); and (c) Factors that determined engagement with ICT (10 items). [21]

4.3 Sampling

200 questionnaires were distributed to students of three universities in Nigeria – the University of Abuja, Benin and Jos and 100 questionnaires also were given out to lecturers in these three institutions. The sample was randomly selected and excluded students and lecturers in the Computer Science/computer related studies, who by nature of their specialization are already fully engaged with ICT. However the number of questionnaires successfully completed and returned to the researcher was 156 for students and 64 for lecturers.

4.4 Validity of Instrument

The research items were drawn from a universe of items received from ICT experts, very senior academic colleagues, and literature. [2,7,8,17,19] The instrument was thereafter pilot-tested to ensure that both the students and lecturers had no difficulty in understanding the precise meaning of the constructs and grammar used.

4.5 Reliability of the Instrument

Adequate attention was given to the reliability of the instrument to ensure that repeated administration on the same samples will elicit same response. The Likert items, in particular, were subjected to statistical verification using Cronbach’s alpha index of reliability to ensure that each item in the sections on “perception”, “interest” and “determining factors” appropriately measured the respective underlying constructs. [22]

Table 1: Internal consistency index of the Likert items using Cronbach's Alpha

Construct	No. of Items	Alpha
Perception	9	.816
Interest	11	.775
Factors	10	.804

Overall reliability of instrument = .798

4.6 Application of Likert Items, Likert Scale and Student's t-test to the Research

Questionnaire with Likert items (named after Resis Likert (1932) who developed a most popular instrument for the measurement of attitudes) was used to conduct the survey. The Likert items enabled respondents to agree or disagree with statements. The Scale also involved the summation of figures obtained by an individual in an entire section of the questionnaire so as to arrive at the total figure of the individual for that section. The Likert Scale assumes that all items of a given section are measuring aspects of the same variable. Therefore summation of items (in a section or even the entire questionnaire) yields a figure that is much more valid than one obtained from a single Likert item. This approach was very necessary because the Student's t-test was applied in the verification of hypotheses. The t-test determines the statistical significance of the difference in the means of two groups (in this case, students and lecturers) and the means were determined by computing figures of every respondent with respect to each section of the questionnaire. In other words, Student's t-test deals with only values obtained at a minimum of the interval level of measurement. Therefore, the use of Likert item and Likert Scale adequately satisfied this requirement.

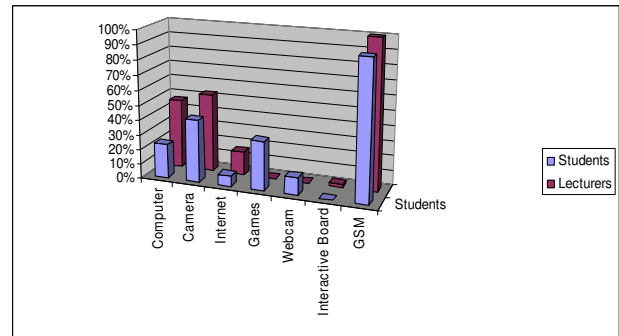
The completion of the questionnaire was made relatively easy as respondents were requested to simply tick the correct answer that applied to them. A 7-point scale was used. Though the common Likert Scales utilize 5-point scale, some studies have found the 7-9 point scales as being quite valid. [23] The seven points or responses of each Likert item were presented in form of a visual analog scale with equal spacing of response levels which strongly suggested that the measurement was at the interval level.

5. PRESENTATION OF FINDINGS

5.1 Access to ICT Tools

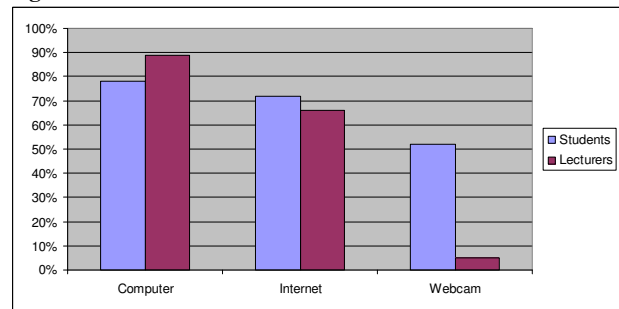
The first item in this section gave a list of ICT tools and required respondents to indicate those that they owned. The following were the percentages of students and lecturers, respectively, that owned the tools: Computer desktop or laptop: 36(23%) students as against 30(47%) lecturers; Digital camera: 66(42%) students and 34(53%) lecturers ; Internet connectivity (plug and play device, etc): 11(7%) students and 10(16%) lecturers; Electronic games: 51(33%) students and nil for lecturers; Webcam: 19 (12%) students and nil for lecturers; Interactive whiteboard: nil for students and 1 (2%) for lecturers; GSM handset or line: 145(93%) students and 64(100%) lecturers. In summary, all the lecturers had mobile telephone while 93% of the students had as well. Also, more lecturers had digital camera, computer and internet connectivity than students. However, while 33% of the students had ICT tools for games, none of the lecturers had any.

Figure 1: ICT tools owned by students compared with Lecturers



The questionnaire also requested the students and lecturers to indicate whether or not they had access to computer (desk top or laptop), internet connectivity and webcam – be it at their home, public places, cafés, school or offices. For computer, 122 (78%) students and 57 (89%) had access; in terms of internet, 112 (72%) students and 42 (66%) lecturers had access; and for webcam, 81 (52%) students and 3 (5%) lecturers had access.

Fig. 2: ICT tools accessible to the students and lecturers



5.2 Use of ICT

Table 2. Use of ICT by respondents

Use	Number and percentage that engaged in ICT over 5 times in one year	
	Students	Lecturers
Word processing	129 (83%)	36 (56%)
Email messages	144 (92%)	39 (61%)
Internet browsing	151 (97%)	42 (66%)
e-transactions	129 (83%)	22 (34%)
Online chat/facebook	112 (72%)	3 (5%)
GSM multimedia	90 (58%)	12 (19%)
e-learning/teaching	76 (49%)	4 (7%)
Academic multimedia	51 (33%)	26 (42%)
Internet search engines	142 (91%)	33 (52%)

Table 2 shows the responses of students and lecturers regarding the use of ICT. The students consistently maintained a clear lead in the use of ICT tools except the multimedia (audio and visual discs and other materials) which were used by a slightly greater percentage of lecturers than students.

5.3 Perception about Importance of ICT

The items in this section of the questionnaire attempted to know how respondents would rate issues such as the indispensability of ICT in society and in development; importance of ICT in getting organisational results and academic performance; the importance of the internet compared to other inventions in the

past century; comparison of manual and online transactions; estimation of the positive and negative consequences of ICT; the role of ICT in teaching and learning; among others.

Null Hypothesis: There is no significant difference between the mean of students and lecturers in the perception of the importance of ICT.

Alternate Hypothesis: The mean of the lecturers is significantly higher than that of the students.

The 156 students recorded a mean figure of 73.955 and standard deviation of 11.1212; while the 64 lecturers had a mean of 82.797 and standard deviation of 10.5923. The Student's t-test of the differences between the two means revealed as follows:

Observed difference (lecturers-students) = 8.842;
Standard deviation of the difference = 1.5956.
Degree of freedom: 122
95% confidence interval for the difference = 5.6834, 12.0006.
T-Value = 5.5415
Students =/ lecturers: P-Value = <.00001
Students > lecturers :P-Value =>.9999
Students < lecturers: P-Value =<.00001

Based on the statistical evidence above, the null hypothesis was rejected while the alternate was accepted. The implication of this finding is that the lecturers attached more importance to ICT than the students.

5.4 Interest in the Use of ICT

The issues addressed here included how respondents associated the quality of their work or performance with ICT; the kind of experience they had in using ICT tools; how exciting or boring they felt while browsing or using other tools; whether or not their very close and important friends or relations encouraged them to excel in the use of ICT; how they could rate their ICT ability; if anything could make them lose interest in the use of ICT; willingness to take advanced course in ICT; and whether they had made great friends with the help of ICT.

Null Hypothesis: There is no significant difference between the mean of students and lecturers in terms of interest in the use of ICT.

Alternate Hypothesis: The mean of students is significantly higher than that of lecturers in terms of interest in the use of ICT.

The students got a mean figure of 76.122 and standard deviation of 10.5564; and the lecturers recorded a mean of 53.594 with standard deviation as 16.1665. The t-test of the difference in means showed as follows:

Observed difference (students-lecturers) = 22.528;
Standard deviation = 2.1904.
Degree of freedom= 85
95% confidence interval for the difference (18.1728,26.8832)
T-Value =10.2849
Lecturers =/students: P-Value = <.00001
Lecturers > students: P-Value =>.9999
Lecturers < students: P-Value =<.00001

The result of the statistical test led to the rejection of the null hypothesis and acceptance of the alternate. This finding means that the students had interest in the use of ICT than the lecturers.

5.5 Factors that Determined Engagement with ICT

The items here attempted to ascertain whether their use of the ICT tools particularly e-mails, face-book, and other blogs and facilities was to make and sustain friends; how much their relationship with family and important friends depended on the use of the ICT tools; if their use of ICT had much to do with examinations taken in the past; whether they engaged in use of e-payment more often than the use of cheques; the availability of time to engage in ICT; their priority for ICT compared with other needs; how much fun or entertainment they derived from ICT; how often the use of ICT helped them to explore ideas about life; how much resources they could devote to ICT compared to other interests; and other similar issues.

Null Hypothesis: There is no significant difference between the mean of students and lecturers in terms of factors that determined their engagement with ICT.

Alternate Hypothesis: The mean of students is significantly higher than that of lecturers in terms of factors that determined engagement with ICT.

The students' mean figure was 77.058 and standard deviation of 9.2396; and the lecturers' mean was 50.156 with standard deviation of 14.9191. The results of the t-test were:

Observed difference (students-lecturers) = 26.902;
Standard deviation = 2.0063
Degree of freedom= 83
95% confidence interval for the difference (22.9115, 30.8925)
T-Value =13,4088
Lecturers =/students: P-Value = <.00001
Lecturers > students: P-Value =>.9999
Lecturers < students: P-Value =<.00001

With the findings above, the null hypothesis was rejected and the alternate accepted. The finding shows that the students are more associated with the factors that promoted the use of ICT than the lecturers.

6. DISCUSSION OF FINDINGS

6.1 Evidence of the Digital Gap between Students and Lecturers

This study has revealed that there is significant "digital gap" between the students and lecturers. Though the lecturers seem to be better aware of the critical role of ICT, the students show more interest in its use and are favoured by factors that encourage the use of ICT. The study further indicate that there could be equitable access or ownership of ICT tools, but the real difference or digital gap comes with the differences in the ability and interest to use them.

The digital gap between students and lecturers is closing the knowledge gap between the two key players of the education system. On one hand, this is a positive development because it shows that students are becoming more proactive and that the quality of learning by students is accelerating. On the other hand, it poses a danger to the lecturers who are professionally expected to lead knowledge development in their various specializations and particularly in the classroom. The Educational system will find its optimum quality of teaching and learning at the point where both students and lecturers are equally engaged in the race towards e-participation.

6.2 Way Forward

UNESCO presented two models of ICT development for students and teachers which it considers to be a kind of scaffold or framework that could guide the integration of ICT in the education system. [2] One model is seen as “*a continuum of approaches to ICT development*” and the other is referred to as “*stages of teaching and learning with and through ICT.*” In the first model, ICT development as a *continuum* runs from the *emerging, applying, infusing to transforming* levels. In the second, ICT development as stages passes through “*discovering ICT tools, learning how to use ICT tools, understanding how and when to use ICT tools for particular purposes, and specializing in the use of ICT tools.*” The UNESCO framework has proved to be a very powerful tool or guide that can help in a systematic turn-around of the low level of appreciation and use of ICT in schools especially by teachers. Wokocha and Nwokeocha have reported that the biggest successful attempt to re-orientate teachers in Nigeria towards appreciating and using ICT was accomplished in year 2006 by the Teachers Registration Council of Nigeria, inspired by the UNESCO models. [24]

Altun after extensive review of literature on strategies adopted by selected countries (Japan, Germany, United Kingdom, USA, etc) to reposition ICT in their schools, outlined four major areas that all the countries addressed in order to make significant progress. [18] These are (a) ICT infrastructure and physical resources, (b) curriculum and policy development, (c) training of lecturers, and (d) pedagogical training in ICT. Similarly, Albion and Redmond (2009) asserted that a teachers’ ability to use ICT is determined by motivational factors, personal knowledge and experience with ICT tools, confidence in use, access to ICT resources and training, teacher preparedness, and pedagogical and technical support. Therefore, for a successful advancement in teachers’ use of ICT, this study advocates for increased access to technology, training of teachers, and favourable policy environment.

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