International Journal of Innovative Information Systems & Technology Research 8(4):86-94, Oct-Dec., 2020

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Exploring the Extent of Information and Communication Technology (ICT) Adoption, Integration and Utilization among Secondary School Teachers in Yobe State Nigeria

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ABSTRACT
This study investigated the levels of ICT adoption, integration and utilization in the classroom among secondary school teachers in Yobe state Nigeria. Questionnaire was administered to 60 science and technical college teachers who were teaching various subjects. The questionnaire included items related to teachers' ICT usage, competency, perception on adoption and integration. The result shows that teachers' ICT skills were at low levels, and that a vast majority of teachers were low users of ICT in classroom teaching. There were significant differences of teachers' ICT skills as a function of demographic factors: gender, age, years of teaching experience, and level of ICT training. Also, there were significant correlations between ICT skills and ICT integration in classroom. Teachers' demographic factors (age, gender, teaching experience, except level of education) did not influence ICT integration in classroom.
Keywords; ICT adoption and integration in school, ICT competency, teachers' perception of ICT and teacher education

INTRODUCTION

The field of education has been affected by ICTs, which have undoubtedly affected teaching, learning, and research (Yusuf, 2005). A great deal of research has proven the benefits to the quality of education (Al-Ansari, 2006). ICTs have the potential to accelerate, enrich, and deepen skills, to motivate and engage students, to help relate school experience to work practices, create economic viability for tomorrow's workers, as well as strengthening teaching and helping schools change (Davis and Tearle, 1999; Lemke and Coughlin, 1998; cited by Yusuf, 2005).

In a rapidly changing world, basic education is essential for an individual be able to access and apply information. Such ability must find include ICTs in the global village. The Economic Commission for Africa has indicated that the ability to access and use information is no longer a luxury, but a necessity for development. Unfortunately, many developing counties, especially in Africa, are still low in ICT application and use (Aduwa-Ogiegbean and Iyamu, 2005).

Objectives of the study: To get insights on the level of teachers ICT training and skills on ICT Utilization, integration and adoption in secondary schools.

Significance of the study: The findings and recommendations of this study are expected to provide a process or framework which should assist school managers in making decisions on how to adopt, integrate and use ICT in schools. The planners and policy makers are expected to use the findings of this study as a base for revising the current ICT policy in order to overcome the challenges hindering smooth adoption and use of ICT in schools in Nigeria. Teachers are expected to find the result of this study useful as it highlights challenges they face during adoption, integration and use of ICT in schools. Further, findings of the study are expected to open areas for further study by other researchers and academicians, hence benefiting the whole community.

The Need for ICT Application in Nigerian Secondary Schools

Improved secondary education is essential to the creation of effective human capital in any country (Evoh, 2007). The need for ICT in Nigerian secondary schools cannot be overemphasized. In this technology-driven age, everyone requires ICT competence to survive. Organizations are finding it very necessary to train and re-train their employees to establish or increase their knowledge of computers and other ICT facilities (Adomi and Anie, 2006; Tyler, 1998). This calls for early acquisition of ICT skills by students.

The ability to use computers effectively has become an essential part of everyone's education. Skills such as bookkeeping, clerical and administrative work, stocktaking, and so forth, now constitute a set of computerized practices that form the core IT skills package: spreadsheets, word processors, and databases (Reffell and Whitworth, 2002).

The demand for computer/ICT literacy is increasing in Nigeria, because employees realize that computers and other ICT facilities can enhance efficiency. On the other hand, employees have also realized that computers can be a threat to their jobs, and the only way to enhance job security is to become computer literate. With the high demand for computer literacy, the teaching and learning these skills is a concern among professionals (Oduroye, n.d.). This is also true of other ICT components.

New instructional techniques that use ICTs provide a different modality of instruments. For the student, ICT use allows for increased individualization of learning. In schools where new technologies are used, students have access to tools that adjust to their attention span and provide valuable and immediate feedback for literacy enhancement, which is currently not fully implemented in the Nigerian school system (Emuku and Emuku, 1999 & 2000).

ICT application and use will prove beneficial in improving Nigeria's educational system and giving students a better education. A technologically-advanced workforce will lead to ICT growth in Nigeria, with the potential to improve military technology and telecommunications, media communications, and skilled ICT professionals who will be well-equipped to solve IT problems in Nigeria and other parts of the world (Goshit, 2006).

ICT Application in Nigerian Secondary Schools.

There are developments in the Nigerian education sector which indicate some level of ICT application in the secondary schools. The Federal Government of Nigeria, in the *National Policy on Education* (Federal Republic of Nigeria, 2004), recognizes the prominent role of ICTs in the modern world, and has integrated ICTs into education in Nigeria. To actualize this goal, the document states that government will provide basic infrastructure and training at the primary school. At the junior secondary school, computer education has been made a pre-vocational elective, and is a vocational elective at the senior secondary school. It is also the intention of government to provide necessary infrastructure and training for the integration of ICTs in the secondary school system.

It should be noted that 2004 was not the first attempt the Nigerian government made to introduce computer education in schools. In 1988, the Nigerian government enacted a policy on computer education. The plan was to establish pilot schools and diffuse computer education innovation first to all secondary schools, and then to primary schools. Unfortunately, the project did not really take off beyond the distribution and installation of personal computers (Okebukola, 1997; cited by Aduwa-Ogiegbaen and Iyamu, 2005).

The Federal Ministry of Education has launched an ICT-driven project know as School Net (www.snng.org) (Federal Republic of Nigeria, 2006; Adomi 2005; Okebukola, 2004), which was intended to equip all schools in Nigeria with computers and communications technologies. In June 2003, at the African Summit of

the World Economic Forum held in Durban, South Africa, the New Partnership for African Development (NEPAD) launched the e-Schools Initiative, intended to equip all African high schools with ICT equipment including computers, radio and television sets, phones and fax machines, communication equipment, scanners, digital cameras, and copiers, among other things. It is also meant to connect African students to the Internet. The NEPAD capacity-building initiative will be executed over a ten-year period, with the high school component being completed in the first five years. Three phases are envisaged, with fifteen to twenty countries in each phase. The phases are to be staggered, and an estimated 600,100 schools are expected to benefit. The aim of the initiative is to impart ICT skills to young Africans in primary and secondary schools, and to harness ICT to improve, enrich, and expand education in African countries (Aginam, 2006).

The Federal Government 0f Nigeria has commissioned a mobile Internet unit (MIU) operated by the Nigerian National Information Technology Development Agency (NITDA). The MIU is a locally-made bus that has been converted into a mobile training and cyber centre. Its interior has ten workstations, all networked and connected to the Internet. The MIU is also equipped with printers, photocopiers, and a number of multimedia facilities. Internet is provided via VSAT with a 1.2m dish mounted on the roof of the bus. It is also equipped with a small electric generator to ensure regular power supply. The MIU takes the Internet to places areas and various primary and high schools (Ajayi, 2003). The number of buses is so small; however, that most rural areas and schools have not yet been covered.

Although efforts have been made to ensure that ICTs are available and used in Nigerian secondary schools, the level of uptake is still low. It has been observed by Goshit (2006) that most schools, both private and government, do not offer ICT training programmes.

METHODOLOGY

The study was conducted in science and technical colleges. Two hundred and sixty teachers were selected from thirteen schools participated in the study. The sample size was made up of 162 males and 98 females. The ages of the participants ranged between 35 and 45 (mean = 25.9; standard deviation = .927). The participating teachers were from science and technical from different departments of the schools.

Procedure for Data Collection

A simple random sampling technique was used to select the teachers in science and technical colleges who participated in the study. Questionnaires were delivered personally to the vice academic of each school for distribution to the participants. This method was chosen to avoid low response rate. Also, the involvement of teachers in the study was strictly voluntary. They were also assured of confidentiality of any information given. The questionnaire was pilot-tested to measure the reliability and to determine whether it was understandable for the target population. The validity was improved by consulting experts in the field. The final version of the questionnaire was sent to teachers. It was distributed to 60 teachers in different departments. One week was given to the teachers to complete the questionnaire except teachers in a particular school who were given two weeks to complete since they were busily invigilating end of term examinations. Follow-up phone calls were made to the assistant head teacher for academic affairs in each school to remind the teachers to complete the questionnaire. The questionnaires were collected in person from the school. A total of 51 questionnaires were collected back from the participants indicating an 88% return rate. Of 51 questionnaires received, 10 were not used for data analysis since they were incomplete. Thus, 41 questionnaires were used for data analysis indicating an 88% valid response rate.

Instrumentation

A survey was designed to collect data from teachers of science and technical colleges. The first section of the final version of the questionnaire focused on demographic information of the teachers based on gender, age, teaching experience, computer experience, and frequency of computer use. The second section consisted of Likert-type questions. The teachers were asked to respond to the use ICT in classroom instruction and management. Also, respondents were asked to rate the extent of ICT application in their endeavor. The respondent were also asked to rate their ICT competencies; computer computers. They were also asked to rate their perception to adoption and integration of ICT in teaching to achieve professional objectives.

Finally, teachers were asked to indicate the perceived needs for ICT training and support. A reliability test was carried out to determine the internal consistency of items in the questionnaire by using Cronbach's Alpha reliability test. Cronbach's alpha coefficient was 0.903. According to Kline (2005), alpha value of .90 is considered excellent, .80 very good, and .70 acceptable. In this study, the observed variables had good internal consistency. In this study, data was analyzed using descriptive statistics.

PRESENTATION OF RESULTS AND DISCUSSION

Use Of ICTs In Schools

Respondents were asked to indicate how frequent had they used ICT in each case – for teaching and instructional support, classroom management, communication and personal development. Each item was measured on a five point rating scale from 1 (never) to 5 (daily).

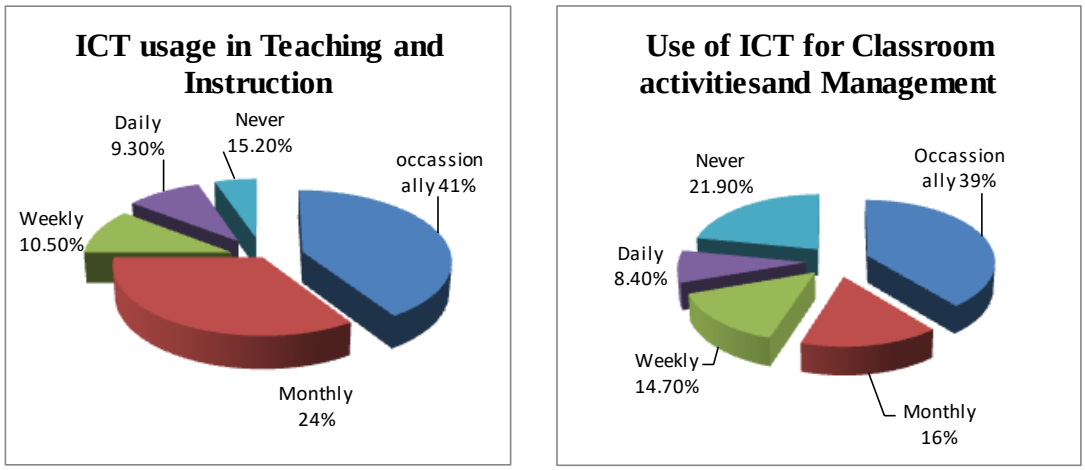
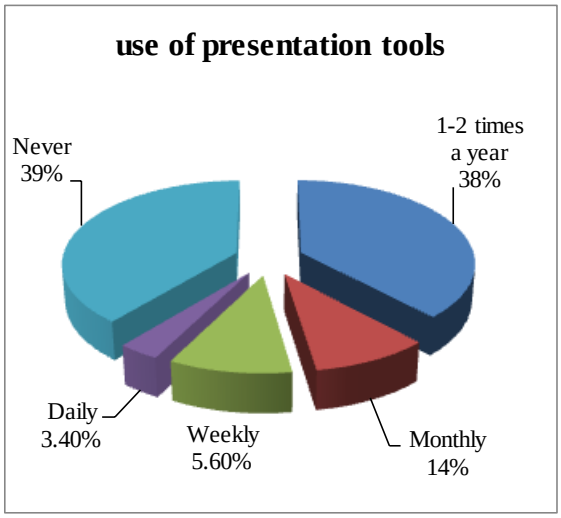


Figure. 1 Use of ICTs by Teachers in Schools

As shown in Figure. 1, respondents were reported less frequent use of ICT, either daily or weekly for teaching and instructional support (19.8%) and classroom management activities (23.1%). Respondents however, reported less frequently use of ICT for personal development (12%). This is contrary to the findings of The Gordon University Aberdeen (2004) which revealed that secondary school teachers at Scotland made use of ICT as much or more for professional development and communication as in the classroom. Thus, mechanisms need to be put in place to ensure that teachers utilize computer technology for further development and communication, such as seeking peer-to-peer advice or participating in online professional development.



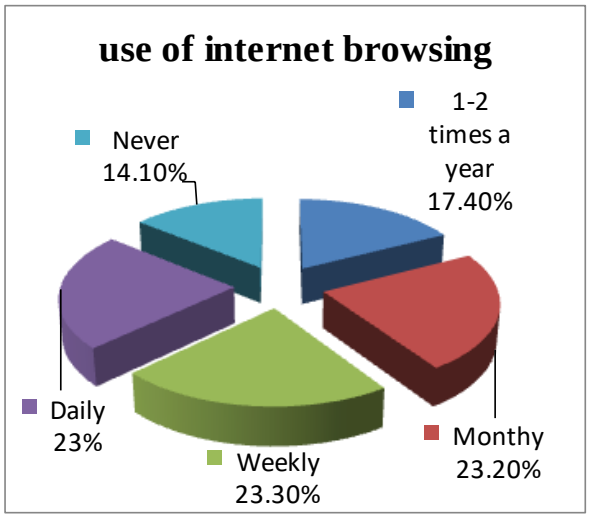


Figure 2: Use of ICT Application by Teachers

When asked about ICT application most frequently used either on daily or weekly basis, low ratings were given to presentation tools (9%), and moderate use was recorded as per the use of internet browsing (46.3%),

ICT Competency

For teachers' ICT competency, respondents were asked to rate their perceived competency in basic computer applications which include word processing, presentation tools, e-mailing and internet browsing. Each item was measured on a five point rating scale from 1(no capability) to 5(excellent).

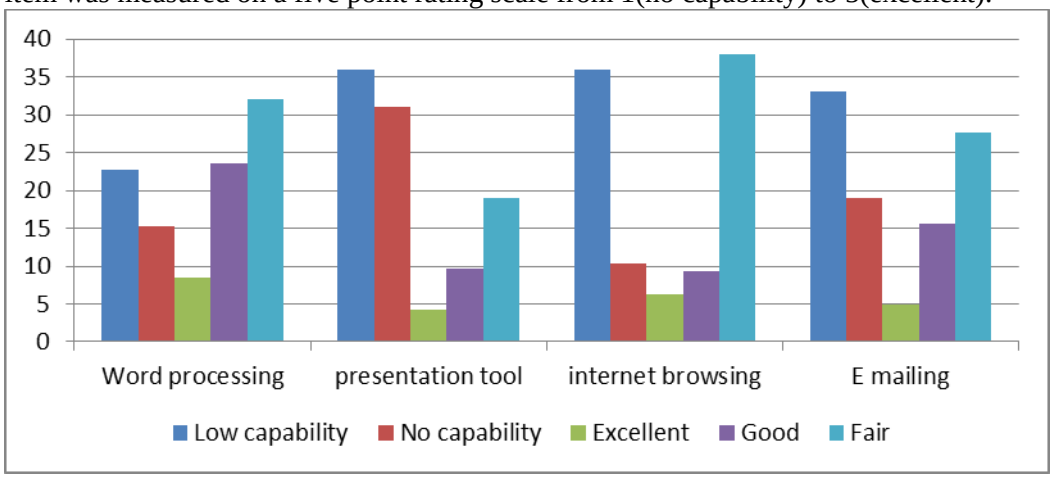


Figure 3; Computer competency of Teachers

The result indicated that teachers considered themselves to be less competent, either low capability or fair in the use of word processing (33%) and presentation tools (36%). The results suggest that teachers' computer competency if any is possibly related to their partial use of word processing in preparing teaching materials and presenting lessons. The result is in agreement with those of Cuckle et al. (2000) and Jegede et. al. (2007) who found teachers to be most competent in word processing compared to other applications.

On the other hand, a lower proportion of respondents perceived themselves to be broadly less competent in internet browsing (36%) and emailing (33%),). As shown in Fig. 3b, most of the rating fell between the range of "fair" and "low capability", i.e. low/fair level of skills in these applications. It is however, not surprising

for teachers to feel less competent as these applications are most likely not used in daily teaching and instruction, e.g. spreadsheets are normally used by teachers to manage student grades and results.

Overall, the results are consistent with the findings of Slaouti & Barton (2007) who concluded that ICT most commonly used by teachers was word-processing, PowerPoint and the WWW. According to their research, "Video conferencing and synchronous communications had again not been used; email had only been used for just sending messages to friends and credentials where necessary. It also appears that respondents feel least competent in statistical tools (31%), as shown in Fig. 3b. It might be that these are technical areas that need to be learned by teachers, and that current training courses do not address teachers' training need in this area.

Teachers' Perception On ICT Adoption

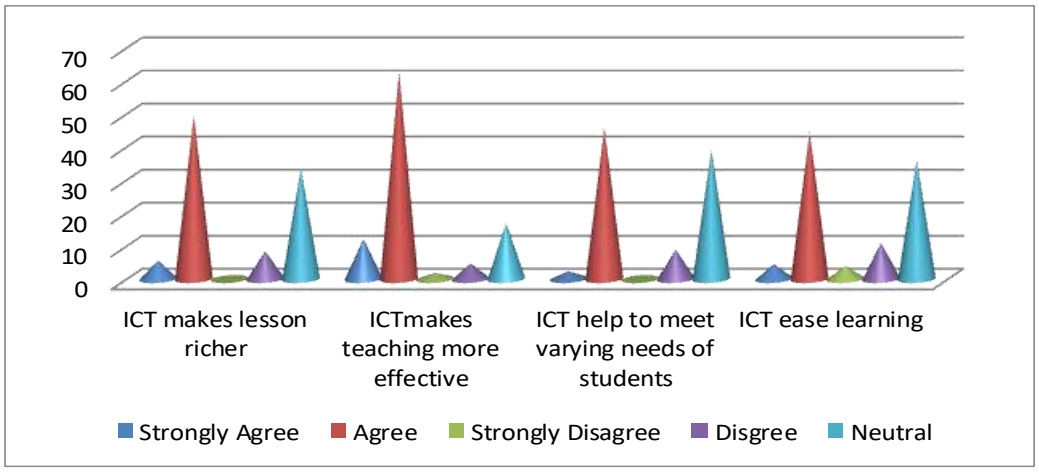


Figure 4 Teachers' Perception of ICT Integration

In general, teachers broadly agree that use of ICTs makes them more effective in their teaching (75%), more organized in their work (80%) and better able to meet the varying needs of students (48%). In general, teachers broadly agreed that with the use of internet and technology, their lessons are richer (55%) [Fig. 4]. This is in agreement with the findings of Slaouti & Barton (2007) which reported that ICT can motivate students in their learning by bringing variety into the lessons, and at the same time, sustaining teachers' own interest in teaching".

A further positive sign is 85% of them indicated that they would like to integrate more computer applications into their teaching. It appears that teachers' perceptions toward ICTs are encouraging, where most of them showed positive perceptions on computer use in teaching and instruction. It is believed that teachers can see the value of the ICTs in enhancing teaching and learning, and they are positive towards further integration of technologies into classroom instruction.

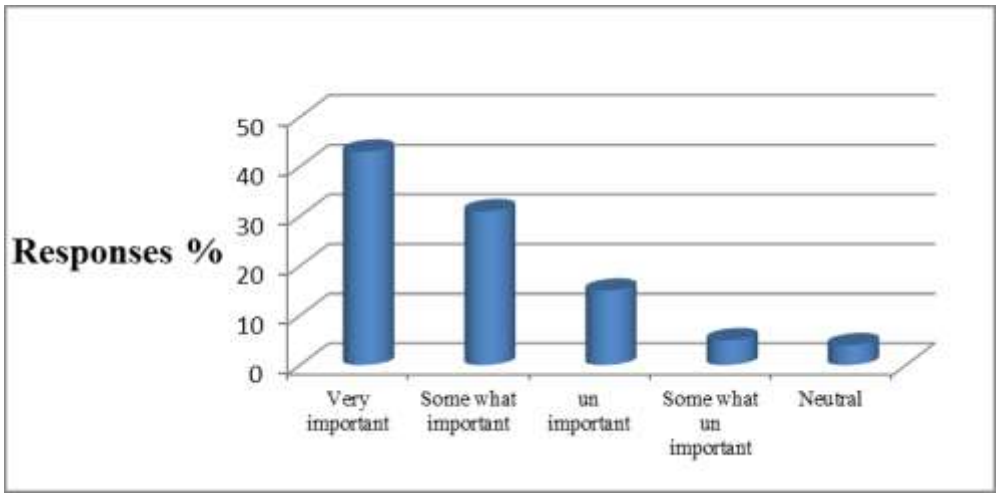


Figure 5 Teachers' Perception of ICT Integration

ICT Training And Support Needs

In addition, most of the teachers consider themselves as having limited knowledge to make full use of ICTs, or to integrate ICTs fully into teaching.

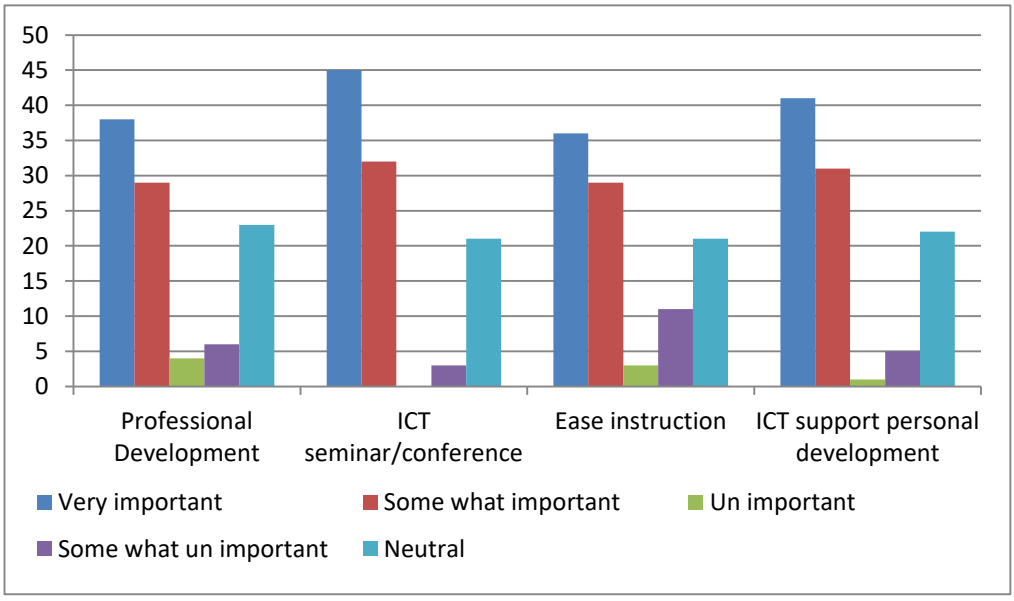


Figure 6; Perceived needs for ICT training and support

When asked to indicate the important channels for improving their ICT skills, respondents had given higher ratings to the need of school-based professional development (67%) and ICT seminars/conferences (77%) [Fig. 7]. The result suggests that school leaders should initiate industry-teachers partnerships to deliver ICT training programmes that are appropriate to teacher's needs. Other than courses organized by the central agency, more effective ICT training could be obtained locally through smart partnership with industry and institutions of higher learning. As Ya'acob et.al. (2005) has suggested, training should be offered to teachers on a continuous, rather than a one-off, basis so that their IT knowledge is upgraded over time.

CONCLUSION

The study investigated teachers' ICT use in schools, their perceived competency, perception of ICTs, and

their training and support needs. From the study, it appears that most of them are positive with the use of ICT use in school, and they appreciate the use of ICT in enhancing teaching and learning. Result also showed that there are positive views towards further integration of technology into classroom instruction. Training therefore, should be offered to teachers on a continuous, rather than a one-off, basis so that their IT knowledge is upgraded over time. It is indeed hoped that the benefits from the use of ICTs can be fully realized and optimized in teaching. From the results, it would appear that mechanisms need to be put in place to ensure that teachers utilize computer technology for further development and communication, and training need to be designed to increase teachers' familiarity with a wider range of ICT applications. Teachers' should also be given the opportunity and encouraged to reflect on, and make decisions about their own ICT development needs on ongoing basis.

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