

Information Communication Technology Appraisal for Enhancement of Quality Education in North-Wollo District, Amhara Region, Ethiopia

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Abstract:- An attempt has been done in this study to assess the status and challenges of information communication technology (ICT) for the enhancement of quality education in Ethiopian secondary schools. The study examined the availability and status of ICT infrastructures, electricity, characterizing the levels of challenges of ICT, skills, and capability as well as the perception of teachers and principals towards ICT. The descriptive survey design using a mixed research methodology was used. A total of 375 samples were randomly and purposely selected from teachers, principals, and students in four schools of north-Wollo district in the Amhara region. A self-designed questionnaire prepared for secondary schools and ICT was used to collect the data for the study. Data collected for the study were analyzed using descriptive statistics such as percentage scores and frequency counts. As the finding showed, the unavailability of ICT devices, inconsistent technology usage by teachers and staff because of lack of computer, poor internet connection and lack of ICT skills make ICT infertile in enhancing the quality of education. Moreover, the result of the study indicated that several other factors pull back the implementation of ICT at the schools. Therefore, it is recommended that the responsible principals should increase the budget for ICT infrastructures in schools and ICT skills should be a mandatory skill for teachers. Policymakers should adopt a hybrid ICT integration model that takes into account comprehensive factors tailored to both technological and pedagogical aspects are recommended.

Keywords:- Amhara region, Challenges, ICT, Quality of education.

I. INTRODUCTION

A. Overview of ICT as a tool for quality education

Ozaji in Jimoh (2007) characterized ICT as the controlling and treating of information (images, texts, instruction, graphs) for use employing electronic and specialized gadgets, for example, PCs, cameras, and phone. (Ofodu, 2007) likewise allude to ICT as electronic or mechanized gadgets, helped by human and intelligent materials that can be utilized for a wide scope of instructing and learning just as for individual use. These days, the spot of ICTs in instruction and the world, can't be undermined. Data and correspondence innovation has the possibilities to quicken, advance, and extend expertise; to persuade and draw in understudies in figuring out how to help relate

school encounters to work rehearses; to help make monetary suitability for tomorrow's laborers, add to radical changes in school; to reinforce instructing and to give chances to an association between the school and the world (Ajayi, 2009). There are various advantages gotten from the utilization of ICT instruments in improving quality training, for example, the capacity for the student to pick when to learn regardless of the topographical area without stress (Birhanu Moges, 2013). Furthermore, ICT likewise empowers students to find and investigate new developments from specialists around the world (Birhanu Moges, 2013). Thirdly, the presence of ICT into the training framework will empower the conveyance of educators to understudies, checking of student progress and evaluation should be possible opportune (Birhanu Moges, 2013). (Olurunsola, 2007) expressed that through ICT, instructive necessities have been met; it changes the requirements of training just as the potential procedures.

As indicated by Oduma, 2014), ICT increment student inspiration and commitment, encourage the securing of essential aptitudes, encourages e-learning, encourages instructor re-preparing, holding and up-dating of least scholarly standard and arrangement of virtual library administrations. Additionally, (Anthony O., 2012) likewise portrayed extra advantages of ICT are worldwide access to information, instant sharing of understanding and best practice, self-guided, incitements of experiential picking up, opening windows for new reasoning, an environment of development, demonstrate and owing innovation. Observing at the advantage of schooling in population-building and the populace blast in the secondary schools now a day, the usage of ICT in the teaching-learning progression becomes vital (Ajayi, 2009). Instructing and learning have gone past the educator remaining before a gathering of understudies and dispersing data to them without the understudies' satisfactory cooperation. The creator depicted that with the guide of ICT, instructors can take understudies past conventional cutoff points, guarantee their satisfactory interest in the educating and learning process and make essential conditions to test and investigate Ajayi, 2008).

Instructors as a key in of the teaching should have innovative education including 1) application of technology in Instruction, 2) basic computer operations and concepts 3) personal and professional use of technology (Aktaruzzaman, 2011). (Nwosu and Ugbomo, 2012), portrayed that ICT significantly encourage the obtaining of information, offering nations extraordinary chances to

upgrade instructive frameworks, improve strategy plan and execution, and enlarge the scope of chances for business people.

ICT has affected the quality and amount of instructing, learning and research in the custom or potentially separation training foundations utilizing it (Gloria O., 2013). Indeed, even most correspondence specialists in the field of training concur that when appropriately utilized, ICT innovation holds an extraordinary guarantee to improve educating and learning (Ubogu, 2012). Along these lines, if Ethiopia as a country needs to improve quality in education the basics of ICT technologies in its education framework need critical consideration (Birhanu Moges, 2013). Improving the nature of instruction and preparing is a basic issue, especially during a period of instructive extension. ICT can improve the nature of education in different ways; this incorporates expanding student inspiration and commitment, encouraging the securing of essential abilities, and upgrading instructor preparing, (Aktaruzzaman, 2011).

Regardless of whether there might be many pulling factors for poor education quality, but utilizing ICT improperly, educators' ICT competency, understudies' ICT abilities, tendency and inspiration to utilize ICT, ICT and instructive framework integration point, ICT foundations, electricity issues were surveyed. The general goal of the investigation was to evaluate the status and difficulties of ICT innovations for the improvement of education quality on Kobo and Lalibela secondary schools. According to our survey made, then north-Wolloso' secondary schools had poor ICT infrastructures, poor ICT competency of teachers, very weak student to computer ratio, lack of internet-connected laboratories, lack of awareness of teachers and principals in educational technologies.

B. ICT Integration model into the curriculum

The promise of Information Communication Technology (ICT) into the education system is crucial and will remain to be a subject of great significance. One intriguing question that gets great attention is how to

integrate and adopt ICT into various levels of the educational system. ICT integration model refers to the use of computer systems and the Internet to support teaching and learning experience across the curriculum in the education system.

Some studies examine the integration and adoption of ICTs for teaching and learning in various contexts. (Tomaro, 2018) and (Sang, G., 2010) argues that techno-centric approach to ICTs in education may not bring its promising result, rather, policymakers, should look into and explore a comprehensive integration processes that take into account various factors, such as ICT skill and knowledge, the attitudes of both teachers and students play a great role in ICT integration in education system. (Oye N. D., 2012) presented the benefits of integrating ICT in school counseling are so great that there is no need justification as to why there is an urgent need to undertake integrating ICT in school counseling for the basic education.

According to (Capuk, S., 2015), to integrate ICT into the educational system, curriculum development in the ICT knowledge domain should be given great emphasis on various categories of knowledge such as Content Knowledge, Curriculum knowledge, Pedagogical content knowledge and Knowledge of learners. (Ng, W.K., 2009), pointed out that a great emphasis should be given capacity building in technology integration that might be of relevance based on the needs of a given country, as shown in figure 1. Furthermore, the author argued that there is a tendency to emphasize the installation of ICT over the seamless integration of ICT in teaching and learning i.e., making ICT a part of the education setting and ensuring that it results in improved learning outcomes and qualify learner engagement. However, Policymakers should clearly state how the process of adoption and integration of ICT into the educational system should proceed; determine the educational purposes that technologies are to serve before they brought on implementation. It is important to note that ICT is only a tool and as such, it cannot compensate for weakness in education policy.

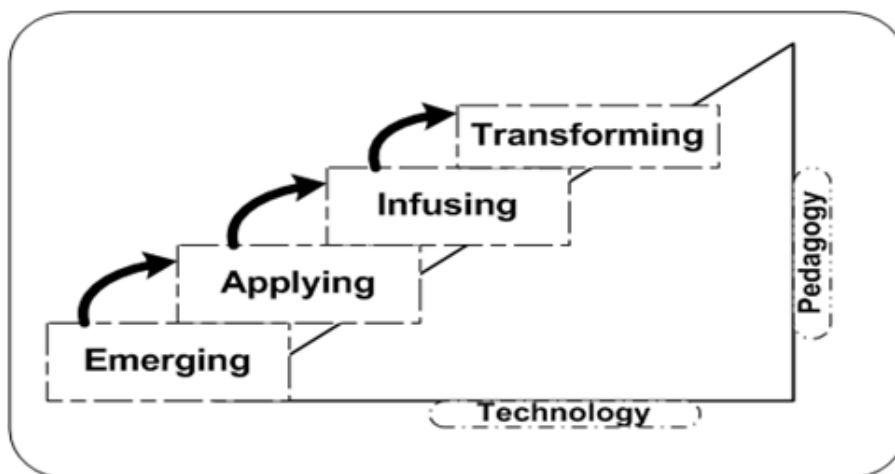


Fig 1:- Stages of ICT integration Ng, W.K, (2009)

As is illustrated in figure -3, in the first stage, teachers and learners are exposed to discover ICT tools and their general functions and uses, and the emphasis is given ICT literacy and basic skills. The second stage involves how to use ICT tools, and making use of them in different disciplines (subjects). This includes the use of general as well as a particular application of ICT tools, and it relates to applying stages. In the third stage, there is a clear understanding of how and when to use it. This implies the ability to recognize situations where ICT will be a potential solution to solve real problems. This relates to the infusing stage.

At the final stage, it is the process of transforming the learning situation via the use of ICT. This stage requires a new way of approaching a teaching-learning environment with well customized and fine-tuned ICT tools.

This paper is divided into parts. Part 1 was about the introduction, part 2 is about methods and techniques, part 3 is about result and discussion, part 4 is about conclusion and recommendation finally the last part is a list of references.

II. RESEARCH METHODS

A. Description of the Study Area

North-Wollo is situated in the northern course of Addis Ababa. The focal point of the zone is Woldia town and the town is around 521-kilo meters away. According to the central statistical agency of Ethiopia (CSA, 2007), the zone has an all-out populace of 1,500,303. In this zone, there were a total of 73 secondary schools. The objective schools were chosen dependent on efficient arbitrary examining utilizing a lottery strategy wherein the 73 secondary schools were recorded on paper by separating into two gatherings A) bunch I, were schools with acceptable ICT foundation for the most part PC and related, B) bunch II schools with some way or another less framework, because of their gathering, schools chose by lottery method and from that has great ICT framework Lalibela was chosen and from less foundation kobo was chosen.

B. Nature and Types of Data and Research Design

The descriptive survey was used for this study in which a blend of both quantitative and qualitative data was collected and analyzed.

C. Sampling Techniques and Procedures

The sampling technique was blended (probability and non-probability) types of sampling techniques. Simple random sampling and stratified random sampling from probability sampling techniques were applied. But some of

the data were collected through interviews, observation and focus group discussion was conducted using purposive sampling from the non-probability sampling technique.

The testing size would be 375 and chosen dependent on Yamane's formula (Kasiulevičius, 2006), for finding a minimum sample size from a known population. The formula is.

$$n = \frac{N}{1+Ne^2}$$

Where n=the sample size

N= the size of the population and e= the error of 5 percentage or with the confidence coefficient of 95% (Kasiulevičius, 2006).

As per data from the North-Wollo zone education office, the schools have the sum of 6051 population. So we had had a sample size of $n=6051/1+6051(0.05)^2=375$.

D. Methods of Data Collection

To get adequate and complementary information for the study, a diverse set of data gathering instruments were employed. Observations were used since to get contextual information especially the level of ICT infrastructures, available infrastructures types, their qualities, teacher's and students' level of competence in the schools were observed. A questionnaire composed of both closed-ended and open-ended questions, to draw out information on respondents' attitudes and beliefs as well as ICT skills towards ICT in improving the quality of education. Interview of school principals, ICT teachers and technicians to get the overall status of ICT infrastructures and FGD was also used to strengthen all the collected data using other instruments from all of principals, general course teachers, ICT teachers, technicians, and students.

E. Method of Data Analysis

Descriptive statistics analysis techniques such as frequency counts and percentage scores were used. Qualitatively the data were analyzed through narration which consists of analyzing the contents of all verbal and written materials, which made it appropriate to analyze both documents collected through data collection tools of the interview, FGD, and observation.

III. RESULT AND DISCUSSION

A. Result:

Lalibela secondary schools have a total of 2582 students and 226 computers. The student to computer ratio is 11:1. However, the school has only 66 instructional computers and the other 160 computers are only used for E-learning and are not used for day to day instructions.

No	Recommended Ratio	Kobo Ratio	Lalibela Ratio
1	3:1 (Student to computer)	80:1 (26.6 times of the recommended ratio)	39:1(13 times of the recommended ratio)

Table 1:- Student to computer ratio comparison

A comparison of teacher’s purpose of using computers and an internet in the schools indicated in Figure 2, below.

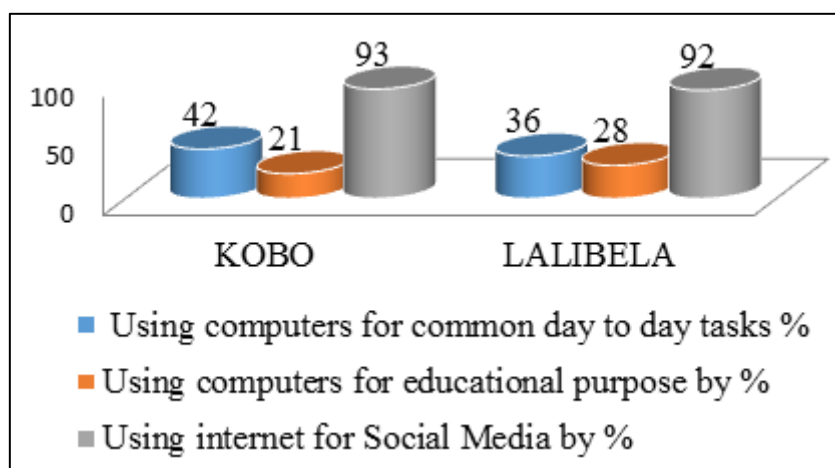


Fig 2:- Teacher’s ICT tools usage

NB. 1) Using computers for common day to day tasks indicates Microsoft office applications, internet browsing, and online education, using an LCD projector in a class, using ICT machines (printers, scanners, copiers). 2) Using Computers for educational purposes indicates:- Preparing a teaching material, teaching in the classroom using ICT tools, for educational video tutorials, for research. 3) Using the internet for social media indicates:- For face-book, Telegram, Imo, Whatsup, Viber.

N ^o	Explanation of basic ICT related abilities	High		Medium		Low		None	
		Rate	Frequency (%)	Rate	Frequency (%)	Rate	Frequency (%)	Rate	Frequency (%)
1	Working with word-processor applications (example: Microsoft Word)	11/40	27.5	12/40	30	9/40	22.5	8/40	20
2	Working with spreadsheet applications (example: Microsoft Excel)	7/40	17.5	10/40	25	12/40	30	11/40	27.5
3	Working with databases tools (Example: Microsoft Access)	7/40	17.5	5/40	12.5	8/40	20	20/40	50
4	Ability of using electronic mail	12/40	30	2/40	5	10/40	25	16/40	40
5	Searching data using search engines (example: Google, yahoo)	16/40	40	9/40	22.5	4/40	10	11/40	27.5
6	Using online teaching and learning materials	5/40	12.5	1/40	2.5	10/40	10	24/40	60
7	Uploading and downloading different materials	15/40	37.5	6/40	15	6/40	15	13/40	32.5
8	Using educational e-libraries	5/40	12.5	9/40	22.5	7/40	17.5	19/40	47.5
9	Working with PowerPoint (presentation tools)	7/40	17.5	5/40	12.5	11/40	27.5	17/40	42.5
10	Skills to use LCD projector for teaching	3/40	7.5	4/40	10	10/40	25	23/40	
11	Abilities to operate printers and related peripherals	10/40	25	8/40	20	7/40	17.5	15/40	

Table 2:- Competency of teachers on ICT

Keys: *High*→I have good experience on it.
Medium→I have some experience on it.
Low→I have seen how people use it.
None→ I have no experience on it.

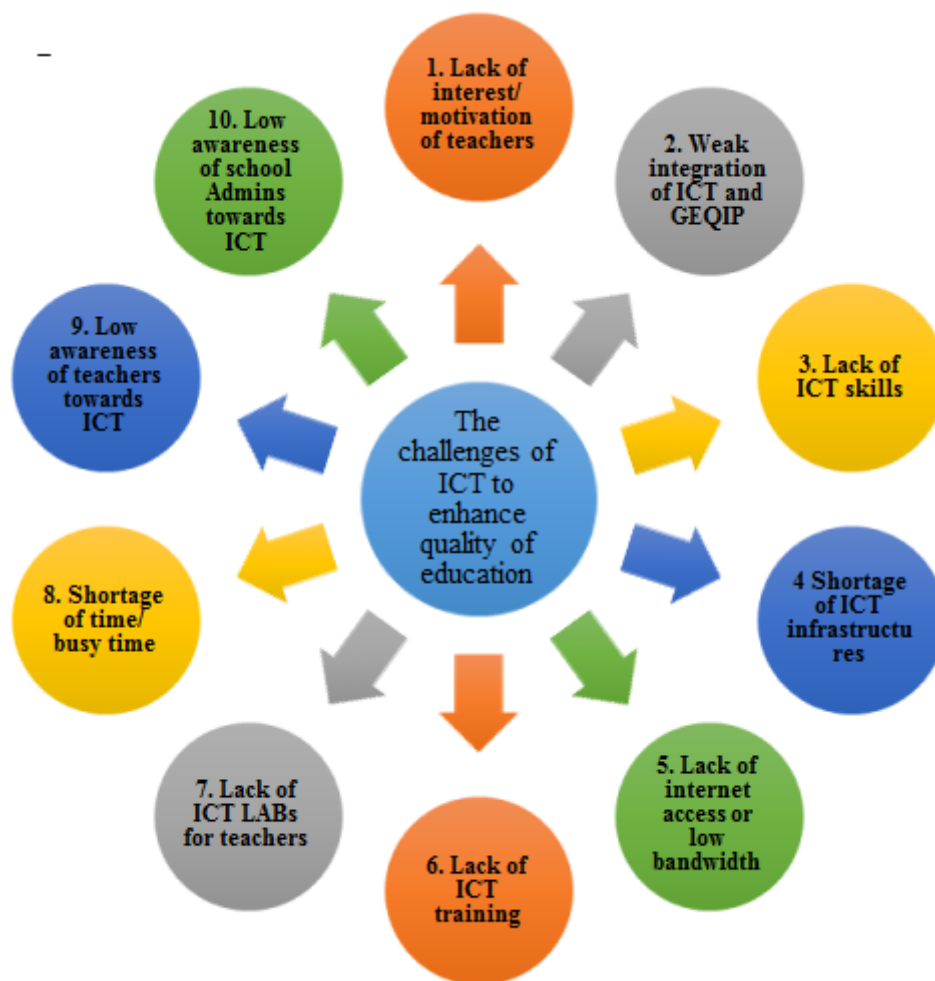


Fig 3:- The challenges of ICT to enhance the quality of education

B. Discussion

The student-to-computer ratio recommended by the U.S. Department of Education is 3:1, according to (Lucinda Gray, 2010). According to the president's committee of advisors on science and technology, 4 to 5 students per computer is the ratio that many experts consider to representing a reasonable level for the effective use of computers within the schools. The degree of participation in the use of ICT in education for a given country could be affected by several factors like cost of facilities, infrastructure, literacy level, availability of human resources, cultural attitudes and ignorance (Diana Kessy, 2006). One of the major challenges facing developing countries is to make technology an essential part of the culture of the people, (Abdulkafi Albirini, 2006). The reverence with which technology is held in technologically developed countries may be in contradiction to the perceptions of cultures that are relationship-oriented. Indicators of ICT in education are computer & internet access, ICT usage of teacher & student in school, the infrastructure of ICT use in education and competency of students ICT skills (Song, K.-S, 2013).

The study evaluates the status of the schools using the above indicators and criteria. Kobo secondary schools have a total of 3225 students and 160 computers. Therefore, the student to computer ratio is 20:1 more than six times the recommended ratio. But badly the school has only 40 instructional computers and the other 120 computers are used for E-learning and are not used for day to day instructions. Therefore, the ratio of students to instructional computers becomes 80:1, which is 26.6 times of the recommended ratio.

The result showed that even if 42% of the total respondents of Kobo secondary school teachers that have the skill, only 21% of them are using computers for educational purposes and this means that the remaining 79% are using computers for none educational purpose. But 93% of them are using the internet for accessing social media only from all populations using their cell phone.

Comparatively, teachers in Lalibela secondary schools have a lower number of staff (28%) of them are using computers for educational purposes and 91% of them are using the internet for accessing social media, which is almost similar to Kobo schools.

The overall finding of this study showed that Ethiopian secondary schools are lagging in using ICT technologies for the teaching-learning process due to the lack of ICT competency of teachers, students, and principals. Lack of ICT infrastructures, lack of motivation towards skills of ICT, Weak integration point of ICT to GEDIP, using the existing infrastructures for non-academic purposes are major outcomes.

➤ *Recommended ICT Integration model*

Policymakers should give great emphasis for capacity building in technology integration that might be of relevance based on the needs of a given country. Based on (Ng W.K, 2009) ICT integration stages, an effective integration model is adapted given this study finding as an input that depicts the status and ICT usage in the existing educational system.

The devised integration model is consists of two approaches. It is a hybrid model that comprises what to include in the existing educational system such as curriculum development in the ICT knowledge domain. It includes also the second component that depicts the processes of implementation which guide the integration process in four stages with a feedback loop.

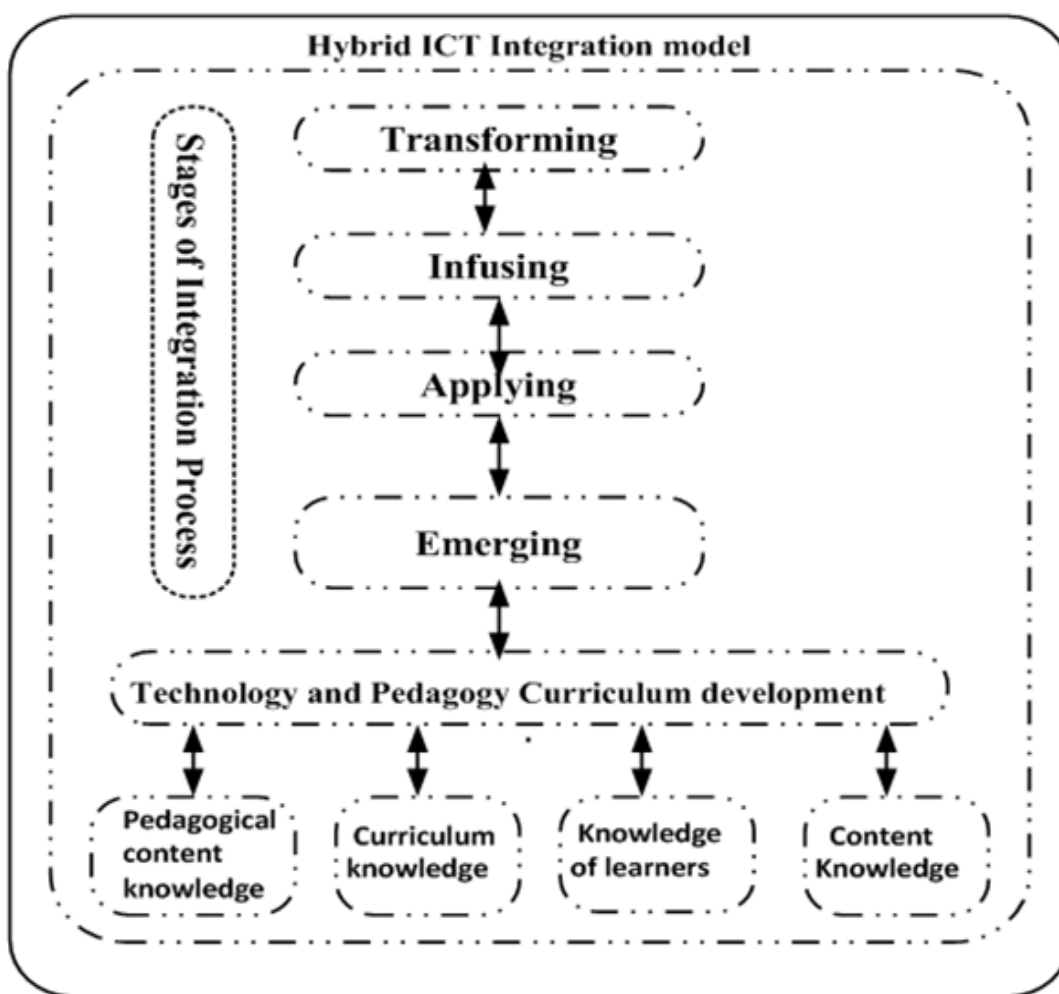


Fig 4:- Hybrid ICT Integration model

In summary, progression through these stages of integrating process would take a significant amount of time and requires a holistic view and solution due to the reason that it requires more than just purchasing cutting edge ICT tools and equipping teachers' handful skill training.

The following lesson should be taken into account when training teachers' ICT capacity building training in the process of ICT integration. These are:

ICT capacity building training should tie to and within the context of classroom objectives and activities.

- School-based training of teachers should be delivered in peer to peer mode rather than a convention training lecturing mode.
- Teachers should learn how to use the ICT tools more effectively when they see the technologies not as generic and decontextualized tools but as tools for

teaching, that is, for motivating, managing, facilitating, enhancing, and evaluating learning.

Moreover, Policymakers and respective stakeholders should give great emphasis to develop capacity in holistic and systematic policy formulation and strategic planning for ICT integration. It should give high priority to the pivotal role of the teachers that play in ensuring the appropriate, effective, and sustainable use of ICT to provide quality education for all. For this to happen, a careful design of a comprehensive ICT focuses on Teacher Professional Development that powers the teacher is not just implementer but also to lead the sectors. Policymakers need to decide on what type of ICT integration approach to adopt in the given educational curriculum.

IV. CONCLUSION AND RECOMMENDATION

A. Conclusion

The purpose of this research was to appraise the status and challenges of information communication technology for the enhancement of quality education in north-Wollo district secondary schools. The finding of this study showed that Ethiopian secondary schools are lagging in using ICT technologies for the teaching-learning process. Despite many advantages of ICT to enhance the quality of education, teachers' students, as well as principals, are not using ICT technologies. The factors that hinder the technology are lack of motivation, lack of skills, lack of awareness, lack of devices available, integration problems are major reasons.

This study finds out that the existing ICT integration model has lacked some important aspects that help to enhance the quality of education. Therefore, this study adopts an effective ICT Integration model that helps to enhance the quality of education.

Finally, to improve the students' quality of education all responsible bodies should give attention to the problems listed in the result session and should go through the solutions and ICT can be subject, and can be a tool which used to teach other subjects, or to access information, communicate with others. Therefore, it should be integrated into our education curriculum carefully starting from primary schools and the problems listed should be solved accordingly.

B. Recommendation

- It is recommended that a hybrid ICT integration model that takes into account comprehensive factors tailored to both technological and pedagogical aspect. Policymakers and the educational practitioners should give a higher priority and emphasis by considering major aspects of integration model such as, emerging, applying, infusing and transforming stages.
- ICT should be a mandatory skill for all levels of teachers and teachers should get a basic computer and internet browsing skills training regularly.
- ICT-assisted instruction, it includes, all or combinations of Television-assisted instruction, Computer-assisted

instruction, and Internet-assisted instruction should be employed effectively. Internet Laboratories available in schools have to be clean and accessible and connect with more computers.

- Disorientation towards affordable ICT and general education integration in Ethiopian secondary schools needs further research.

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