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The relationship between the technology needs of the youth and institutional resource provision

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Abstract

This survey explored the relationship between students' technological needs and the availability of resources in Ethiopia, emphasizing the role of educational stakeholders in promoting the productive and ethical use of technology in youth education. Focusing on secondary school and university levels, the study examined how the age and level of students influence their selection and use of technology, noting both benefits and challenges. Through a desk review of current research, the study revisited gaps between students' technological needs and institutional provisions in Ethiopia. A situational discourse analysis, using criterion sampling, was employed to assess students' needs against institutional provisions. Findings revealed that key challenges in meeting youth learning needs included issues with infrastructure, internet connectivity, and technology preparedness. Additional barriers included pedagogical misalignment of ICT resources, inconsistent access to electricity, weak managerial support, and limited collegiality among staff. These factors were identified as significant obstacles to the effective implementation of instructional technology in Ethiopia.

Keywords: Resource provision; students; technology; technology needs

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1. INTRODUCTION

Access to technological resources, so far termed information and communication technology, is an essential part of youth development through education (Godsk & Møller 2024; Rasa & & Laherto 2022). In that, proper access and success in technology-use process are believed to have lubricating effects in improving young people's prominence to mobilize, collaborate, and respond to social concerns in addition to having access to capital, markets, and training opportunities needed to pursue a career (Peretti et al., 2024; Çelik & Baturay 2024). Technology has also proved a systematic tool for virtual development across nations, sectoral inclusivity in development, advances in wealthier, healthier, and more productive ties, and the production of a techno-native generation of youth that can advance democratic governance and productive connectivity in and out of the classrooms.

Technology has elevated educational services with the latest information and communication besides improving business altars and alleviating poverty through youth job creation. Promoting youth employment and employability could be ensured through integrated efforts in the areas of education, skills development and job supply, and support for low-income entrepreneurs (Sunkara et al., 2015; Tatpuje et al., 2022). Parallel to the existing prominence, however, there are conditions in which the educated youth are less prepared for the world of work either due to lack of access and proper adaptation of technological resources or reluctance to use technology for the right purpose. Though technology provides potential employment networks that can enhance youth sustainable development, there are socio-economic barriers, digital skill shortages, and maladaptive practices that hinder progressive uses of technology (Alao & Brink, 2020).

Researches also denote social alienation backed up by internet addiction as found in a study held on 500 randomly selected students from Shiraz University of Iran where 13.2 percent were so affected. In that, there were psychological injuries emanating from addiction to the net such as loneliness, a decrease in self-esteem, unreal world imaginations, and a widespread range of anti-social behaviors. The same research recommended education for the youth to employ time-control mechanisms. Social supports from parents, caregivers, and the community at large are also traced as indispensable. However, the study does not touch any internally self-directed and need-based inflections in using information and communication technology. Problematic uses of ICT in personal and school settings were also reported largely among young users of mobile technology; more specifically smartphones, with top manifestations of wastage in learning time, copying homework from others, and getting detracted during lesson times (Rodriguez-Gomez et al., 2018). This is consonant with Bosamia (2013) who affirmed that reduced face-to-face interaction, social disconnection, and reduced physical activity lead to health problems, cost of using ICT resources, job insecurity, loss, and loss of privacy.

In the face of technology use, there are both advantages and disadvantages, as observed in the aforementioned studies. Youth in Ethiopia are no exception to the above inflections of technology use both in education at workplaces. Yet, the extent to which researchers touched on comprehensive aspects of technology use among the youth in the Ethiopian context is an issue of concern. Hence the succeeding questions were traced to look into existing studies on Ethiopian conditions in technology use and reflect on youth needs and assertions:

1. What are the practices and challenges of technology use among youth groups in Ethiopia?
2. How do informal and formal institutions address and handle challenges related to technology use among the youth at school, at work, and in society?
3. What breakthrough mechanisms could be implied from domestic and international research works?

1.1. Literature review

1.1.1. Basics of technology in education

Technological resources make life and learning easier by providing up-to-date information in an accessible manner. Information and communication technology, in particular, refers to the transfer and use of all kinds of information which can serve as the foundation of the economy and a driving force for social changes where

distance is no longer an issue concerning accessing information in working-from-home, distance learning, e-banking, and e-government (Celebio & Rendulic, 2011).

Technology use in education is presented in different forms. Bruckner (2015), for instance, asserts educational technology to be the effective use of technological tools in learning which, as a concept, concerns an array of tools, such as media, machines, and networking hardware, as well as considering theoretical perspectives for their effective application. According to this assertion, educational technology embraces human, material, and technical components.

According to Huang et al., (2019), educational technology refers to the use of tools, technologies, processes, procedures, resources, and strategies to improve learning experiences in a variety of settings, such as formal learning, informal learning, non-formal learning, lifelong learning, learning on demand, workplace learning, and just-in-time learning. In this regard, the use of technology in education has a broad spectrum of compositions and purposes as it embraces material, means of production and use, and goals for the use on successive bases. Tools are essential but valued with the active facilitation of supportive technology (techniques), orderly processing as per needs, and resources (human, material, psychological, financial, time) aspects.

A brief presentation signifying the positive use of information and communication technology (Ratheeswari, 2018; Aarnio et al., 2024) denotes that ICT use in the classroom is important for giving students opportunities to learn and apply the required 21st-century skills as it improves teaching and learning, and supports teachers in performing their role as creators of pedagogical environments. Ratheeswari (2018) marks the fact that the classroom use of information and communication technology helps active learning and facilitative teaching.

1.1.2. Theories of information and communication technology in education

Different learning theories have been tamed to be used along with information and communication technology use in education. One such theory is Behaviorism which largely focuses on adjusting external stimuli to evoke internal drives to learn (Capacho, 2018). Cognitive learning theory advocates the arrangements of *internal cognitive processing* for students to work on the learning atmosphere thereby engaging in activities first through attentive reception, selection, cognition, and then retrieval (Mechlova & Malcik, 2012). Humanism, more specifically Digital Humanism, advocates the uttermost necessity to opt for *a sensitive and meaningful approach* to the requirements of the digital world and the needs of individuals without using too many technologies in schools can represent a serious threat to students' healthy development (Barnova & Krasna, 2018).

According to digital humanism, the new generation adapted to growing information and communication technologies (Generation Z) bears two apparent qualities, positive and negative (Barnova & Krasna, 2018; Gibson, 2016). On the positive side, they are easily connected to social media; socially open and interactive; fast decision-makers and actors; multi-tasking, and accepting diversity in an easy manner of the trade. On the negative side, they are impatient; socially-emotionally maladaptive; fail to share values descending from earlier generations; go short of critical thinking, and fail to validate information to the extent of being deceived by fake news and pseudo-information (Shatto & Ervin, 2016).

Constructivist theory of information and communication technology advocates the active role of users (learners) in constructing meaning and new ways of communicating ideas with the support of the vested technology (Chaudhary & Nagar 2018; Chand, 2018). In that, constructivism transforms the learner from a passive recipient of information to an active participant. In the learning process, the ICT-integrated tools provide learning opportunities with which learners formulate and test their ideas, draw conclusions and inferences, and pool and convey their knowledge in a collaborative learning environment (Leask & Younie, 2001). Learners construct their knowledge actively rather than just mechanically ingesting knowledge from the teacher or the textbook. Commonly in use is Communal Pedagogy as a unifying theory for ICT Integration in education and learning (Leask & Younie, 2001) which stresses the communal building of knowledge (rather than the individual). That emphasizes drawing on actual and real situations (rather than ideal or theoretical situations) through contacting communities with specialist knowledge around the world, to build this

knowledge (Jha, 2017; Chaudhary & Nagar 2018; Chand, 2018). Jha (2017), in specific, underlines message accuracy, living interaction which is substantially sustainable and vital for effective learning, transformative skills of using the technology broadly and deeply, and interaction with technology which liberates learners from being dominated by external supplies.

The point is to identify conditions in which the youth in schools use information and communication technology in an *efficient* (with maximum benefit in a *cost-effective* manner) and *effective* manner (in a relevant and developmental way) without undue exposure to wastage in time and psychological makeup.

2.3 Determinants of Information and Communication Technology in Youth Education

Various factors could be stressed as determinants of information and communication technology use in youth education which could be institutional, individual, socio-cultural, or managerial. Rajan (2021) studied factors influencing ICT integration into education in India, and came up with poor connectivity (access possibilities delimited to urban centers as an institutional concern), users' self-enthusiasm (connected with aging or task-attributes such as lesson control as an individual concern), extra-time-seeking (extreme reliance and tendency to stick to hardcopies as a socio-cultural concern), shortage in incentives in terms of constructive feedback and appreciation from both students and administrators (managerial), and lack/shortage of training on certain software (Institutional and managerial) as hierarchically prominent factors among others.

Another research looked into factors influencing ICT integration to teaching and learning in Nigeria and came up with a shortage in access and high cost of equipment (institutional), affordability of training for users (institutional), especially teachers, and negative attitudes of teachers and students (Individual) towards the use of ICT to be the successively influencing factors (Agbo, 2015). Harrell and Bynum (2018) studied factors affecting technology integration in selected K-12 classrooms in Albania and identified poor infrastructure and inadequate technology, insufficient tools (shortage in quantity) and ineffective professional development (shortage in quality), and lower professional efficacy and perception (Individual skill-gap and interest) to be among the striking factors on ICT integration to lessons.

Taking the stepping ground of *Activity Theory* in ICT integration into lesson situations, Tay et al., (2013) underlined technological infrastructures (Institutional) and teachers' beliefs and practices (Individual) as the leading factors influencing ICT integration into classroom lesson provision. The same research denoted curriculum (Professional), school leadership (Managerial), and professional development (Technical) as *less visible but supporting factors* in the process of integrating ICT into the teaching and learning process.

Related research on Indonesian school experience identified factors affecting ICT integration to be in lack of vision and personal perception (Individual), the competence of teachers (Individual and institutional), lack of time (individual and institutional) lack of resources (institutional), and lack of electronic-based learning resources (Institutional) (Sokku & Anwar, 2019). Professional predictors were stressed by far as denoted in the research held by Law, Lee et al., (2008) in which general pedagogical orientation. The teacher was indicated to have a much stronger relationship with the perceived impact of ICT use on students' learning compared to the more specifically ICT-related pedagogical orientations. Further, the self-perceived pedagogical ICT-use competence of the teacher was indicated to have been a stronger *predictor* for the perceived impact of ICT use on students.

1.2. Purpose of study

In all the above factors analyses, research was rare on what constituted youth technology needs and role orientations. Thus, revisiting what research works had regarding youth-based technology needs and institutional provisions became the springboard for this study.

2. METHODS AND MATERIALS

This study deals with identifying the relationship between youth needs for information and communication technology and institutional provisions to meet the vested needs. The base of the study became contemporary research works held in Ethiopia in the last ten years: 2013 to 2022. Contextual discourse analysis of the interpretive, qualitative design was used. In that, a systematic desk review (Newman & Gough, 2020; Nunn &

Chang, 2020) was held on research works so far held in Ethiopia at different levels. In the selection of the research works, criterion sampling was applied, the point in focus being the concentration of the studies on the need-based use of the esteemed technology. Units of analysis were purposes, questions addressed, data collected and analyzed, findings, and recommendations provided for each case in the studies. Pertinent sources denote that a systematic review, also known as the research synthesis, aims to provide a comprehensive, unbiased synthesis of many relevant studies in a single document (Aromataris & Pearson, 2014; Petticrew & Roberts, 2008).

3. RESULTS

In holding this study, core issues related to practices and challenges of technology use among youth groups in Ethiopia were revisited based on existing research findings.

3.1. Practices and challenges of technology use among youth groups in Ethiopia

Tremendous research works have been held regarding ICT integration into learning and youth development in Ethiopia. One of the research works conducted (Hailye, 2019) focused on *challenges in ICT integration in Ethiopian education* by taking practice-related issues in selected schools of the Southern Ethiopia Region (S.N.N.P.R.). The research objective was to identify categories of media (e-learning tools and digital devices already used) as per their influences on ICT integration through a snapshot of teachers' existing practices. Mobile phones, web browsers, and internet search constituted the successively used ICT resources with the purposes vested in social networking, searching for information on the internet, and computer games. A total of 212 data providers from three schools in the Soddo area took part in the research process. According to this research, contextual tools excelled tools for sharing information and experiential gains.

In the broad sense, functioning, tactical, and pedagogic challenges were observed. Lack of ICT infrastructure, shortage of qualified teachers and students' lack of interest to learn as well as inadequate information on the practical enforcement of ICT were the triggering factors. The point is that, though the research identified practice dimensions and challenges faced by teachers and students, it failed to earmark what necessitated the practices and factors that triggered the shortages. Poor access to the internet was one of the challenges but the research did not denote why that shortage came about. It may have been related to poor ICT administration, an institutional predicament to update the use system, or a high cost of service. The other factor was *poor working conditions*. Like the internet problem, the working conditions in ICT use was the other factor that could jeopardize smooth and strong relationships among teachers and students on vertical and horizontal bases. However, the research did not trace the driving factors to be indicative of the way forward.

Shortage of viable software was the third-level challenge as the research marked but what led to the software shortage was not clearly stated. So, the research lacked clarity concerning identifying the preparation, implementation, evaluation, and improvement of ICT use in education. Moreover, the type and degree of role-assumption in and out of schools regarding ICT integration for the best need assertion was not touched at all.

Hailemariam (2022) studied the challenges of using ICT among secondary school teachers of Yeka Sub-City, Addis Ababa, and found inadequate infrastructure, lack of internet connectivity, electric power fluctuation, high cost of hard and software, outdated computers, shortage in computer literacy, shortage in staff collegiality, lack of encouragement for teachers to be professionally strong to have been the challenges. Since the research does not put practice-based issues foremost, it was hard to relate the challenges to any practice events. Ergado (2019), exploring the role of ICT for pedagogical practices in higher education in Ethiopia, came up with the findings that, limited infrastructure, users' negative attitudes, shortage in management support, human resource skill shortage, lack of policy support, lack of progressive support and structural misalignment of ICT administration with pedagogic practices. Students' skill shortage in using ICT for learning purposes was also another barrier.

Alemu (2017) studied means of transforming the educational practices of Ethiopia into a knowledge society by taking the image of higher education and identified the lack of relevant preparation, the lack of well-qualified professionals, and the shortage in aligning the use of technology with teaching and learning

techniques to be traceable barriers. Assefa et al., (2021) held a study on ICT integration in Ethiopian high schools and denoted high investment in ICT purchases coupled with short-term training and use. In that, teachers’ reluctance to use information and communication resources, shortage of computers and related gadgets, problems in ICT administration, shortage in maintenance support due to shortage in expertise and motivation, connectivity interruption, inadequate teacher skills both at pre-service and in-service level, less-accessed on-job training for teachers, non-alignment of skill-training to the practices time and situation, and lack of administrative support for teachers due to failure to recognize the benefits ICT has for professional success.

Research held by Gemiya (2020) on *factors affecting the use of ICT services in the Illubabor Zone* identified lack of training for the working staff and insufficiency of ICT-related budget for proper provision of services to be the dominant factors pulling services back. Roman and Harpriya (2022) studied *factors affecting the use of ICT secondary schools of Kolfe-Keraneo of Addis Ababa City Administration* in which they identified inadequate infrastructure, power outages, internet outages, inadequate computer supplies, lack of technical support, lack of ICT skills training, teachers’ lack of skills to teach and work with computers, lack of entry skills for teachers and students and lack of attention on the part of hosting schools to ICT education overall.

Ferede et al., (2022) surveyed determinants of instructors’ educational ICT use in Ethiopian higher education, and came up with four categories of determinants which had attributes in individual (skill competencies and attitudes); institutional (ICT-related vision, plan, professional development, management support, and technical support); infrastructure-related (internet connectivity, ICT equipment, electricity-power, and classroom setup), and course nature and the encompassed subject matter.

Kebede & Getnet (2018) conducted a study on factors affecting teachers’ ICT use for instructional purposes by taking the case of schools in Southern Gondar, Amhara Region, and came up with the findings that, access to ICT resources, school ICT policy, alignment of ICT to school curricula and teachers’ perceptions about the use of ICT in providing lessons to have been the successively daunting factors. Here, both institutional and individual determinants were subsequently manifested as determinants.

Molla & Seyoum (2022) conducted a study on the Status of ICT Integration in Secondary Schools of Dire Dawa and came up with the findings that, a lack of training and technical knowledge, the high cost of technological devices and internet service, and a lack of internet connectivity were major challenges. A shortage of computers in private schools and a lack of enthusiasm in government secondary schools were particular problems as well.

The use of ICT for instructional purposes across the education of the youth for proper and sustainable development needs due care and support. For due care and support, it has become duly important to revisit and reflect on research findings on ICT use in education across Ethiopia. In the above research-based survey, studies held regarding ICT use in education in Ethiopia from north to south regions, and from east to west were concerned. Some studies from the central part of the country were also revisited. Based on the research-based presentation and reflections made on the findings, the succeeding determinants were identified as per the researchers so far held in line with issues concern at large:

Table 1
Categories of Determinants Observed in Current Research on ICT.

No.	Determinants Identified	Determinant categories	Revisited Researches									
			1	2	3	4	5	6	7	8	9	10
1.	Infrastructure	Institutional	x	x	x	-	x	x	x	x	-	x
2.	Training and Preparation	Institutional	x	x	x	x		x	x	x	-	-
3.	Budget	Institutional						x	x	x		
4.	Pedagogic alignment	Professional			x	x	x	x		x	x	
5.	Policy Guide	Institutional			x	x					x	
6.	Internet Connectivity	Institutional	x	x				x	x	x	x	x

7.	Staff Qualification	Professional	x			x	x			
8.	Cost of hard and software	Institutional	x	x						x
9.	Staff collegiality	Individual		x		x	x		x	
10.	Interest in using ICT	Individual	x		x	x	x		x	x
11.	Power supply	Technical		x				x	x	x
12.	Access to ICT resources	Institutional			x	x	x		x	x
13.	ICT Plan	Institutional						x	x	x
14.	Management support	Managerial			x		x			
15.	In-service Induction	Institutional	x							x

4. DISCUSSION

As indicated in Table 1, the categories of determinants of ICT use in the instructional process included institutional, managerial, professional, and individual factors. In line with their distribution in the research works so far assessed, shortage in infrastructure and internet connectivity constituted the largest and greatest part (8, 80%) whereas lack of preparation (7, 70%) and pedagogic non-alignment of ICT provision constituted the third determinant in prevalence (6, 60%).

Shortage in access to ICT resources was indicated to be a striking (the fourth) problem of concern in 5 (50%) of the research cases assessed whereas a shortage in managerial support, failure in electric power supply, and reluctance in managerial support constituted the fifth (4, 40%). Less significant was budget, the rising cost of software and hardware, and ICT Policy (3, 30%) whereas the least significant as the studies denoted were issues of shortage in budget and institutional plan (2, 20%).

Overall, research has indicated the arrangement and supply of ICT infrastructure in due quantity and quality to be the foremost point of consideration in the education of the youth. Perhaps, providing for entry and in-service skills to apply ICT in education plus pedagogic alignment of ICT to the nature of courses and lessons provided remains to be very essential for the success of the vested technology use in education. Most of the researchers studied access to technology, just the second point next to availability, which constituted the fourth issue of concern. Usability issues could have been very much essential as per the nature of courses and the professional competencies of teachers. However, that part was not traced in almost all studies assessed.

5. CONCLUSIONS

About the provision for youth learning through ICT, this research looked into the relationship between youth learning needs and institutional provisions in terms of practices and challenges. Most researchers indicated negative relations to have existed between institutional supplies and learning demands in terms of infrastructure and facilitative services. Entry skills and in-service training were also traced to be indispensable but the findings highly focused on informative, cognitive, and implicational aspects rather than psychological or ethical aspects.

While attention to pedagogical alignment is considered crucial for effective ICT use in the instructional process, the role of educational stakeholders from policy development to practical implementation has not been sufficiently explored. Therefore, further research is needed to conduct a holistic analysis of ICT's role in education, focusing on human development, comprehensive resource utilization, and the ethical implementation of technology.

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