Contributing Factors for the Integration of Information and Communication Technology into Ethiopian Higher Education Institutions Teaching-Learning Practices

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ABSTRACT

This paper is aimed at exploring the contributing factors for the integration of Information and Communication Technology (ICT) into higher education teaching-learning practices. For the study, a qualitative case study was used and the stakeholders from higher learning institutions were selected via purposive sampling. The data collected through interview and focus group discussions were analyzed using the QDA Miner Lite software. Information system theories such as the Technology Acceptance Model (TAM) and Technology, Organisation, and Environment (TOE) framework guided the discussion of the results. . The findings showed that there are limited ICT resources for education in Ethiopian higher learning institutions and the limited resources are not used effectively. The challenges like insufficient ICT infrastructure, lack of skill, resistance to change, wrongly perceiving ICT as an additional burden, lack of cooperative work, and lack of policy for ICT integration into teaching-learning practices are identified as the contributing factors. Based on the discussion using TAM and the TOE framework, the researchers developed a conceptual framework guiding the integration of ICT into the higher education system of Ethiopia. The research suggested that the stakeholders involved in the education sector specifically, higher learning institutions, should follow the framework developed for ICT integration into their education system.

Keywords: *ICT and Education; Ethiopian education system; ICT policy, ICT integration; Teaching-learning*

INTRODUCTION

ICT has increasingly become part of daily life and it is improving the way teaching and learning is perceived by educators and learners. Educators are a key role player in the transformation process of education using ICT. Its implementation enhanced traditional teaching methodology, created student centered education, and has been used as a means for pedagogical innovation, and for development of technological knowledge (Assar, 2015). In Ethiopia, one of the developing countries, the integration of ICT in teaching-learning within higher learning institutions (HLI) is not like the developed world due to various factors. Therefore, identifying the contributing factors for the integration of ICT into teaching-learning in higher HLIs of Ethiopia is one step forward to find the solution to the problems. Alemu (2015) states that ICT is becoming the common practice in all aspects of human life, such as, businesses, education, politics, and social life. Saravanakumar

(2018) indicated that to provide quality education, teaching-learning standards need to be modified and supported with ICT resources.

ICT is becoming a part of our daily lives in routine activities. It is also broadly utilized in educational activities to enhance quality at all levels of the education sector. Particularly, teachers and students are using ICT to make the teaching-learning process attractive and interactive. The recent developments in technology require teachers to have ICT skills in addition to content and subject knowledge. Similarly, the students in the digital era need to have practical skills to be effective in their education (Bhattacharjee & Deb, 2016). The traditional teaching-learning methodology adopted for a long period of time is influencing the teachers and students in the adoption of ICT. However, the transition from teacher-centered education to student-centered teaching-learning requires educators or learners to have ICT skills. It also requires a change in teaching methodologies and their beliefs in various situations where the learning would be achieved (Hernandez, 2017).

ICT is providing a suitable environment for teachers and students in developing countries to enhance teaching-learning in content and pedagogical skills. However, the contribution of the ICT sector to the education sector is struggling with challenges like inadequate ICT resources for teaching-learning, ICT illiteracy of students and teachers, and Internet connection problems (Chirwa, 2018). Similarly, Payal (2018) notes the barriers for ICT use for education such as insufficient computers, slow Internet connection, unsuitable environment for ICT use, lack of pedagogical guidance for educators and students, and lack of expert support for teachers

This paper is focused on the contributing factors for the integration of ICT into higher education teaching learning practices in the context of Ethiopia. According to Cha *et al.* (2020), integrating ICT into the teaching and learning practices of the developing nation would be affected by lack of ICT policy for education, shortage of ICT infrastructure development, the traditional teaching methodology, and teaching materials. In Ethiopia there is an Education Sector Development Plan five (ESDP V (2015/16-2020)) which has set the goal for HLI to train and produce capable students having skill, understanding, and approach in different fields to support the development of the nation (Ministry of Education [MOE], 2015). This goal needs more advanced training, teaching, and learning activities more than the traditional teaching method provides.

As stated by Alemu (2017), ICT in Ethiopia is at an early stage of development, and communities in rural areas lack ICT infrastructure to access the required information. On the other hand, giving priority to the integration of ICT in education is one of the challenges in the developing world for improvement in the education sector. Ethiopia is one of the developing countries in which the education sector is not free from the problems indicated by UNESCO (2016). Therefore, this problem requires the study to determine whether ICT is integrated in the pedagogical practices of Ethiopian HLIs. Dintoe (2018) reported that little time for technology training to integrate ICT into teaching-learning for educators and learners, affected effective ICT implementation in education. This led the students to use ICT for non-educational activities and the teachers to restrict the methods used to PowerPoint presentations to support the traditional teaching-learning methods.

There are ICT implementation plans in higher education systems to modernize the teaching-learning process. ICT increased teaching-learning conception created a new model for communication among educators and learners, information exchange, knowledge sharing, creativity, as well as removing challenges related to traditional teaching methodology practiced in education (Cha *et al.*, 2020).

The education system in developing nations, such as in Ethiopia, is not supported by ICT and student performance is poor when compared to the developed world. The teaching-learning institutions are required to integrate ICT for the better performance of their students, and the

stakeholders are required to work seriously for the improvement of education by giving attention to ICT development (Kingsley 2017). Similarly, Woyo *et al.*, (2020) stated that the policymakers, academic administrators, institutions, and educators are expected to rethink the use of ICT in education. As indicated by the scholars, ICT adoption in education needs an investigation to indicate the contribution of ICT resources to education and its implementation stage in academic institutions in developing countries like Ethiopia, particularly higher learning institutions.

Therefore, the gaps that called the researchers to conduct this study are, the inappropriate use of ICT, skill to access ICT, ICT infrastructure shortage, support from top management, and traditional teaching-learning methods. In addition, there is no empirical research conducted to indicate the gaps and suggested options for better integration of ICT in the context of Ethiopian HLIs. To indicate the contributing factors for the integration of ICT into HLIs of Ethiopia the following questions were raised as research questions to lead the study.

1. What are the ICT resources available and used for educational activities in the HLIs of Ethiopia?
2. What factors are affecting the use of ICT in teaching-learning practices of Ethiopian higher educational institutions?

LITERATURE REVIEW

Integrating ICT into teaching-learning practices; organising and providing training for teachers on the use of ICT in their pedagogical activity are central in most developing countries in Africa and other countries of the world. UNESCO (2017) indicated that Ethiopian teacher training fits with the current government policy for quality education, however, it is noted that ICT development lacks a policy for ICT implementation for the enhancement of educational practices at all levels of the education system. Mwangi & Khatete (2017) stated that teachers are interested in training on the implementation of ICT in teaching-learning. The authors pointed out that teacher training institutions are not providing enough skill and understanding to integrate ICT into teaching/learning practices. They also suggested that integrating ICT into teaching-learning requires theoretical, technological, and pedagogical skills.

According to Amuko, Miheso & Ndeuthi (2015); M. Jatileni & N. Jatileni (2018); and Johnson et al. (2015), the main factors contributing to the level of integration of ICT into teaching-learning are lack of ICT policies for integrating ICT into teaching-learning practices; insufficient ICT infrastructure in most developing African countries; shortage of technological resources and access; ineffective training for students and teachers; time limitation; continuing focus on the traditional teaching-learning method, lack of ICT content in the curriculum; and lack of support from the top managers in the education system. Ghavifekr and Rosdy (2015) indicated that knowing the operation of ICT tools is the first step for effective use of ICT for teaching-learning, and to implement ICT stage by stage the top managers of the education system should provide support. A study by Raihan (2016) indicated that the positive attitude of the top managers towards ICT use in education increases the integration of ICT and equally, a negative attitude can decrease ICT integration into education. Thus, focusing on ICT tools alone is unsuccessful; and in parallel training and awareness creation is required to integrate ICT in teaching and learning practices. Studies conducted (Elemam, 2016; Özdemir, 2017; Alemu, 2017; Kaur, 2015 & Asabere et al., 2017) have indicated that ICT implementation in African universities is poor, lacks technical support, funding allocated for ICT development for teaching and learning is low, and the skills required to integrate ICT into education is limited.

The information system theories such as TAM by Davis (1989), DOI by Rogers (2003), and TOE by Tornatzky and Fleischer (1990) are used in various research to indicate the user's behavior towards ICT in education; the individual manager characteristics affecting ICT adoption; and the

technological, organizational, and environmental factors contributing for ICT use. In this paper we have used TAM and the TOE framework to guide the discussion on the findings of the study, since the elements in DOI are like the elements of the TOE framework. Therefore, the researchers were confident in using TAM and TOE for the integration of ICT into HLIs of Ethiopia that would show the contributing factors in the context of the Ethiopian higher education system.

RESEARCH METHODOLOGY

The research method employed for this study is a qualitative case study. It provides the researchers with a tool to study a given phenomenon in context. When the case study research method is employed correctly, it supports theory development, program evaluation, and facilitates the development of intervention guidelines (Baxter & Jack, 2008). In a case study research method, a variety of data required for the study are collected in the given time (Creswell, 2003). It is powerful to employ various data-gathering instruments to triangulate and to compare multiple cases from various sources (Kinaanath, 2013). This guided selection of the case study research method to investigate the contributing factors for the integration of ICT into HLIs in the case of two HLIs in Ethiopia. Case study one was conducted in Wolaita Sodo University and case study two at Jimma University. In parallel, data were collected from the Ministry of Science and Higher Education (MOSHE) and the Higher Education Relevance and Quality Assurance Agency (HERQA).

At both universities, top management (two academic vice presidents, and two quality assurance directors), two ICT facilitators, six college deans, and ten department heads were considered for the interviews, and four focus group discussions (FGD) were arranged for students. Additionally, two ICT sector coordinators for education from MOSHE and two ICT department coordinators at HERQA were selected for participation in the interviews. All participants were selected using purposive sampling. A total of twenty-six (26) participants were included from the universities, MOSHE and HERQA for the interview question and four student focus group discussions which included seven to ten (7-10) students each were selected to gain the required data for the study.

The data collected were organised in themes and interpreted to develop a conceptual framework by using QDA Miner Lite free version software for qualitative data analysis. The QDA Miner Lite software supported the researcher to easily organise and link the codes of the research themes with the research questions. The data collected from both case studies were analysed and interpreted in line with the research questions. Finally, the findings from both cases and government bodies were used for the conceptual framework development based on the information system theories (Technology Acceptance Model (TAM) and Technology Organisation Environment (TOE) framework).

RESULTS AND DISCUSSION

In this section, the data are presented and discussed based on the themes arising from the research questions and the rationale for the study. For the discussion, the existence of ICT resources, the way ICT resources were used, and the barriers are explained by using TAM and the TOE framework.

According to Davis (1989), TAM is related to the behavioral intention of users to use technology. Their intention may be to use the technology or not to use the technology to perform their activity. Davis stated that individuals have positive or negative behavior towards the technology-perceived usefulness (PU) and perceived ease of use (PEU). According to the author, PU is the user's belief that use of the technology will enhance the performance of their job and PEU is the user's belief regarding the simplicity of given technologies for use without effort. By employing TAM, the user's acceptance of ICT in their teaching-learning practice is explained under teachers' perception towards ICT use, students' confidence to use ICT, and the complexity of ICT tools for teachers and

students. The TOE framework by Tornatzky and Fleischer (1990) indicates the technological context, organisational, and environmental contexts for the use of technology in the given organisation. Through TOE the technological, organisational, and environmental factors are discussed as contributing factors for ICT integration in HLIs.

In the analysis of data, the core contributing factors for the integration of ICT into HLIs are described under technological, organisational, and environmental categories based on the TOE framework and the behavioral factors are explained based on the TAM.

Analysis based on TOE framework

The use of ICT in the HLIs' teaching-learning practice is not only affected by the perception of the users, but it is also related to the technological, organisational, and environmental factors that are contributing to the integration of ICT into education. Therefore, the technological factors like the existence of ICT resources and the status of ICT tools; the organisational factors such as top management support, financing ICT resources, ICT expertise support, ICT training, and cooperative works; and the environmental factors like ICT policy, change management, and technological improvements are discussed based on the TOE framework as shown in Figure 2 below.
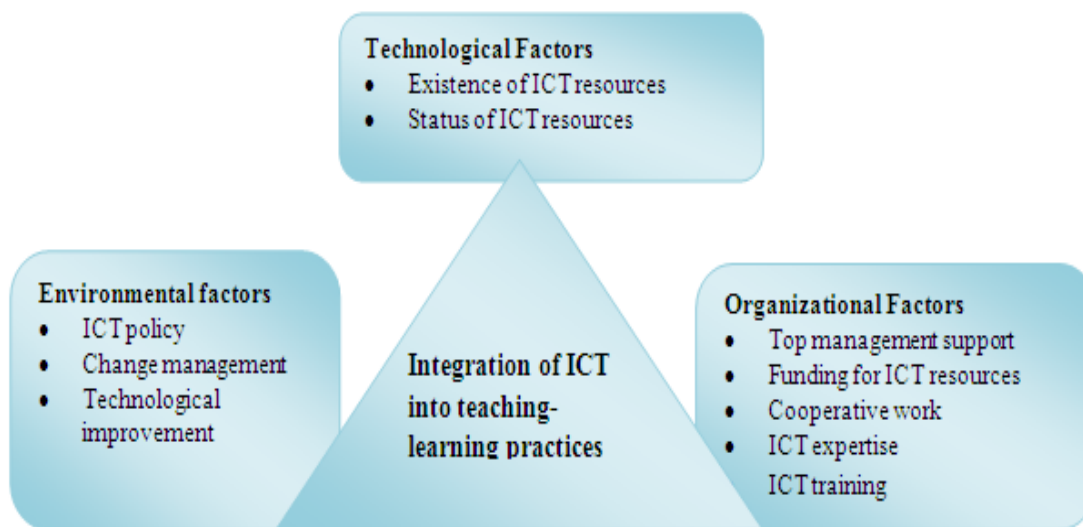

Figure 1: Technological, organisational, and environmental factors

Technological Factors

The existence of ICT resources: there are various ICT resources for education like computers, printers, overhead projectors, scanners, display screens, the Internet, and other online resources. However, in this study, the focus is on computers and Internet resources for teaching-learning practices. To investigate the existing ICT resources in universities we asked the question "**what kind of ICT resources are there for teaching-learning?** For this question, there were various responses and all of them are focused on the availability of computer and Internet resources for teaching-learning.

> *"The main ICT resources available for teaching-learning activities in HLIs of Ethiopia are computers and Internet to access academic resources. However, there are other ICT*

related resources available like projectors, printers, photocopy machines, and display screens." **[Interview with college dean 2, 5, and 4]**

Hennessy et.al, (2010) notes that the most important factor for ongoing improvement of educators' ICT-related practical skills is having consistent access to working and appropriate ICT tools. However, the focus group discussion shows that resources may be lacking. The student focus group discussions highlighted the following:

"*only five network ports are working to access the Internet for teaching-learning purposes in computer laboratories which have thirty-eight computers for seventy and more students using the computer laboratory.*" **[Students focus group discussion 2].**

Therefore, it is possible to conclude that the ICT resources (that is, Computer and Internet) are available in limited amount to support teaching-learning activities of HLIs

The status of ICT resources: the participants pointed out that there is a good Internet connection for University staff, but it was not accessed as much as its capacity for education. During the interviews with Department Heads, it was noted that in some offices, it was noted that one network port is shared by more than two instructors, and some have no Internet connection in their offices [**Interview with Department Head 4**]. Further, we noted:

"*Most of the computer laboratories have an Internet connection but are limited in number. In some computer laboratories as the researcher observed, a few computers are connected to the Internet. e.g., in the computer laboratory with 40 computers only eight Internet ports are working.*"**[Focus group discussion 2]**

"*The universities had Internet connection, but it was not past as previous time due to the increasing number of staff and building campuses in different locations. To increase the Internet capacity the university is working with Ethiopian telecommunication currently. Shortly, we will have a better connection for the university staff and students.*"**[Interview with government body 3]**

Organisational factors

Top management support: the top management of the university was noted to be welcoming the questions from various departments for the improvement of ICT for teaching-learning practices. However, there is a skill gap and motivation problem to implement the ICT tools as required in all departments and colleges as stated by the participants.

"*The university management has awareness about ICT use in the teaching-learning process but lacks a bold action due to lack of teamwork at top-level management and ICT professionals in the university.*" **[Interview with quality assurance 1]**

It was also noted that the department heads and deans are always raising the issue of ICT establishment for teaching-learning activities for higher officials, but the department heads were of the view that the focus is on the construction of buildings and something like that [**Interview with Department Head 2**]. Tagalou et al., (2013) indicated that support from University administration and the community is important for the teachers and students to use ICT in education effectively.

Financing ICT infrastructure establishment: for ICT integration into the teaching-learning process of higher learning institutions, financial support is required, such as allocating a budget for other activities. In using ICT for education, the top management is motivated but equal attention was not given when allocating a budget for the establishment of ICT. In the interview with the ICT facilitators, it was noted that:

> "…*the top management of the university is positive for ICT implementation in the university, however, in taking action they are reluctant and not providing the required fund to establish ICT infrastructure for education."**[Interview with ICT facilitator 2]***

The participants indicated that for construction and other activities in the university, higher budgets are allocated but the budget for ICT infrastructure is insufficient. As noted in the interviews with the Department Heads, purchasing ICT resources in HLIs takes a longer time (five-six months) [**Interview with Department Head 7]**. This indicates that one semester will have passed without using ICT for teaching-learning purposes. One of the College Deans noted the following:

> "*The top management is not giving the required amount of budget to install ICT for academic purposes. The other challenge is the purchasing system of the university which is taking more than five or six months."* **[Interview with college dean 2]**

Cooperative work: Aslan and Zhu (2016) stated that for better integration of ICT into teaching-learning practices of universities various bodies are involved in education including the ministry of education. Otherwise, the integration of ICT cannot be effective for teaching-learning practices.

The participants indicated that cooperative work is very crucial for the successful use of ICT in teaching-learning. However, there is a lack of cooperative work among ICT facilitators and academic administrators. For example,

> "*ICT departments are not working in collaboration with the informatics departments. If they work in collaboration some problems may be easily handled by staff and human resource limitations will be solved.*" **[Interview with quality assurance 2]**

> "*Lack of cooperative work from top management, ICT facilitators, and the departments are affecting the use of ICT in pedagogical practices for better learning."* **[Interview with dean 2]**

ICT facilitators/expertise: in the integration of ICT in education, the role of the ICT facilitator or expertise is high for better functionality of the ICT resources. They are responsible and critical from the selection of ICT resources to its installation, training the users, and maintenance. In handling problems related to ICT, the ICT technical person is playing the main role (Prestridge, Tondeur & Ottenbreit-Leftwich, 2019).

As the participants stated, there is evidence of skill gaps and reluctance in supporting ICT integration into the teaching-learning practice of the higher learning institutions [**Interview with Department Head 6]**. One of the top managements stated that:

> "*The ICT facilitators have no plan to integrate ICT into pedagogical practice; even you cannot get the required information on the given time. If Internet access is there, they believe there is no problem. To my perception, they are handling other issues than the academic one. I hope it is better to have a separate ICT wing for academic purposes under the academic vice president of the university."* **[Interview with quality assurance 1]**

The participants also indicated that, to get maintenance service the procedure is long, and it may take a week or more. Meanwhile, the academic activities are affected, and the teachers and students may lose interest in using ICT in their academic activities.

> "*If maintenance is required on ICT resources, the college level ICT coordinator reports the problem to the ICT facilitators at the administrative wing of the university. To solve the problem, it may take weeks or months."* **[Interview with college dean 3]**

> *"They lack the commitment and skill of pedagogy to integrate ICT into the teaching-learning process."* **[Interview with quality assurance 2]**

ICT training: Tondeur et al. (2016) stated that continuous professional development is important to effectively integrate technology into teaching-learning activities. Further, the authors indicated that having ICT resources alone is not important without access and its use in education.

In Ethiopian HLIs, the culture of traditional teaching methods is common and has been practiced for a long period as noted by the participant below.

> *"Most of the teachers are stuck to the traditional teaching method which is not inviting the students and teachers themselves to use ICT. Currently, the traditional teaching method is not changed to modern or technology-supported teaching because teachers perceive using technology in their teaching-learning is another burden."* **[Interview with University top management 1]**

The students joining HLIs have no practice of using ICT for their education due to a lack of ICT resources and training. When they join the university, they may fear technologies since it is a new environment with new methods of teaching. As stated by one of the participants, the students joining the universities are not ready to use ICT for their education because they fear ICT and cannot use it effectively for education due to their background [**Interview with Department Head 1**].

In the education system, the culture of teachers in handling teaching-learning in the classroom, and their lack of familiarity with technological resources in the education environment limit the students from using ICT in their education. To change the students' culture of learning, they are expected to be exposed to ICT supported educational environments through attachments, internships, student visits, and expertise experience sharing. After exposing the students to the technological environment their mentality towards ICT use in education will be changed and they can easily integrate ICT into their learning. The following from one of the student participants illustrates the view.

> *"Taking the students to the field and letting them to perform the work to acquire the required skill will be better with the support of ICT."* **[Focus group discussion 4]**

Educators require broad and continuous exposure to ICTs to be capable to assess and choose the best fitting resources. However, an earlier study shows that the progress of then current teaching-learning practices was more important than the technical skill of ICTs (Tagalou et al., 2013).

Environmental factors

ICT implementation policy: the participants argued that ICT is a crucial element for the success of education at all levels and it should be supported by policies which are guiding its establishment, or its use by educators and learners. Most of the African countries plan to use ICT in their education and fail due to a lack of established ICT policy supporting the integration of ICT into teaching and learning. The same situation is true in Ethiopia as illustrated by one of the interviewees.

> *"There is no established ICT policy which supports and guides the integration of ICT into education. As to my knowledge at the Ministry and institutional level, there is no standardised policy for the establishment of ICT for education improvement but there is a kind of statement on national ICT policy for education sector improvement."***[Interview with Quality assurance 2]**

The participants pointed out that different African Universities are trying to implement but it has not been effective when compared to developed countries in the world. Their failure is based on their policies as noted by one of the participants below.

> *"If you search for ICT policy for education you can find the policies implemented by developed countries. Even if the policies are developed in developing countries for education it is done by scholars from developed countries by sponsorship or other methods"* [**Interview with Department Head 3]**.

Change management: ICT is changing constantly from time to time. Similarly, in the education sector, various technologies have changed. To acquire these new technologies there must be change management in the education sector to improve the quality of education. Therefore, Ethiopian HLIs are expected to have change management practices to adopt new technologies into the education system.

The department heads that participated, stated that previously the skill of the teachers, teaching methodology, subject skill, content, and communication was enough to engage students in their learning. Currently, to engage students in the learning process technology is required. Through technology, students can learn by themselves and access detailed information in the subject area, which leads them to have a deep understanding of the subject matter at hand and be creative [**Interview with Department Head 3,6,8 and 9**]. Therefore, to cope up with the changing nature of ICT in HLIs, the universities are expected to manage the changes to use ICT effectively and efficiently by educators and learners.

> *"Improved technologies for education need to be acquired in the higher learning institutions and required training should be provided for the users. Otherwise, the technology cannot be used for educational activities."* [**Interview with ICT facilitator 3]**

Technological improvements: using ICT in education contributes to the development of the nation in general and specifically supports the education sector. By using ICT, educators can communicate their study findings to the scientific community and communicate with their students easily. Therefore, these benefits from ICT initiate the university community to use ICT for better teaching-learning performance in this developed world. As noted by one of the Deans:

> *"The advantages of ICT use are time-saving, resource-saving, making life easy, and environmental friendliness. It makes teaching-learning very simple and create motivation among the teachers and students to use ICT in their educational activities."* [**Interview with dean 4]**

The respondents pointed out that currently the world is linked through technology and competition is high in the world due to globalisation. In this globalised world, the students graduating from any country compete with each other based on their potential to be in a suitable position. To generate competent graduates using ICT in education is not an option.

> *"Globalisation is one of the reasons to use ICT in higher learning institutions teaching-learning to make the graduates competent with students from developed or developing world."* [**Interview with Government body 3]**

In the developed world there is good ICT infrastructure and policy for its implementation but in developing countries, there is limited ICT infrastructure that is not supported by policies and strategies. So, universities in developing countries have limited potential to compete with world-class universities where there is a better ICT infrastructure for teaching and learning activities.

Analysis Based on the Technology Acceptance Model

Teachers Perception towards ICT in teaching-learning

In the integration of ICT in education, the teaching-learning method is considered as a crucial element for educators and learners to use ICT resources for better subject understanding. Similarly, the pedagogical practice used by an educator may encourage or discourage the learners to use ICT in their education. As stated by Naqvi (2018), the use of ICT in everyday educational activities seems to be more significant than specific training in computer classes. While the growth of technical skill is perceived to have a value in the educational process, it is more crucial as a supporter of other teaching-learning practices. Educational institutions that report the competence of student ICT-related knowledge are mostly not those with high computer course requirements. However, the ones that were effective users of ICTs, used ICT on a repetitive basis throughout the educator's professional growth.

The respondents stated that the use of ICT is lower than the objective it was established for in the university since the educators are applying traditional teaching methods: board, chalk, and talk method [**Interview with Department Head 10**]. However, the teachers are expected to guide their students to refer to advanced materials in the university library system, online eBooks, or tutorials instead of focusing on short notes from the lecture and handouts **[Interview with Department Head 5]**. Similarly, Aslan and Zhu (2016) indicated that the training provided for educators is not effective to integrate ICT in the teaching-learning practice of universities.

Students and teacher's confidence to integrate ICT in education

In using ICT resources for teaching-learning, the educators and learners expected to be competent. As stated by the respondents, the teachers and students need to have a practical skill to access ICT resources for the integration of ICT in higher learning institutions teaching-learning practices. The competency of learners and educators make the integration of ICT into education easy. An ICT facilitator noted the following:

> *"Some staff are not ready to use ICT for education because they are not competent and focusing on the traditional chalk-board-talk method. Still some teachers who have long years of experience do not believe ICT is supportive. They are also not interested to develop required competency for effective integration of ICT into their educational activities. They also believe that the traditional teaching method is enough for teaching-learning."* [**Interview with ICT facilitator 3**]

The complexity of ICT resources to integrate into teaching-learning

Using ICT in teaching-learning practice requires knowledge about computer and Internet access. The teachers and students who lack the basic skills to use ICT perceive using ICT in education as a complex task. However, the ICT resources become complex for the students and teachers due to lack of training at universities and before joining the universities. The participants noted the following points to reduce the complexity of ICT in teaching-learning practices:

> *"Creating awareness among students, teachers, ICT expertise, and top management on the role of ICT for education improvement in higher learning institutions."* **[Interview with dean 2]**

> *"Creating a cooperative learning environment and awareness of lifelong learning for instructors because technology is dynamic, and knowledge is changing rapidly."* [Student **Focus group discussion 3]**

> *"Showing students and teachers the various sources of information, which make them competent enough for the changes taking place in the area of ICT for teaching-learning."* **[Interview with government body 1]**

> *"Engaging students in collaborative learning, self-assessment, and peer evaluation by using ICT as a tool for better knowledge acquiring."* **[Interview with quality assurance director 2]**

> *"Making ICT as part of pedagogy, context, content, and subject for better learning-teaching practice for detailed understanding."* **[Interview with university top management 2]**

In general, the teacher's and students' perception of ICT use in teaching and learning is a big challenge for the integration of ICT in HLIs teaching-learning practices. Their negative perception is related to a lack of confidence and the technological complexity which is related to a lack of training for teachers and students. Therefore, their perception on ICT use in education affects the integration of ICT into HLIs teaching-learning practices.

Figure 2 below shows how the factors relate to each other and affect the integration of ICT into education by following the TAM theory.
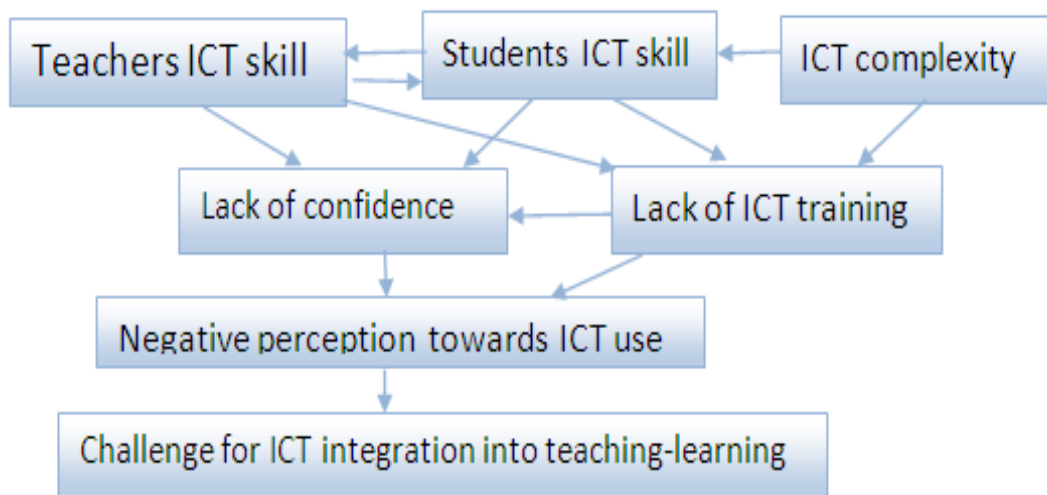

Figure 2: Factors for ICT integration into Teaching-learning

As shown in Figure 2, the ICT skill of the teachers, students, and the complexity of ICT tools lead to a lack of confidence to integrate ICT in their education. Due to the lack of ICT skills and complexity, they perceive using ICT as a complex and challenging process. Therefore, they develop a negative perception towards ICT use in education and the integration of ICT becomes a challenge.

DISCUSSION OF FINDINGS

The interview data and FGD results were explained by using the TAM and TOE frameworks separately. Based on the findings of the study the following model shown in Figure 4 was developed to indicate the contributing factors for the integration of ICT in HLIs teaching-learning practices. In Figure 3 the findings based on TAM and TOE frameworks are combined (the texts circled are TAM related factors and the texts in the rectangles are from the TOE framework).
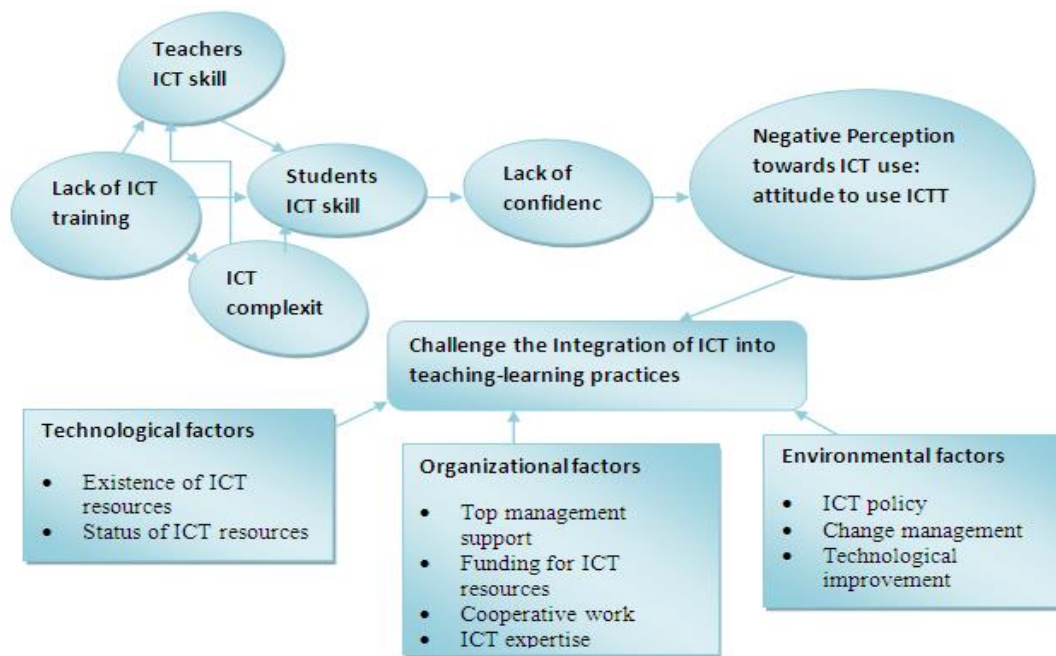
Figure 3: A Theoretical Framework to Indicate Contributing Factors for ICT Integration into the HLIs

The contributing factors found in this study are negative perceptions towards ICT use due to lack of training and complexity of the technology; technological, organisational, and environmental factors as indicated in figures 2 and 3.

Negative perception towards ICT use is a big contributing factor for the integration of ICT into teaching-learning practice in Ethiopian HLIs. This negative perception leads to the resistance of ICT use in teaching-learning. Basak and Govender (2015) indicated that lack of confidence; ineffective training and lack of competence are the main factors leading to the negative perception towards ICT integration into teaching-learning practices. Additionally, in the Ethiopian context limited ICT infrastructure and attitude of the users led to negative perception towards ICT use for teaching-learning practices.

The researchers also found that the teachers and students have skill deficiencies to use ICT in their education, and ICT becomes complex for the users. Therefore, lack of training and ICT complexity leads to lack of confidence to integrate ICT into the teaching-learning practice of HLIs in Ethiopia, which is indicated by TAM characteristics such as PU, user acceptance, and PEU (Davis, 1989).

Nugroho (2017) in the model for information technology adoption for higher education, stated that lack of effective training, shortage of ICT infrastructure, ICT resources inaccessibility, organisational culture, lack of ICT policy, the dynamicity of technology, globalisation, computation, and complexity of the technology are the factors affecting the integration of ICT into education. Through the TOE framework of Tornatzky and Fleischer (1990) in this study, the technological, organisational, and environmental factors affecting the integration of ICT into education were investigated. Furthermore, education in the 21st century requires ICT to be effectively used in teaching-learning and providing quality education, otherwise, teaching-learning cannot be effective and fruitful (Henriksen, Mishra, & Fisser, 2016). In a general sense, the contributing factors for ICT integration into HLIs teaching-learning practices in context of Ethiopia are:

- The negative perception from educators and learners towards ICT integration for education in HLIs are related to limited ICT infrastructure and users' attitude.
- Lack of sufficient ICT resources and ICT resources accessibility problem
- Lack of top management support for ICT implementation in the higher education system
- Limited financial support for ICT resources establishment in educational institutions
- Lack of cooperative work between top management, ICT expertise, university administrations, educators, and students
- Lack of ICT expertise support for ICT installation, training the users, and maintenance of ICT resources
- Lack of ICT policy for education at the Ethiopian government and institutional level for effective ICT integration in HLIs of Ethiopia.
- Change management problem on improvements taking place on ICT resources for education.

Dube et al. (2018) stated that poor training, the negative perception, and lack of access to ICT resources are the factors affecting ICT integration into education. Besides, Mutuku and Ogutu (2018) and Ergado (2019) found that lack of ICT infrastructure, teachers' ICT competency, ICT expertise support, and low funds for ICT establishment are the factors limiting effective ICT use for educational activities.

ICT is a critical instrument to improve education in this digital world, but various challenges are limiting its implementation for teaching-learning in educational institutions (Lawrence & Tar 2018). Therefore, the works by Dube et al. (2018); Mutuku and Ogutu (2018); and Lawrence & Tar (2018) support the findings of this study. However, the context of this study is different from the above-mentioned studies by considering HLIs teaching-learning practices in the context of Ethiopian education system and the ICT resources setup in the country.

CONCLUSION

The modern education system requires ICT to provide a suitable teaching-learning environment for all educational levels. This study aimed to indicate the contributing factors for the integration of ICT into the teaching-learning practices of HLIs in Ethiopia. The required data were collected from the stakeholders in HLIs, and government bodies using semi-structured interviews and focus group discussions. The data were analysed by using QDA Miner Lite and discussed based on information system theories (TAM and TOE framework). The main factors that were noted as contributing to the integration of ICT into teaching-learning practices are negative perception towards ICT use for education, lack of support from top management, limited funding for ICT infrastructure establishment, lack of cooperative work, lack of ICT expertise support, ineffective ICT training for students and teachers, lack of an ICT policy for education, lack of change management, and dynamicity of ICT resources. Finally, a conceptual framework, shown in Figure 3, was developed to indicate the contributing factors for the integration of ICT into teaching-learning practices by considering TAM and TOE framework. The researchers suggest that the government and HLIs should work in collaboration by considering the factors that affect ICT integration into education and ICT policy for education should be developed at the national or institutional level.

Limitation of the study: this study is focused on indicating the contributing factors for the implementation of ICT for educational activities of higher learning institutions in Ethiopia. The study considered only two HLIs as the main source of data for the case studies and included government bodies to gather additional data. The study employed two information system theories such as TOE and TAM for the description of the findings of the study.

RECOMMENDATIONS

Based on the findings of the study the researchers highlight the following recommendations to be considered by Ethiopian higher learning institutions and government bodies working in educational sectors:

● To provide quality education in the HLIs of Ethiopia, suitable ICT infrastructure should be established.
● In most of the developing countries including Ethiopia, there is a shortage of ICT policy for education. Therefore, for effective integration of ICT into teaching-learning activities in the HLIs of Ethiopia, an ICT in education policy should be established.
● The students and educators are resisting use of ICT for their educational activities due to lack of awareness. As a result, HLIs and other stakeholders involved in the education sector are expected to design awareness creation programs for the learners, educators, and general community.
● The support from top management is critical for ICT integration into education. As a result, they should provide managerial, financial, and human resource support for ICT use in educational practices.
● The stakeholders in HLIs should consider using the developed framework (as shown in Figure 3) for the integration of ICT into their teaching-learning activities.

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