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Mr. Musa DimaGenemo and Dr.TelkapalliMurali Krishna

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The Impact of ICT on Higher Education Institutions in Ethiopia

Mr. Musa DimaGenemo*
Lecturer, Department of SEAsst. Professor in IT,
Arsi University, Asella Department of CS&IT, Ethiopia.

Dr.TelkapalliMurali Krishna**
WolaitaSodoUniversity, Ethiopia

Corresponding email:
musa.ju2002@gmail.commurali2007tel@gmail.com

ABSTRACT

Purpose: The purpose of this study is to investigate the impact of ICT on Higher Education Institution (HEI). More specifically, the study focuses on the following specific objectives: to clearly identify how ICT affects the outcome of HEI education quality; to judge the effectiveness of ICT in HEI; and to explore the presence significant differences among HEIin various attempt ICT utilizations and effective usage in universities. In order to achieve these objectives, an attempt has been made to respond the following basic research questions: How ICT improves education quality in HEI? What are the major problems and their possible causes of ICT utilization in HEI? And how often instructors and students use ICT for academic purpose?

Methodology: Descriptive research method was employed in this study. Research Methods are used for describing the real ICT impact in HEI and the difference seen among the universities regarding ICT utilization. To collect data from the respondents both close-ended and open ended questionnaires have been included. Concerning the samples; among selected number of the study population, the respondents were selected as a sample through cluster sampling technique.

Results: The findings of this research indicate that ICT has Positive impact on higher education.

Recommendations: Ministry of Science and Technology (MOST) and MOE should ensure that ICT infrastructure has been fulfilled in Universities especially in two science and technology universities. So government should ensure adequate computers and the Internet connectivity across the country especially in newly established (2^{nd} and 3^{rd} generation universities) and the two Science and Technology universities.

Keywords: *Impact of ICT, ICT services, Higher Education, Organizational Change.*

1.0 INTRODUCTION

The primary goal of higher education Institution (HEI) is providing quality education for citizen, community engagement and research work. HEI is a place where ICT plays significant role. Consequently Information communication technology (ICT) has positive impact in higher education directly or indirectly. For instance, the direct impact of ICT in HEI is on quality of education. Now a days, ICT is becoming medium of instruction in HEI. In developed countries HEIs are using multimedia, video lecture, E-Learning and tele-medicine and many other ICT tools as medium of instruction in class room. ICT solves the communication gap among all university community and applying ICT in classroom leads both students and instructors towards innovation, research, peer to peer learning and self-learning. Some higher education institutes such as University of Gondar and University of South Africa (UNISA) located at Addis Ababa are using video conference especially in teaching health science students where only few students are permitted to go for operating room(OR), and Arbaminch University is using E-learning to reach society anywhere any time. In this regard ICT has much potential to accelerate, motivate and engage students learning in higher education. In general to the total development of the institution; strengthens teaching and learning and provides opportunities for connection between the school and the world (Davis & Tearle, 1999). ICT can help the higher education to improve teaching mechanism from teacher centered to student centered by using variety of ICT tools in class such as smart class, fast internet connection, multimedia, relevant video demonstrations and demos for lab practice. It creates opportunity for students to learn by their own and inquiry based learning to learn and share information from other students in the globe. Moreover, it also plays role in developing instructors' capacity, professional improvement of teaching and the aggregate effectiveness using ICT in the class. Besides this it also helps instructors to deliver the courses by demonstration in class rather than narration and incorporating current information and application by using multimedia and videos so that students can get idea of the course easily. ICTs are most likely to be cost effective when used to reach very large number of students; when used for research; and when used by administrators irrespective of time and place [1].

Even though HEI has ICT infrastructure, there is huge variability in adoption and utilization in tricks and goals for which ICT is being used. The utilization and adoption deference is better understood if HEI is seen prospective of their mission and visions [2]. Thus ICT is used as a tool for addressing challenges in teaching and learning situation, a change agent, community engagement and workforce to deliver quality and fast services for customers. The usage of ICT is based on the accessibility [3]. Availability ICT tools in lab and on plane may not be more meaningful [4]. Only when the right tools in terms of capacity and functional ICT impacts can clearly viewed [5].Here them isuse of ICT impacts quality of education for both students and Instructors. They need to use ICT for academic propose [6]. This study highlights the implementation of ICT policy in higher education and further explores the impact of ICT in teaching learning process in higher education institution.

For institutions that are in the early stages of the ICT adoption, there are no appropriate models or frameworks that are being used to assess their state of readiness to use ICTs in education and to develop appropriate institutional ICT strategies aligned to the institutional strategies [7].Additionally, ICT usage by students in higher education institutions develops the future

workforce to effectively participate in the increasingly networked world and the emerging knowledge economy [4, 5]. The pervasiveness of ICT has brought about

rapid teleological, social, political and economic transformation, which has eventuated in a network society organized around ICT [1].

1.1 USING ICT IN TEACHING / LEARNING

Know a day's HEIs are expected to use ICT in teaching. This is because the strength of ICT is their power to manipulate words and symbols in class room - which is at the heart of the academic Endeavour. Universities using ICT in eLearning or online learning in courses taught on campus. In case of Bahirdar University, it has good practice on E-Learning. Through E-Learning using ICT solves communication gap between instructor and teachers so that student can learn from their mobile at any time even at vacation time. ICT must be fully applied in all directorate of HEI through BSC to bring transparency to the business and to evaluate office outcomes from all parameters of BSC perspective.

Behind this increasing faith in the role of technology in higher education institutions, however, it lies implied acceptance of technology by various commentators, either as neutral or autonomous, neutral and human controlled, autonomous and value laden, or human controlled and value laden [7]. ICTs are a potentially powerful tool for extending educational opportunities, formal and non-formal, to previously underserved constituencies scattered and rural populations, groups traditionally excluded from education due to cultural or social reasons such as ethnic minorities, girls and women, persons with disabilities, and the elderly, as well as all others who for reasons of cost or because of time constraints are unable to enroll on campus [8]. ICTs make possible online courses accessed 24 hours a day, 7 days a week. Instructors and students no longer have to rely exclusively on printed books and other materials in physical media housed in libraries (and available in limited quantities) for their educational needs. Effectiveness, cost, equity, and sustainability are four broad intertwined issues which must be addressed when considering the overall impact of the use of ICTs in education [9].

1.2 STATEMENT OF THE PROBLEM

It is obviously known that the ministry of education (MOE) efforts to improve quality educationin all HEI in Ethiopia; there is a fundamental problem which impact quality educations development. The problem is lack of sufficient ICTs infrastructure and effective usage of ICT for instructions in HEI; this has reduced access to ICT in teaching. One of the issues of HEIs is lack of giving more focus for ICT based instruction.ICT based education encourages to use multimedia, software, interactive courseware, and demo in class. In class room teachers need to display video, multimedia and demo on relevant topics to encourage student to capture knowledge very easily. Lack of ICT tools and infrastructure in classroom used for lecturing is the core issues that affecting quality of education in HEI. Not only these, some instructors still using old books as reference which has no relevance with current curricula. Even they may not put internet as course material in course outline to encourage students to use ICT in their course work. In addition they also not use ICT for course material preparation and in the class room teaching. The issue is there is no pre training on ICT based education and ICT tools used for teaching for graduate Assistants like pedagogy.

From researchers observation some universities like Jimma University (JU) and Mekele University (MU) are partially taking ICT as a project to incorporate ICT in teaching. One of these is automating library system, smart class, and some business automation which has relevance with

student services. In this case a few universities(Mekele University, Jimma University, and Bahirdar University) has automated student information system (SIS), cafeteria management system, class scheduling system, library management system, patient information management system, file sharing system that helps the students to download lecture notes, the books, and any relevant videos uploaded by course instructor. A few universities also offer training for teaching and administrative staff in order to use ICT for both teaching and administrative purposes. JU is leading University in this regard. The applications of ICT are particularly very powerful in HEI research purpose [1].The other problem of HEI is the institutions are not networked together to cooperate together on research, community engagement, and course works. This may affect third generation universities not to grow fast. ICT links researchers together to communicate and solve problems all over the world rather than being limited in their institution only. So that ICT helps HEI to transfer knowledge and solve problems of technology transfer gap among Universities. To take the advantage of this trend, creating national policies for ICTs in higher education and the establishment of joint information systems linking in all HEI is very important. The objective of this study is to investigate impact of ICT on quality of education in HEI. In addition, the study helps the higher education to know their status of ICT utilization in relevance of other institution, help them to learn from each other and technology transfer. More over the study expected to contribute and open the door professionally for other researchers through these study findings.

1.3 RESEARCH QUESTIONS

i. How does ICT influence HEI and professional development in higher education in Ethiopia in terms of community engagement, Improving quality education and research?
ii. How ICT improves education quality in HEI? iii. What are the major problems and their possible causes of ICT utilization in HEI?
iv. How often both instructors and students use ICT for academic purpose?

2. 0 LITERATURE REVIEW

Obviously ICT is becoming popular in self-learning. It helps both Instructors and students to manage their courses. Students and Instructors can learn from online available material by using ICT. One of the great benefits of ICTs in teaching is that they can improve the quality and the quantity of educational provision [2]. For this to happen, however, they must be used appropriately. While using ICTs in teaching has some obvious benefits, ICTs also bring challenges [3]. First is the high cost of acquiring, installing, operating, maintaining and replacing ICTs [4]. While potentially of great importance, the integration of ICTs into teaching is still in its infancy [5].

The other challenge faced is that in many universities the basic requirement like office, internet, computer, class room and laboratories for ICT is not available. Also some instructors have no interest to use ICT efficiently and make use of the different ICT tools in classroom because of skill gap. Skill development is another important area in which ICT could be used effectively. ICT can play a major role in integrating skill development as a component of poverty alleviation strategy.

3.0 RESEARCH METHODOLOGY

3.1 Data source description

In this study, the researchers have used a questionnaire, interview, and focus group discussion and observations as primary data collection techniques. The questionnaires are used to collect primary data from Instructors and administration staff. This is found to be most appropriate and effective tool to collect the data from the sample respondents, because most of the instructors and student have sufficient level of education about ICT to respond the questionnaire. A separate questionnaire for instructors and students is prepared. The questionnaire contains both close-ended and open ended questions. The close-ended questions are included to collect precise information about the study variables; and the open-ended questions are included to allow the respondents to clarify their responses and to let them forward their opinions and suggestions generously.

The questions in the questionnaire were organized into four sections, based up-on objectives of the study and basic research questions. The first section was encompassing about the demographic characteristics of the respondents. In the second section, issues related to the current practices of ICT in higher education have been raised. In the third part, items related to problems of ICT in higher education and their possible causes have been included. The last part, section four, contains questions related to the opinion and suggestions of the respondents about utilization of ICT in higher education and their suggestion regarding using ICT in class room. The collection of data from the sample respondents' through the questionnaire takes place by the researcher. The interview was administered with ICT directors and experts of selected universities. In this regards, leading interview questions were prepared and administered by the researcher on face-to-face base with each interviewee. In doing so, the results of the interview helped the researchers to probe the respondents to get more in-depth information, and to gain insights into the topic under study.

More over focus group discussion was held with ICT Experts, instructors, and administrative staff of the universities for a minimum of sixty minutes all together. These help the researchers to get in-depth information and possible suggestions about impact of ICT in higher education. For the purpose of this focus group discussion leading questions and checklists are prepared and used during the discussion session.

Besides the actual utilization of ICT services and infrastructure has been observed by the researchers. This helped the researchers to complement the data obtained through the questioner, interview, and focus group discussions. The observation was taken place for about 45 minutes at each data center of the university. In conducting observation, point of emphases and checklists were prepared and utilized accordingly.

3.2 Description of study area and population

The study focuses on seven universities. The selection of this 7 universities is purposive. The seven universities selected depending on the generation of the universities (year of establishment). From all generation universities exist in Ethiopia (first generation, second generation and third generation) two representative universities were selected. From first generation universities, Jimma University (JU) and Addis Ababa Universities (AAU) are selected. JU is selected because of university where one of the researchers studied his first degree and the other researcher worked there in the department of computer science. This creates opportunity for researchers to know

instructors so that the respondents give accurate data. Even though the two universities found in same generation, they have different age. So this helps researcher to identify the gap in ICT utilization. From second generation universities, Adama Science and Technology University (ASTU), and Addis Ababa Science and technology university (AASU) are selected. The first two universities are selected for the reason that the government selected the two universities as center of excellence in science and technology and in addition the universities are located on the same direction. So this will reduce cost of expense for researchers and save time. ArsiU is selected as it is rapidly expanding the ICT infrastructure for the effective use of teaching/learning purpose and also one of the researchers is currently working. From the third generation universities, Arsi University (ArsiU) and Oda Bultum Universities (OBU) are selected. Arsi University is selected because of home of researcher working in and OBU is selected because of currently delivering lectures. To select respondent of selected universities purposive sampling is used. The selected respondent includes both gender male and female that are involved in ICT use in HEI. For getting desired sample size and studying related information, total 210 population size is selected. From each university 30 respondents including instructors and students are interviewed from the selected study sites.

3.3 Method and data analysis

In this study descriptive research method is used. The method is selected to describe the real impact of ICT in higher education and the differences observed between the universities regarding ICT utilization and applying ICT as instruction media. In addition qualitative research methodology has been also employed to analyze qualitative data. To select sample respondents different sampling techniques were used in this study.

3.4 Data Analysis

A total of twenty questions were administered. A sample of thirty staff in each of the seven institutions (JU, AAU, ASTU, AASTU, WSU, ArsiU, and OBU) is considered. Sixty Questionnaires were equally retrieved immediately from the respondents. **Table1: the seven selected HEI**

Name of institution	Number of questionnaire retrieved and use
Jimma University	30
Addis Ababa University	30
Addis Ababa Science and Technology university	30
Adama Science and Technology University	30
Arsi University	30
OdaBultum University	30

Table 2: ICT tools used for instruction in HEI

ICT tools used	JU	AAU	ASTU	AASTU	ArsiU	OBU	Total	100%
internet	30	30	30	30	30	30	210	100%
Video	0	0	0	0	0	0	0	0%
Video conference	0	0	0	2	0	1	3	1.42%
multimedia	0	0	0	0	0	0	0	0%
eLearning	1	0	0	1	0	0	3	1.42%
Demo	0	0	0	0	0	0	0	0%
Smart class	0	0	0	0	0	0	0	0%
VOIP	0	0	0	0	0	0	0	0%
File sharing	0	0	0	0	0	0	0	0%
IP telephony	0	0	0	0	0	0	0	0%
Security camera	1	0	0	1	0	0	4	1.9%

The questionnaires result in the seven HEI obtained indicates that the instructor's uses internet, video, video conference, multimedia, eLearning, demo, VOIP, File sharing system, IP telephony, attendance management system and Security camera. None of the seven universities uses ICT as mode of delivery like video, multimedia, VOIP, File sharing, IP telephony. The study also shows from selected HEI each of the thirty instructors sampled for study showed the entire 210 staff have used the internet,1.42% use video conference and E-Learning. The study also indicates that 0% demo and multimedia.

Table 3: advantage of using ICT in HEI

Benefits	JU	AAU	ASTU	AASTU	ArsiU	OBU	Total
I can share lecture note with my student online	1	0	0	2	0	0	2.4%
I use multimedia in my lecture	0	0	0	0	0	0	0%
I invite expert online for student	0	0	0	0	0	0	0%
Improvement in the quality of education	30	30	30	30	30	30	100%
Improve communication gap	30	30	30	30	30	30	100%
Improving my skill	30	30	30	30	30	30	100%
Enhance learning	30	30	30	30	30	30	100%
Active learning enhancement	30	30	30	30	30	30	100%
Encourages collaborative and interactive learning	30	30	30	30	30	30	100%
Encouraging creative learning	30	30	30	30	30	30	100%
Encouraging interactive approach to learning	30	30	30	30	30	30	100%

The above table shows advantages of ICT in HEI such as ICT facilities, sharing of lecture note and other reading materials with student. They are using 2.4%. Usage of multimedia and expert knowledge sharing in classroom is 0%. From the data gained, 100% of respondents agreed that ICT Encourages interactive approach towards learning and encourage creative learning, Active learning enhancement, Encourages collaborative and interactive learning in general.

Table 4: Aspect that affects ICT based education in HEI in Ethiopia

Aspect	JU	AAU	ASTU	AASTU	ArsiU	OBU	Total
Insufficient ICT infrastructure	27	30	30	28	20	30	91%
Insufficient tools	28	30	30	25	20	24	87.6%
Insufficient funds to replace facility components	10	30	15	8	12	13	49.1%
Shortage electricity power supply	25	30	30	25	27	29	89.5%

The table above shows aspect that affects ICT based education in HEI in Ethiopia, the study indicates insufficient ICT facilities 91% insufficient ICT tools, 49% insufficient funds to replace, 90% Shortage electricity power supply.

5.0 Conclusion, Discussion and Recommendations

ICT is very important in HEI for teaching and administration purpose. To create competent graduate to force venture for the future society in Ethiopia, ICT is the most important tool. ICT create self-learning, problem solving and creative graduate that solves recent challenges of the country. To support the instructors to use ICT in the university the department, ICT director and top administrative must support the instructors to use ICT in the classroom. Another issue identified is the lack of ICT based education training for instructors in HEI, lack of true smart class rooms, and true Lab for all departments. Instructors are not getting ICT based education training and have difficulties fitting into the requirement especially in science and Technology universities. Regarding smart class only a few universities have smart class rooms. Instructors are giving lectures by paper based teaching. The most important use of ICT investigated are instructors are expected to incorporate multimedia into their teaching. In order to help all students learning process, instructors need to incorporate ICT. To transform the country from developing to middle income country, ICT based education plays great role. So all HEI should use ICT to deliver quality education, community engagement, research and socio economic development in the country.ICT helps to do administrative activities more efficiently than the traditional paper work system.

The uses of ICT in HEI benefits instructors and students and also speed up the country development. It is observed that countries that have achieved high levels of economic growth are because of the efforts they have made in ICT use in national education. Skillful graduate is very important for technology transfer and innovation which accelerates the country towards development. Thus to have competent graduate using multimedia and demonstrate videos make the learning process easier for students. It really makes learning process easier. Thus the country mission regarding the creativity and Ethiopian renaissance ICT must fully realized in HEI. So

Ministry of Science and Technology (MOST) and MOE should ensure that ICT infrastructure has been fulfilled in Universities especially in two science and technology universities. So government should ensure adequate computers and the Internet connectivity across the country especially in newly established (2nd and 3rd generation universities) and the two Science and Technology universities. Therefore, Ministry of Education (MOE) and MOST must deal with the problems mentioned above.

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AUTHORS PROFILE

Mr. Musa DimaGenemo is working as aLecturer and Application Development and Administration Expert @Arsi University, Asella. He has done his B.Sc in CS and MSc in Software Engineering. He has obtained course completion certificate on Java and Database from Oracle Certifications, and ITE Certification from CISCO regional Academy fromJimma University.He has around 3 plus years ofteaching and Software Development experience. As developer Mr.Musa has participated on more than ten plus Big Project.

Dr. TelkapalliMurali Krishna is working as Asst. Professor, department of CS & IT, CNCS, WolaitaSodo University, Federal Democratic Republic of Ethiopia. He has done Three Masters Degrees namely MCA, M.Phil ,M.Tech and PhD in Computer Science. He is specialized in Software Engineering and Data Mining. He has around 17 plus years of teaching / administration / research experience. He is a life member in CSI, IAENG & CSTA.