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Educational Technology Usage in Higher Education: Student and Instructor Digital Competency: A Case Study

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Abstract
Background: digital technology plays an important role in higher education institutions. Objective: this study investigates how students and instructors are using digital tools, for what purposes they use digital technology and to what extent digital technologies adopted in higher education. Methodology: structural equation modeling was used; triangulation approaches, data have been collected from the students (n= 168), instructors (n=64) using a survey questionnaires and an in-depth interviews with students, instructors. Data was analyzed using SPSS v26. Result: Based on the data analysis more than 88.09% of students use digital tools for non-academic purposes (for entertainment), like playing games, online chatting with their friends, watching videos (movies), telegram, face book for personal or social use. However digital tools have a great impact on student academic achievement especially for students who score in GPA are greater than 3.5. Conclusion: higher education students have access to digital tools like the internet, desktop computers (1:6), laptops (4.16%) and mobile devices (97.61%). But 88.09% of students use digital tools for non-academic purposes. The digital competency of instructors and students are very low. (74.21% of instructors not use digital tools in the Classroom)
Keywords: Digital technology, digital transformation, digital competency, academic, non-academic
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1. INTRODUCTION

"Digitization' refers specifically to the conversion of information or data from analogue to digital format. 'Digitalization', by contrast, refers to the adoption or increases in use of digital or computer technology (by an organization, an industry, or a country) and therefore describes more generally the way digitization is affecting economy and society"

Technology has definitely transformed the way we live, we shop, work, communicate and we learn. it plays a crucial role in all aspect of our life. In 21st century digital technology has becoming an inevitable or an integral part of our life. Numerous manual tasks can be automated or computerized, thanks to technology. Also, several difficult and serious or dangerous procedures can be carried out with ease and greater efficiency with the help of current technology (robotics application of artificial intelligence).

Acknowledges to the application of technology, life has become easy except emerging cyber security threats like cyber-attacks due to the advancement in technology (internet of things or IoT, cloud computing, 5G mobile technology, and Zoom or video teleconference). Technology has transformed the field of education like e-learning, e- government, e-commerce, e-business, m-learning, m-pesa(m-money), bit coin, distance learning, virtual learning, video conferencing, teleconferencing, and online discussion forums.

" The prime minister of Great Britain or united kingdom (UK) Boris Jensen says thanks to technology I doing my work by isolating myself when he caught by Corona virus or novel Covid-19". Due to novel COVID-19 in Ethiopia even in Africa all schools closed. But in technology advanced country like china teaching and learning continues online or virtual learning using the internet. And they control corona virus using mobile app within 5 months (BBC).

This indicates that the application of digital technology is not only in education but in all aspects of our life in the era of digital technology or in connected globe. The importance of technology in higher education cannot be ignored in this era of digital technology or in 21st century. Technology advanced countries like USA, Canada, UK, China, India, Japan, South Korea, Germany, France, Spain, Australia in general Europe have enjoyed. Developing counties should learn from those countries.

Digital technologies are measured to be a theme of attention in many ranges of actual lifetime typically in education for lifelong learning, active learning and self-learning. A study link advanced in the arena of distance learning universities emphases on the students' access, capabilities, activities and perception to digital technologies and smartphones and on in what way those variables are connected to education. Instructors can currently use digital tools as an instrument that permits adapting the pedagogical method in the laboratory so as to produce digitally competent students.

In Germany 99.4% of the students use the internet and digital tools, more than 99% of the students have internet access at home and are well equipped digital devices (Zawach-Richter,2019), but in the case of Ethiopia

no internet access at home at all even for 80% of university instructors including me we have no internet access at home. Image how much the "digital divide"!?

71.42% of instructors not use digital tools in Classrooms due to lack of digital competency or literacy. This is a root cause for lacking quality in education, so training is an important to enhance instructor's digital competency and skills. As student (interviewee) responded that half of the instructors teach simple or elementary concept that student leant at elementary, secondary and preparatory school (in advanced java programming they teach how to add two numbers which is trivial at university level.

Digital transformation is one way of serving higher education institutions to reduce costs, saving time, improving active learning, enhancing efficiency and effectiveness. Education organizations are accepting digital tools as a centered pedagogical, technological and organizational method and giving digital technology focused on educational platforms. Lately, the Government of Ethiopia has also accepted the use of digital tools in the education sector, but still no adequate ICT infrastructures and lack of qualified IT professionals in Ethiopia.

Hence, students' individualized the digital services for the educational and non-educational purposes exhausting different smart phone and the internet. The study associated to the use of digital technology in education by students has been conducted in numerous studies [1].

Many study conducted in higher education that need completely accepted digital technologies have verified huge progression in the use of digital tools for the development of education approaches, training, investigation, and economic growth. However, not strong what influence the digital technology uses has on the competency and success of students, By way of each the reviews accompanied by [2].

So this research focuses on instructors and students digital competency, for what purpose they are using digital technologies and to what extent higher education adopting digital technologies or tools in teaching, learning and administration. Which is not got attention by the previous study. The students of colleges and universities in advanced nations use the digital technology entirely in their education actions. But, due to the completed access of funny resources through digital tools impede their overall student educational achievement.

Other study showed that in Ethiopia, about 85% of the respondents do not agree that the digital technology is valuable in promoting or empowering the educational achievement; they rather consider it as a source of entertainment[3]. Which support my findings 88.09% of the respondent use digital tools for non-academic purposes, this show that the problem become more serious that means it increases from 85% to 88,09%.
The investigator wants to address the following study objectives in this research:

Objectives of the study

1. How students and instructors are using digital technologies.
2. For what purpose students use digital tools (academic or non-academic purposes)
3. To what extent the universities are adopting digital technology.

2. BACKGROUND OF THE STUDY

Shortage of digital infrastructure seems as main obstacles in student's digital tools usage. Though students 'insights are explicated in varied educations as significant variables to examine digital tools usage, which lone depends on sufficient digital services. Showing multi-media laboratories digital technology infrastructure was found to show an important part.

But, students are not using digital tools continuously for an academic purpose; but, it can be used for the different purposes. For instance, students might use digital tools to make class equipment or for individual use. Students spent more time on social media or networks, like Facebook, telegram, you tube, instagram, online chatting, watching movies (videos), and playing games [4].

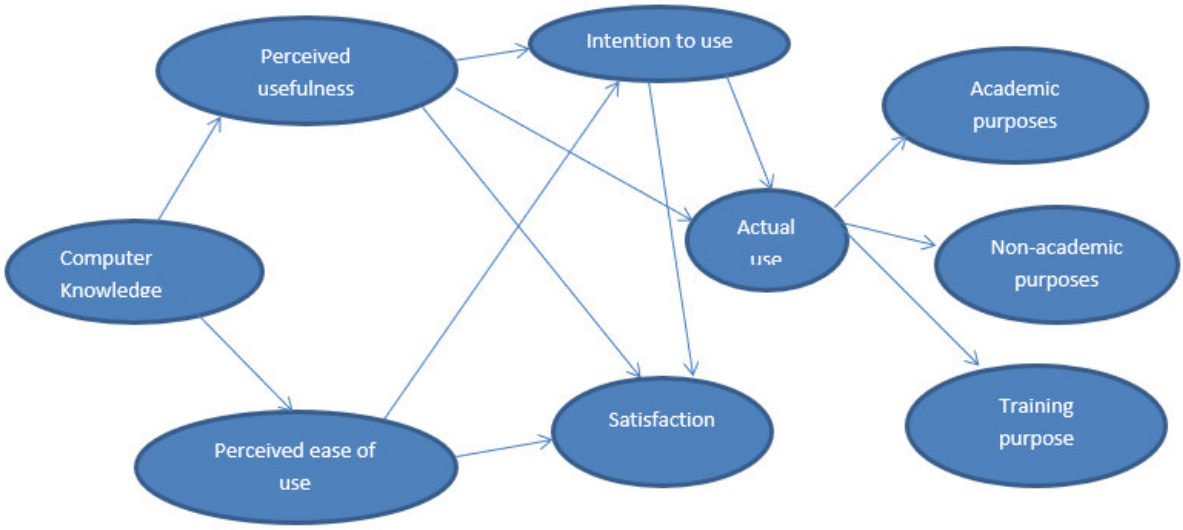
By computers and the internet in education actions is anticipated to inspire learners to study additional self-sufficiently and continuously with the skills and ordinary abilities they have. The expansion of inventiveness and independency of students is also actually extensively exposed by building the internet a new learning system [5].

Digital technology can influence student knowledge once instructors are digitally literate and understand how to integrate it into curriculum. It is influencing every aspect of education from teaching-learning to assessment, evaluation, to show student result and grading. It improves the effectiveness of education in general. Digital technology makes life fantastic and easy, so digital tools such as mobile devices, tablets, small laptops, the internet, and Wi-Fi should be an integral part of our life as water, air, and food.

Recently almost all students have a mobile phone or smartphones with a capacity to search or browse for information form the internet. Recent research suggests that many students perceive the cell phone primarily as a relaxation device, and most commonly use cell phones for social networking, surfing the internet, watching videos or movies and playing games, online chatting with their fiends [8]. With the number of 'wicked challenges' growing around the world, the need for university graduates to possess a range of collaborative and interdisciplinary skills is ever increasing [10].

Equipping students with digital competencies as part of their higher education experience is necessary, in

order to empower their "agency and identity in digital spaces" (Kühn Hildebrandt, 2019).In Germany, despite young people (aged 14–29) being the biggest consumers and users of the internet and digital tools, they place less importance on the teaching of digital media in schools than other age groups (Melissa Bond, 2019).
To drive the digital transformation of teaching and learning within German higher education institutions, it is paramount to understand the technology skills and knowledge of both teachers and students, to discover their respective needs, and to aim for a mutual understanding of both perspectives



Revised Technology adoption and satisfaction (TAS) model

3. METHODOLOGY AND DATA COLLECTIONS

R ESEARCH D ESIGN

The dataset of this research were collected using survey questionnaires directed to students (n=168) instructors (n=64) and technical assistant (n=17) in higher education in Ethiopia. The questionnaire reliability was analyzed using the coefficient with the help of SPSS software version 26 and smartPLS3 (to analyze the qualitative data like interview or model).Besides an in-depth interviews with students, instructors and technical assistant to gain a deer understanding. Also from the researcher actual working experience (more than 7 years university teaching, research and consulting experience).

4. RESULTS AND DISCUSION

The findings of this research show that the students have access to digital tools especially mobile phone. However most of students (88.09%) use digital tools for non-academic purpose such as watching videos, playing games, online chatting with their friends, only 11.90% use digital tools for academic purposes. The previous study supports my findings that mean 85% of the student use digital tools for non-academic purpose. Another study conducted in Germany 84% of students use the internet for non-academic purpose daily.

In Germany 99.4% of the students use the internet and digital tools, more than 99% of the students have internet access at home and are well equipped digital devices (Zawach-Richter,2019), but in the case of Ethiopia no internet access at home at all even 80% of university instructors including me we have no internet access at home. Image how much the "digital divide"!?

Even in Tanzania 85% of student owns laptops, 65% own smartphones and 78% of students owns mobile phones (in 2016) [13]. But in the case of Ethiopia only 4.16% of student owns laptops and 83.92% of students own mobile devices (in 2020).

The present generation of students has grown up surrounded by digital technology. The digital technology has been a critical component of teaching and learning in higher education over the last few decades. The widespread availability of mobile devices and wireless networks offer enormous opportunities for knowledge acquisition [7].

Another study conducted in Taiwan found that using internet for information seeking was associated with better academic performance and using it for online gaming was associated with lower academic grades. Another study conducted in Saudi Arabia, found that there exists a relationship between digital technology and academic performance and that digital technology adoption resulted in the improvement of the academic performance of the female students more than male [8].

more study conducted in Malaysia, it was concluded that smart phones have negative effects on student`s academic performance. A report by the OECD, argues that there is little evidence of digital technology having a

positive impact on academic performance. Jumoke S et al also found that students are negatively influenced by mobile phone due to entertainment [9].

In order to improve student - and teacher - perceptions of using digital tools for learning, it is essential to help them understand why technology is important in their professional lives as lifelong learners. However, students may not be prepared to use digital tools for learning and they may ask for guidance and support [10].

Earlier investigation also found mobile phone use as an interruption in academic settings. Students supposed cell phone or smart phone mainly as a relaxation method rather than as an educational tool. Here is an increasing volume of study that recommends automated broadcasting in first system inspires multitasking and mission transferring, both of which are harmfully associated to educational achievement [11].

Here is an important correlation (with $p < 0.08$) of 0.510 between digital technology uses and academic achievement. This is for students whose GPA is greater than 3.5, but student who score GPA less than 2.75 have no correlation because all use digital tools only for non-academic purposes.in addition female students score highest GPA (3.93).

Participant background information

This is accepted through an opinion to giving an idea about the dataset student (n=168), instructors (n=64) and technical assistant (n=17). Descriptive statistics or percentage technique was used to describe the experience features of this dataset. The suggestion of Table 1 is that maximum of the respondents 93 (55.35%) were males whereas 75 (44.64%) of them were females. The investigation also shows that, 3.57% of students use the internet for about 1 to 2 hours, 14.28% for three hours, and 65.13% for more than 4 hours daily.

Table 1 also tells that 94.34% students browse the internet regularly for different purposes. According to the findings of this research, only (11.90%) of students use a laptops and only 2.39 % of students use mobile devices on their academic purpose, 17.86% have access only to the internet for their academic purpose, 82.14% of the student's use the internet in non-academic purpose.

Expressive Figures

The separate items in the Questionnaire, Pointers of three unique sizes and their incomes, standard deviations, and result of reliability items are done in Table 2. The general mean and standard deviation of different items is 1.311 and 0.201 respectively. The finding of reliability items in SPSS version 26 displays that, there is an internal consistency between the items in questionnaire related to the students 'educational achievement and use of digital tools. The general coefficient is 0.211

As many respondents confirmed that instructors are not use digital tools in class room. Because they are not well – trained, lack of training, lack of instructor's digital competency, lack of computers, laptops, fast internet access, secured wireless networks, lack of well-equipped computer laboratory, electric power interruption, lack of educational software, and inadequate ICT infrastructure and lack of well-trained instructors (IT professionals).

As I observed most of the instructors are theory oriented than practical, computer RAM is not sufficient to install and run applications like android studio, visual studio, and Microsoft SQL Server and virtual machine. Frequent electric power interruption, students have no programming background but they join computer science, information technology, information systems and software engineering just I am delivering the courses for last 7 years up to now.

Students learn for exam only but not for knowledge, computers and students are not proportional 1 computer for 6 students in the computer laboratory. Students are more interested on theory rather than coding or programing, students read only lecture notes a maximum of 100 slides they did not read supplementary books. I remember that when I was BSc and MSc student 9 years ago I was read 2 up to 4 supplementary books for each course. These and others are obstacles for quality of education in Ethiopian higher education institutions.

Table. 1. Respondents dataset

Variables	Variable types	Frequency(f)	Percent (%)
Gender	Female	75	44.64
	Male	93	55.35
Internet surf frequently	Yes	160	95.23
	No	8	4.76
Browsing frequency per day	Zero hour	6	3.57
	1 to 2 hours	24	14.28
	Three hours	50	29.76
	Four or more	88	52.38
Use of digital tools	Laptop	7	4.16
	Desktop	20	11.90
	personal mobile	141	83.92
Mobile phone use in Non-Academic Purpose	Yes	148	88.09
	No	20	11.90

As the respondent confirm above in table 1, 95.23 % of the students spent their time by browsing the internet for non-academic purpose like Facebook, telegram, YouTube, twitter, Skype, for enjoyment (online chatting with their friends, playing games, watching movies and videos, hearing music and song, capturing photos, football game or betting. Betting reveals by British Broadcast Corporation (BBC) and FBC in 2020 in Ethiopia as pandemic in higher education this may lead social crisis in Ethiopia. BBC and FBC support or demonstrate my findings.

Questionnaires	Point displays	Mean	S D	Coefficient
Digital tools in Class Room	PD	2.104	0.001	0.413
Multimedia classroom	PD1	2.131	0.023	0.414
Use of digital tools by lecturers during lecture	PD2	2.134	0.142	0.412
Class taken by the projector	PD3	2.143	0.131	0.413
Outdoor the teaching	PD4	1.452	0.133	0.412
To make project	PD5	1.134	0.02	0.413
Planning of the exam	DT	2.10	0.300	0.413
Viewing educational notes	DT1	1.331	0.112	0.413
Arena learning	DT2	1.301	0.021	0.421
View to digital tools usage	DT3	1.321	0.004	0.412
I paid greatest of the period with digital tools	DT4	0.05	0.003	0.412
individual management of data	VD	1.304	0.22	0.412
Habit of digital tools	VD1	1.421	1.041	0.413
Exhausting digital tools my educational result	VD2	0.11	0.212	0.412
Game playing in online	HD	2.112	0.220	0.413
Educational Effects	HD1	1.421	0.144	0.413
Digital technology advances learners‘ achievement	HD2	0.12	0.214	0.421
Exhausting digital technology individual skills	EE	0.23	0.211	0.41
To search grant	EE1	0.13	0.103	0.423
General	168	0.31	0.103	0.422

Table. 2. Respondents dataset

Assenting Influence Investigation

Assenting Influence Investigation (AII) has been used to describe the model appropriate of the assumption. The subsequent Assumption has been measured in the Organizational equality model: Assumption: Here is no

arithmetically major association among the students 'purpose to use digital technology for academic and non-academic.

As shown below describes the inside reliability of many objects beside through deterioration constants and R-square value. So as to assess the inside constancy of the influence charging, maximum of the factors exceed the limiting value 0.60 [5] are shown except PD5, DT1, DT2, VD1, EE1, and EE3. educational influence of digital technology The factors DT5, PD1, PD2, PD1, AI1, and VD3 are measured, since the result of reliability items on coefficient is greater than 0.60. The planned model described variance in the.

Below the thoughtful measurement model coefficient, compound reliability, and the normal variance removed are evaluated. As shown blow shown that although coefficient of one variable is low, but compound dependability and the variance removed are evaluated satisfy the minimum cutoff value 0.6 and greater than 0.5 [5]. Although reliability values greater than 0.60 is good, but between 0.50– 0.60 is also satisfactory if additional measurement of the concept's legitimacy is respectable [6].

As shown blow that completely concept indicates suitable discriminant validity where the diagonal value is larger than the correlations for all reflective constructs [7]. It is obvious that, habit of digital technology is the maximum persuasive result on students' educational influence $\beta = 0.454$, shadowed by View to digital technology use in academic purpose $\beta = 0.115$. Nonetheless digital tools use in internal and external in the classroom has not been important. The likely motive is that, instructors do not use digital tools in the classrooms.

5. CONCLUSION

In 21st century, digital technology promotes dramatic changes in our actions like the way we live, we shop and the way we learn, in teaching and learning process. Higher education students have access to digital technologies like the internet, desktop computers (1 computer for 6 students), laptops (4.16%) and mobile devices (97.61%). However most of students use those digital tools for enjoyment rather than academic purposes. This study reveals the negative impact of use of mobile phone and the internet on student's educational achievement. In Ethiopia use of the internet is no more Facebook, Unfortunately Africa far behind 200 years in technology, only 20% of African use the internet.

The data analysis reveals that more than 88.09% of students use digital technologies for non-academic purpose (for entertainment) like playing games, online chatting with their friends, watching videos, watching movies, they use telegram, Facebook, YouTube, Skype, twitter, what Sapp and instagram for personal and social use rather than academic purposes. However, digital technology has a great impact on student academic achievement especially for students who score GPA greater than 3.5.

Here is an important correlation (with $p < 0.08$) of 0.510 between digital technology uses and academic achievement. The technology skills or digital competency of instructors, technical assistants and students are very low. Based on the data analyzed 71.42% of instructors not use digital tools in the Classrooms and Computer laboratory class due to lack of digital skills or digital competency.

This is a root cause for quality of education and unemployment, so training is an important to enhance instructor's digital competency and skills. Institutions of higher education is not well equipped with digital technologies (lack of computers, laptops, tablet, smartphone, projectors, whiteboard, table, chair (2 students sit on one chair), I am not exaggerate but I am really faced this problems for the last seven years up to now in higher education in Ethiopia (in the case of Wolaita Sodo University), weak internet connection, no secured wireless networks, lack of well-equipped computer laboratory, electric power interruption (like dime light), lack of educational software, inadequate ICT infrastructures and shortage of well-trained instructors or IT professionals).

Author contributions

The researcher (Instructor of University) has reveals notable findings in this study based on the data analyzed and from his actual experience (more than 7 years teaching, research and consulting experience).

The findings contribute to the present philosophy and preparation associated to digital tools usage (for academic or non-academic purposes) in higher education. This investigation can be a motivation for refining willingness of instructors and students about digital technology uses in learning and teaching process, to improve the quality of education in Ethiopia.

RECOMMENDATIONS

I recommend the following based on the data analyzed (dataset students n=168, lecturers n=64 & technical assistants n=17) and from my real working experience (more than 7 years university teaching, research and consulting experience).

- The classrooms and computer laboratory should be equipped with adequate digital tools (desktop computers, laptops, digital projectors, fast internet connection or access, secured wireless networks, educational software and uninterrupted electric power.).
- Instructor needs training to promote academic digital literacy or digital skills.

- Students should use digital technologies for their academic purposes commonly or more time rather than non-academic purpose.
- Higher education institutions should have strategic digital policy or legal framework and initiatives fostering on how to use digital technologies in higher education.
- Assess or monitor how students are using digital tools specially the internet and smartphones based on the findings the internet and smartphones usage need urgent solution or policy framework (when, why, how and for what purpose students use the internet & smartphones).
- Curriculum revision is needed, assess student evaluation systems or make national even international standards finally all higher education institutions should integrate digital technologies into their curriculum.
- The governments should invest on ICT infrastructures, digital economy and IT professionals to transform the education system. Once education is transformed then every aspect of the country or world will be transformed. Because education is a base for all.

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