

ASSESSMENT OF LEVEL OF AWARENESS, COMPETENCE AND USE OF DIGITAL TECHNOLOGIES FOR SUSTAINABLE TEACHER EDUCATION BY LECTURERS IN ENUGU STATE

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Abstract

This study investigated the level of awareness, competence in utilization of digital technologies for sustainable teacher education by teacher educators in Colleges of Education in Enugu State. The study design was descriptive survey. Three research questions guided the study. The sample consisted of 80 randomly selected participants (forty males and forty female) drawn from a population of 344 lecturers in two Government owned Colleges of Education in Enugu state. The instrument used for data collection was a researcher-structured questionnaire duly validated by experts in Measurement and Evaluation. The reliability coefficient obtained was 0.76. Frequency counts, mean statistics and Standard Deviation were used in answering the research questions. Findings of the study show that most lecturers in Colleges of Education are moderately aware of digital technologies used in teaching; they also have low competences and level of use of the digital technologies in teaching is low. Based on the findings, it was recommended that in order to ensure the use of digital technologies for a sustainable Teacher Education in this age of information and communication technology (ICT), teacher educators should be sensitized on the need to become aware of digital technologies for teaching; they should be continuously exposed to the use of digital technologies in teaching and learnings through workshops, seminars and further training. Above all, digital technologies for teaching and learning should be made available in Colleges of Education.

Keywords: Assessment, Awareness, Competences and Digital technologies, Sustainable Teacher Education

Higher education which undoubtedly holds the key to different kinds of development in any nation includes Teacher Education system where prospective teachers for the primary, secondary and tertiary levels of education are trained. Teacher education plays crucial role in the development of sustainable education system. In teacher education institutions, student teachers are prepared to live as professional teachers. Therefore, it is a system with the responsibility of not only training teachers, but also the entire citizenry so that they will be able to live comfortably and contribute to societal development in many ways.

With the recent advancements in information, communication and technology, the world today is experiencing digital revolution in every sphere of life. There are rapid technological advancements which are transforming the processes and practices of education to meet the challenges of the 21st century teaching and learning. There is the introduction of use of digital technologies in education which encompass, digital tools, digital contents and methods of instructional delivery that are equally changing the quality of education delivered to the learners.

In compliance to the new order in the teaching and learning process, it is expected that teacher education should embrace the use of these technologies in the preparation of students for sustainable education. It therefore becomes important that lecturers in the teacher education systems such as colleges of education should not only be aware of the variety of digital technologies for teaching, but also possess the requisite skills and competencies to use these technologies in the teaching and learning process for the enablement of quality education and sustainability of the system.

Digital technologies are those electronic tools, devices, resources and systems that are used to generate, store and process data. In education, they are regarded as tools, resources and systems used in the teaching and learning as well as in other educational services, for generating teaching resources, presenting and sharing of learning materials, assessing students' practices/learning outcomes; and for collaborating with students, other teachers and subject experts. Akingbe (2014), describes digital technologies as tools and strategies used to help and to engage learners in the 21st century; an array of technologies with numerous benefits which include reduced teacher preparation time, bringing life (interaction) into instruction and elimination of challenges associated with writing. Use of digital technologies enhance students commitment and creates learning engagement with the students. Digital technologies enable rapid increase in students' performance.

Digital technologies include technologies for preparation, presentation and social interaction. Desjardin, Davidson, Bayne, Van-Voostergen and Child (2017), opine that digital technologies permeates all human activities and requires everyone to adapt constantly to the reality especially as technology is rapidly advancing and making demands into the classrooms. To meet the challenging demands in instructional delivery, there is need for teachers in colleges of education to be conversant with the digital technologies used in teaching which are not only changing

the way students learn by engaging them in learning activities, but also offer to teachers new opportunities and experiences to ease access and creation of instructional contents that undoubtedly enhance rapid increase in students' performance and in learning outcomes. Sauban and Baharaddin (2016), point out that there is a paradigm shift from the age-long traditional teacher-centered method to learner-centered learning where students are constructors of their own learning and where the use of digital technologies will produce better results in learners than the traditional method. There is therefore need for teachers to have knowledge of the digital technologies and equally possess the skills to carry out the teaching and learning process smoothly.

The need for possession of awareness of the digital technology used to support students learning by lecturers in teacher education cannot be over emphasized. Amutha and Kennedy (2015), are of the view that teachers' knowledge of the digital technologies in teaching and learning process, solving problems and building capacities etc. is very essential. This is because all-round development and growth in the society come as a result of the teachers' employment of the varieties of innovative pedagogical strategies in their lesson delivery which includes utilization of digital technologies for sustainable teacher education.

Awareness of digital technologies has to do with knowledge of what types, why and how to utilize them effectively. Reiner (2017), explains that digital awareness is much more than possessing the knowledge of how to use technology or computer, it means being able to understand and use technology in an increasingly interconnected world, especially now that the world has been made smaller with the use of technologies. Leah (2018) added that awareness enables the teacher to employ skills in the classroom which will in turn foster a strong sense of digital citizenship in our society. Equally, Cassa (2014), explain that teachers make the best use of digital technologies by developing their awareness of a range of digital technologies and considering carefully both why and how they can be used to support students' learning. In other words, teachers' awareness of digital technologies is more likely to help them engage students in the classrooms where the 21st century tools are used. Digital awareness by teachers will enable them access, manage, interpret, evaluate and give different kinds of information to their students so that students can function effectively in a knowledge-based society by way of developing critical thinking, problem-solving skills and construction of own learning.

For sustainable teacher education, teachers' possession of the competencies for the use of digital technologies in their lecture delivery is very vital. Competence has to do with the possession of knowledge and understanding of how to operate and use digital technologies especially in planning, presenting, and evaluating learning. It deals with the ability to write, present and communicate using variety of digital technologies. For instance, competences required by lecturers for sustaining learning in the 21st century will include that for use of presentation software and general multimedia; cloud computing, social media networks, mobile technologies and web

editing. Europa (2018), describe digital technology competence as involving the confidence, critical and responsible use of, and engagement with digital technologies for learning, at work and for participants in the society. In other words, possession of competencies in the use of digital technologies is needed in order to acquire desirable knowledge and skills in this globalized age. This is because according to Rahmah (2015) and Sauban and Baharaddin (2016), technology and education are inseparable especially in this 21st century. As a result of high challenges in knowledge practices, acquisition of competencies in the use of digital technologies in teaching have become very necessary in teacher education especially for lecturers to understand how to fit into students' learning. Equally, Desjardin et al (2017) point out that competency is a set or array of theoretical and practical knowledge as well as skills that can be readily called up and put into action as a situation and context different from previous situations. By implication, lecturers are required to possess all the necessary skills that would help them in discharging their professional responsibilities.

Acquisition of competencies in the use of digital technologies by lecturers in colleges of education is of utmost importance in this century. This is because as the professionals that prepare the prospective teachers who would in turn impact to the society, lecturers must be talented and familiar with tools and strategies that they are expected to use in presentation of their lecture materials, as well as for collaboration with students, fellow lecturers and subject experts. Irish Computer Society (2018), reiterated the need for teachers to be extensively exposed to digital technologies so as to be able to select appropriate resources for lecture presentation. It is also noted that apart from the development of appropriate pedagogical practices, it is important for teachers to possess technical knowledge and mastery of the use of digital technologies. According to Sheffield, Blackley and Moro (2018), because contemporary teachers have obligations to support and scaffold students' learning with digital technologies, their competences need to be higher for the 21st century learning skills. Such as skills for communication, collaboration, creativity and problem-solving need. Lecturers in teacher education are therefore challenged not only to become aware of digital technologies, the pedagogical practices, content knowledge but also exhibit the familiarity to use the technologies to support students' learning.

Utilization has to do with the actual use of the digital technologies for planning of instruction, presentation, collaboration and evaluation of learning. For the teacher education, these three processes have become very crucial and desirable for quality teaching and learning in this 21st century. This is because we live in an age where teachers act as support system that enable learners construct own learning with the use of array of digital technologies found useful in teaching and learning. It is equally believed that use of digital technologies will not only enhance students' learning but also help in the achievement of sustainable education.

Sustainable Teacher education hinge on the effectiveness of the lecturers' possession of requisite knowledge and skills for the delivery of quality teaching by employing

innovative techniques, practices and resources which include use of digital technologies in teaching the prospective teachers. Santonne, Sunders and Seguin (2014), posit that sustainable teacher education aims to develop teacher effectiveness basing it on teacher preparation competences, while Thakur (2014), emphasizes that since teacher education is directed towards preparation of teachers, quality of teacher education therefore depends on the teacher trainers' abilities and skills. In other words, lecturers in colleges of education must be trained on how to plan, create and deliver instruction within a technological setting. By implication, they must become very aware and have high competences for use of the digital technologies and equally form the habit of utilizing them in lecture delivery. It must be noted that because teachers are central to growth and development in the society, they must enhance their professional knowledge and skills for efficient and effective teaching using the digital technologies which have been found useful in facilitating students' learning.

Problem of the Study

Classroom teaching and learning is moving away from lecturing students to a more collaborative project-based models. With this paradigm shift in learning, emphasis is on learner-centeredness. In this kind of learning, digital technologies have been found very useful and effective in supporting and enhancing learning outcomes. Education systems are keying into this practice. In teacher education were prospective teachers are trained, it is expected that lecturers should be able to utilize the digital technologies in their lecture delivery in order to sustain the system. However, studies have continued to reveal that most Colleges of Education have not fully launched into the digital world and thus are not harnessing the potentials of the digital technologies for effective teaching. Also the Council of Europe (2014), had noted that many Educational settings fail to integrate new technologies in their content and method. It must be noted that ability to utilize digital technologies in teaching in teacher education hinge on possession of awareness and competencies by lecturers. It is not certain whether lecturers in Colleges of Education, those in Enugu State inclusive, possess the requisite awareness and competencies to utilize the digital technologies in teaching; hence this study that assessed the level of awareness, competences and use of digital technologies by lecturers in Colleges of Education in Enugu State

Objectives of the Study

This study was conducted to achieve the following objectives:

1. To find out lecturers' level of awareness of digital technologies in teaching.
2. To find out lecturers' level of competence to use digital technologies in teaching.
3. To ascertain the level use of digital technologies by lecturers in teaching.

Research Questions

Three research questions formulated in line with the objectives to be achieved guided this research.

1. What is the lecturers' level of awareness of digital technologies in teaching?
2. What is the lecturers' level of competences to use digital technologies in teaching?
3. What is the lecturers' level of use of digital technologies in teaching?

Method of Research

The study adopted the survey design. The population comprised of all the 344 lecturers in two purposively selected Colleges of Education in Enugu, one federal government owned college of education – Federal College of Education, Eha-Amufu and one state-owned college of education - Enugu State College of Education (Technical). A sample size of 80 teachers was randomly drawn from the two colleges. A researcher-developed questionnaire titled “Lecturers’ Awareness, Competences and Use of Digital Technologies” (LACUDDT) was used to collect data for the study. The instrument which has sections A and B was structured on a Four-Point Modified Likert Scale of “High Awareness” (HA), “Moderate Awareness” (MA), “Low Awareness” (LA), “Not Aware”(NA); “High Competence” (HC), “Moderate Competence” (MC), “Low Competence” (LC), “Not Competent” (NC); “Highly Used” (HU), “Moderately Used” (MU), “Rarely Used” (RU), “Never Used” (NU), contained 70 items based on the objectives of the study and research questions.

The instrument was subjected to validation and reliability test the using the Cronbach alpha test which yielded a reliability co-efficient of 0.76.

Data collected were analyzed with the use of frequency counts, mean statistics and Standard Deviation. Scores from 3.6 and above were rated high; 3.5 to 2.5 were rated moderate while 2.4 to 1.0 was considered low.

Results

Research Question One: What is Lecturers’ level of awareness of digital technologies for teaching?

Table 1: Lecturers’ Level of Awareness of Digital Technologies for Teaching

S/ N	Items	High Awarene ss	Moderat e Awarene ss	Low Awarene ss	NotA ware	Mean	Stan. Dev.	Decision
1	Desktop computers	77	3	-	-	3.9625	.19118	High
2	Laptops	77	3	-	-	3.9625	.19118	High

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3	TV Set	73	7	-	-	3.9125	.28435	High
4	Multimedia Projectors	63	13	2	1	3.7375	.56800	High
5	Over-Head Projectors	27	32	6	5	3.1000	.90847	Moderate
6	Video Technologies	20	23	28	9	2.6750	.97792	Moderate
7	Audio Technologies	20	23	29	8	2.6875	.96251	Moderate
8	Smart Boards	30	33	10	7	3.0750	.92470	Moderate
9	Interactive White Board	25	30	26	9	2.7750	1.01850	Moderate
10	Printers	29	34	16	1	3.1375	.77531	Moderate
11	Scanners	27	30	13	10	2.9250	1.00347	Moderate
12	Digital Cameras	28	30	16	6	3.0000	.92777	Moderate
13	Internet (Wi-Fi)	57	23	-	-	3.7125	.45545	High
14	E-Readers	21	25	24	10	2.7125	.99612	Moderate
15	E-Books	28	31	12	9	2.9750	.98051	Moderate
16	Virtual Encyclopedia	26	29	14	11	3.0500	.93997	Moderate
17	Online Games	20	30	17	13	2.7125	1.02121	Moderate
18	Slide Share	21	23	26	10	2.6875	1.00119	Moderate
19	Flipped Classroom	14	18	27	21	2.3125	1.05054	Low
20	Cloud Computing	17	20	22	21	2.4125	1.09883	Low
21	Podcasts	14	18	27	21	2.3125	1.05054	Low
22	Class blogs	16	22	23	21	2.3875	1.08492	Low
23	Wikis	15	18	25	22	2.3250	1.07650	Low
24	Rich Site Summary (RSS)	14	20	25	21	2.3375	1.05475	Low
25	Smart phones	30	33	12	5	3.1000	.88016	Moderate
26	Personal Digital Assistant	16	20	23	21	2.3875	1.08492	Low
27	IPad	17	21	22	20	2.4375	1.08900	Low
28	iPod	16	20	23	21	2.3875	1.08492	Low
29	Facebook	14	20	25	20	2.3375	1.05475	Low
30	Twitter	20	27	22	11	2.7000	.99873	Moderate

1.08492

31	You-tube	27	29	17	7	2.9500	.95334	Moderate
32	LinkedIn	13	20	26	21	2.3125	1.03482	Low
33	WhatsApp	13	20	26	21	2.3125	1.03842	Low
34	Google+	14	20	25	21	2.3375	1.05475	Low

Table 1 which presents itemized digital technologies for teaching reveals that with means of 3.96, 3.96, 3.91, 3.73 and 3.71 recorded respectively for digital technologies such as desktop computers, laptops TV sets, multimedia projectors, internet (Wi-Fi), lecturers have high awareness for these five technologies; they have moderate awareness for the rest of the digitals technologies with means between 2.5 and 3.1. However, the low means of 2.31, 2.41, 2.31, 2.38 2.32, 2.33, 2.38, 2.43, 2.38, 2.33, 2.31, 2.31and 2.33 recorded respectively for items 19, 20, 21, 22, 23, 24, 26, 27, 28, 29, 32, 33 and 34 i.e. Flipped classroom, Cloud computing, Podcasts, Class blogs, Wikis, Rich Site Summary, PDAs, Ipad, iPod, Facebook, LinkedIn, WhatsApp and Google+, is an indication that lecturers have low level awareness for these digital technologies.

Research Question Two: What is lecturers’ level of competence in the use of digital technologies in teaching?

Table 2: Lecturers’ Level of Competence to Use Digital Technologies in Teaching

S/N	Items	High Competence	Moderate Competence	Low Competence	Not Competent	Mean	Standard Deviation	Decision
35	Can start up and shutdown a computer	67	13	-	-	3.8373	.37124	High
36	Can use application programs like Microsoft Word, Excel, PowerPoint to prepare lesson materials.	34	30	11	5	3.1625	.89221	Moderate
37	Can create basic presentation package	17	20	24	19	2.4268	1.06609	Low
38	Can create written documents and slideshow for class presentation	12	15	31	22	2.2125	1.01500	Low
39	Can prepare and give online lectures and tutorials	5	8	34	33	1.7927	.85689	Low
40	Can give assignments and class projects with the use of digital technologies	9	17	22	32	2.0122	1.03630	Low
41	Can generate multimedia works, images, movies, animations and games for class presentations	7	10	33	30	1.9398	.91531	Low
42	Can maintain records of students’ learning achievements	11	15	30	24	2.1625	1.01188	Low
43	Can download resources such as Lesson Plans and teaching materials from the internet	11	12	31	26	2.1000	1.01383	Low
44	Can contribute to online discussions with students and others	5	8	34	33	1.8125	.85823	Low
45	Can collaborate online with other lecturers within the college	5	8	34	33	1.7975	.85305	Low
46	Can collaborate online with lecturers and other experts beyond the college	5	8	34	33	1.7975	.85305	Low
47	Can share teaching resources and projects developed with others through Google docs, wikis etc.	5	8	34	33	1.7975	.85305	Low
48	Can assess and evaluate students online	9	17	22	32	2.0122	1.03630	Low
49	Can carry on Research using the internet	35	40	3	2	3.3457	.67380	Moderate
50	Can create profiles on Social media platforms and manage them	10	15	30	25	2.1250	.99842	Low
51	Can upload files to digital platforms	12	15	31	22	2.1625	.97362	Low
52	Can use Search Engines like Google, Ask.com, MSN, Amazon etc. effectively	18	31	21	10	2.7125	.95723	Moderate
53	Can publish digital contents using Digital publishing platforms (like WEB, pdf, E-book, Bloggers etc.)	7	10	33	30	1.9250	.92470	Low

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Table 2 presents items on lecturers' level of competence in the use of digital technologies in teaching. Analysis of data reveals that lecturers' level of competence in the use of the digital technologies is high for item 35, that is, for starting up and shutting down the computer system. They possess moderate competencies for items 36, 49 and 52 which are competencies for preparing materials using packages such as Microsoft Word, Excel, and PowerPoint, in carrying out research using internet and use of Search Engines like Google, Ask.com, MSN, Amazon etc., while the competences for use of digital technologies for the rest of the items were low.

Research Question Three: What is lecturers' level of usage of digital technologies in teaching?

Table 3: Lecturers' Level of Use of Digital Technologies in Teaching

S/N	Items	Highly Used	Moderately Used	Rarely Used	Not Used	Mean	Standard Deviation	Decision
54	Use multimedia projector in lesson presentations			6	74	1.0750	.26505	Low
55	Use Audio/Video Conferencing to deliver lessons			1	79	1.0125	.11180	Low
56	Use online methods to deliver lectures and tutorials			1	79	1.0125	.11180	Low
57	Give assignments and class projects with the use of digital technologies			5	75	1.0625	.24359	Low
58	Use internet to post information for the class			11	69	1.1375	.34655	Low
59	Use digital technologies to maintain records of students learning achievements			21	59	1.2625	.44277	Low
60	Download resources such as Lesson Plans and other teaching materials from the internet for use in teaching			1	79	1.0125	.11180	Low
61	Contribute to online discussions with students and others			1	79	1.0125	.11180	Low
62	Use digital technologies to collaborate with other lecturers within the college			1	79	1.0125	.11180	Low
63	Use digital technologies to collaborate online with lecturers and other experts beyond the college			1	79	1.0125	.11180	Low
64	Sharing teaching resources and projects developed with others			1	79	1.0125	.11180	Low
65	Use digital technologies to generate examination questions	18	31	21	10	2.7125	.95723	Moderate
66	Use digital technologies to Assess and evaluate students online	9	17	22	32	2.0122	1.03630	Low
67	Use Virtual learning			1	79	1.0125	.11180	Low

68	Use Virtual Library to improve students' learning	1	79	1.0125	.11180	Low
69	Use Social media platforms as discussion forum with students and other subject experts	2	78	1.0250	.15711	Low
70	Publishing digital contents for lessons	1	79	1.0125	.11180	Low

Analysis of data in Table 3 shows that with low means of less than 2.5, lecturers' level of use of digital technologies for teaching in the two colleges of education in the area of study is low for all the items listed, except for using digital technologies to generate examination questions as in item 65 which recorded a mean of 2.71.

Discussion of Findings

Awareness to use digital technologies in teaching

The result from the analysis of lecturers' level of awareness of digital technologies is an indication that lecturers have high awareness for the regular digital technologies such as desk top computers, laptops, multimedia projectors and smart phones; moderate awareness for most of the digital technologies except for Flipped classroom, Cloud computing, Podcasts, Class blogs, Wikis, Rich Site Summary, PDAs, IPad, IPod, Facebook, LinkedIn, WhatsApp and Google+ with recorded low level of awareness. This finding is in agreement with a similar research carried out by DeCito and Richards (2016) who found out lack of awareness or familiarity of digital technologies among teachers. It is also in line with the findings of Obidike, Anyikwa and Enemu (2010), that even though teachers could identify digital resources that promote learning, they were not aware of how the technological resources can be utilized in promoting children's learning. Hammett and Philips (2014) in their study on university teachers and students observed that many teachers did not have any technology background, and therefore were not using any sort of technology in their teaching. The reason for lack of awareness could be related to lecturers not being conversant with information and communication technologies for teaching and learning. Thakur (2014) had earlier found out from his study that teachers have poor ICT awareness.

Level of competences to use Digital Technologies in Teaching

From the analysis of result, it is clear that lecturers' level of competencies in the use of digital technologies to teach in colleges of education in the area of study is low except for the use in starting up and shutting down of computers; use of regular applications like Microsoft Word, Excel, PowerPoint; in carrying out Research using the internet and use of search engines such as Google, Ask.com, MSN and Amazon. This finding of the study is an indication that lecturers lacked the needed competences for the use of digital technologies in teaching/learning process. This finding agrees with Grunwald, Pfaftenberge, Melnikova, Zascierinska and Ahrens (2016), who in their

study on digital competence of university teachers found out that teacher had low level competence in the use of digital technologies. This finding is also not very different from that of Oniveh, Ohawuro and Oyediran (2017), that teachers lack the competence to use assistive technologies (which included some of the digital technologies listed) for teaching students with special needs. Also, this finding agrees with that of Garba and Alademerin (2014), in their study on the Readiness of Nigerian Colleges of Education towards pre-service teachers' preparation for technology integration that most teachers lacked the experience and competence of using computer associated facilities which includes some of the digital technologies listed in this study. The reason for low competences in the use of digital technologies is most likely to be connected to inadequate preparation of teachers which has been pointed out as one of the challenges facing teacher education Nigeria.

Level of Use of Digital Technologies

From the analysis of data on lecturers' level of use of digital technologies, it is evident that lecturers are not using the technologies in their classroom instruction. This particular finding of the present study agrees with those of some earlier researches. For instance, in Marcelo, Yot and Mayor (2015), it is proved that there is no evidence leading to the conclusion that university dons have successfully integrated a wide range of technologies to support the teaching and learning process. Lecturers were found to be frequently using technologies such as Power-point but they hardly used digital technologies such as blogs, podcasts, e-portfolio, wikis or social networks. With respect to the present study, the reason for lecturers not utilizing digital technologies in teaching could be as a result of their lack of awareness and competences to use the digital technologies in teaching.

Conclusion

The use of digital technologies to widen up access to quality education for a sustainable teacher education cannot be over emphasized. Technology cannot be effective in the classroom without the teachers who are knowledgeable about both the technology itself and its implementation in meeting the goals of education. Sustainable teacher education is no doubt achievable when the key actors in the system (lecturers) are not only knowledgeable in area of specialty, but also skilled in the implementation of innovative practices and processes which are expected to improve learning outcomes. This study sought to find out lecturers' level of awareness, competences and use of digital technologies in teaching in colleges of education in Enugu state. Based on the findings of the study, it is clear that many of the lecturers in two Colleges of Education used in this study are not very aware of the use of digital technologies in teaching. Even where they showed awareness of the digital technologies, their level of competences to use most of the technologies in teaching is low. They could only use the digital technologies to perform simpler tasks such as generating examination

questions. Hence, the use of the digital technologies for sustainable teacher education in the researcher's area of study is still very far-fetched.

Recommendations

The researcher made the following recommendations based on the findings;

1. Lecturers in teacher-education should be sensitized on the need to become aware of digital technologies for teaching.
2. Lecturers should be encouraged to embark on further training and re-training to enable them acquire the needed competencies for use of digital technologies in teaching.
3. Lecturers should be continuously exposed to use of digital technologies in teaching through workshops, seminars and conferences so that they can fit into the 21st Century classroom.
4. Above all, digital technologies for teaching must be made available in the colleges as this would spur the interest of lecturers to acquire the needed competencies for their use, and equally use the technologies in their teaching.

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