

Availability and Utilization of ICT Facilities in Teaching and Learning of Agricultural Sciences at Sokoine University of Agriculture, Tanzania

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Abstract: This study examined the availability and utilization of ICT facilities in teaching and learning of agricultural sciences at Sokoine University of Agriculture (SUA). The study adopted a descriptive survey design and the population of the study comprised of 65 instructors from the College of Agriculture (CoA), 4 Heads of Department and the Head of ICT services at the university. A list of instructors with a minimum of ten or more years in teaching from the CoA was used to develop a sampling frame and all research respondents were purposively selected. The interview schedule and questionnaire with a reliability of 0.89 were employed as means of data collection. Quantitative data was analyzed descriptively while qualitative data were analyzed based on themes. The study revealed that most of the ICT facilities were found to be available at the university but they were inadequate to accommodate the number of instructors present at the respective departments. The study further revealed that the extent of utilization was moderate with some of the ICT facilities being over utilized while others were being underutilized. Therefore, it is recommended that the university administration should improve the ICT infrastructure at the departmental level, offer professional development programs that focus on enhancing instructors' technological proficiency and advocate for sufficient resource allocation at both the university and departmental levels to meet the growing demands of instructors and students.

Keywords: Availability; utilization; ICT facilities; teaching and learning; instruction; agricultural sciences.

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Introduction

In an increased globalized world, advancement of Information and Communication Technology (ICT) has brought significant changes within the global education system. This development has given rise to a lot of investment in various kinds of ICT facilities for teaching and learning (Yushau & Nanim, 2020). The presence and utilization of these facilities in universities has proven to be useful and influential by improving quality teaching and learning (Suleiman *et al.*, 2020) and enhanced instructional delivery (Nweze, 2018; Apagu and Wakili, 2015), removing time and space barriers for learning (Yushau and Nanim, 2020; Onu and Ezhim, 2019) and supporting collaboration and communication between students and their instructors. Furthermore, studies have shown that the use of ICT offers powerful learning environments and transforms the teaching and learning process so that students can deal with knowledge in an active, self-directed and constructive ways (Agbo, 2015).

According to Chirwa (2018b), ICT as a diverse set of technologies, tools and resources is used to communicate, create, disseminate, store and manage information. ICT comprises old and new tools/technologies ranging from radio, TV and chalk or green board, to new facilities such as electronic or computerized devices and internet and wireless technology which exist in multiple forms like audio, video, audio-visual and texts (Olatunde-Aiyedun *et al.*, 2022). ICT can also be defined as electronic or computerized devices, assisted by human and interactive materials that can be used for a wide range of teaching and learning (Apagu & Wakili, 2015). ICT in education therefore, involves the adoption and utilization of contemporary technological facilities to enhance information flow within the educational system.

ICTs are now being used in various education systems for enriching the quality of teaching and learning. As the rate of ICT utilization increases, the transformations introduced by ICTs in the education process continue to broaden. This sustains the motivation and knowledge of both academics and students in higher learning institutions, fostering their commitment to integrate ICT facilities in teaching and learning process (Suleiman *et al.*, 2020). According to Hamilton-Ekeke and Mbachu (2015) and Toyo (2017), the introduction of ICTs into universities has changed the way education is conducted and has paved the way for a new pedagogical approach, where students are expected

to play more active role than before. Students are now getting more involved in the learning process by being active participants in knowledge creation and not mere recipients of knowledge.

Agricultural sciences remain a critical component for national economies and the teaching and learning of agricultural science courses in universities and colleges is essential in preparing future generations to tackle agricultural challenges (Onu & Ezhim, 2019). In recent years, there has been an increasing focus on integration of ICT facilities in teaching and learning of agricultural sciences to enhance the quality of education and to prepare students for the evolving demands of the agricultural industry. Given the importance of ICT in teaching and learning, most countries have developed strategies to ensure that ICT facilities are available and are integrated in educational systems. In Nigeria, for instance, the Federal Government developed an ICT policy in 2001. This policy led to the establishment of the National Information Technology Development Agency (NITDA) with the aim of ensuring that ICT facilities are readily available and are integrated in education (Yushau & Nanim, 2020). Similarly, in Rwanda, the government has been working hard to ensure the utilization of ICTs in education institutions through engagement of pre-service and in-service training of instructors (Noyi, 2013).

In Tanzania, the Government has, over the years, recognized the importance of promoting and supporting the use of ICT facilities in teaching and learning processes (URT, 2018). The Government recognizes that effective use of teaching and learning facilities is essential to enhance students' performance and achievement. Given the importance of ICT facilities in teaching and learning processes, the Government formulated a National ICT policy (NICTP) in 2003 and revised it in 2016 in keeping with the Tanzania Development Vision 2025. One of the policy statements of the NICTP was to ensure effective use of ICT in teaching and learning throughout the formal and non-formal education system (URT, 2016). The government has also facilitated the use of ICT in teaching and learning in universities, in line with the Higher Education Development Program (SUACSP, 2021). Furthermore, on 2023 Workers' day, the President of the United Republic of Tanzania Hon. Dr. Samia Suluhu Hassan, while addressing the workers proposed that the government should reform the E-learning program by having teachers/instructors educated on how to use ICT facilities effectively.

Sokoine University of Agriculture (SUA) is one of public universities in Tanzania. It has been offering agricultural sciences courses since 1965. In the early 1980s, the university faced a high rate of dropouts and repeaters, leading to the launch of the University Teaching, Learning and Improvement Program (UTLIP) which aimed to establish alternative forms of instruction that would enable more interpersonal interactions and exchange of ideas between students and instructors. In 2012, SUA adopted Moodle as the free and open-source software for learning management system, but only for ICT courses. In 2002, the University further formulated an ICT policy to promote appropriate utilization of ICT in teaching and learning. This policy was reviewed in 2014 and 2022 to align with the University's Corporate Strategic Plan of 2011 - 2020 and to improve the quality of teaching, learning, research and outreach using modern ICT facilities (SUA, 2014; SUACSP, 2016, 2021). Despite efforts made, UTLIP workshops conducted since 1986 revealed that too much emphasis is placed on teaching/lecturing and too little emphasis on learning (SUA-UTLIP, 2013; 2017).

It is clear that if ICTs are used effectively to enhance teaching and learning in higher education institutions, they can be a useful tool, especially for enhancing the quality of instruction (Chirwa, 2018a). The incorporation of ICT in teaching and learning has the potential to revolutionize education by making it more engaging, interactive and effective. The teaching of agricultural sciences, in particular, has been greatly impacted by the integration of ICT facilities, as it provides students with access to a wide range of resources and tools to enhance their learning experience (Yushau & Nanim, 2020; Onu & Ezhim, 2019). A lot of efforts have been made by SUA to ensure ICT facilities are available and are properly utilized by members of academic staff to ensure effective teaching and learning at the university (SUA-UTLIP, 2013; 2017). Despite a number of initiatives made and the evident benefits of ICT in teaching and learning of agriculture sciences, the actual utilization of these facilities is still uncertain, particularly during the teaching and learning processes. In principle, there is no readily accessible information about the availability and utilization of ICT facilities at the University, particularly for educational/academic purposes.

On the other hand, several studies on availability and utilization of ICTs in higher education

institutions have found that ICT facilities are limited in most of education institutions (Onu & Ezhim, 2019; Fidelis & Onyango, 2021). Other studies proclaim that ICT facilities are available but they are not properly utilized by members of academic staff during teaching and learning processes (Kiboss & Kosewe, 2017; Okorieocha *et al.*, 2019). As such, there is a need for increased investment in ICT facilities to ensure their availability. There is also a need for instructor training to enhance the utilization of ICT facilities so as to improve the quality of education in agricultural sciences and prepare students for emerging demands in the agricultural industry. This study, therefore, attempted to establish the availability and extent of utilization of ICT facilities by members of academic staff in teaching and learning of agricultural sciences at Sokoine University of Agriculture.

Literature Review

This section presents the review of relevant literature to explore more information on availability and utilization of ICT facilities in the teaching of agricultural sciences.

Types of ICT Instructional Facilities in Agricultural Sciences

There are various types of ICT facilities that can be used in the teaching-learning process in higher education institutions. Several studies have identified various ICT facilities which are now being integrated in teaching and learning processes. For instance, Toyo (2017) designed a study to investigate the ICT adoption on the educational growth at colleges of education in Nigeria. The study revealed that majority of the ICT facilities were the internet, television, photocopying machines, computers, flash drives, printers, intercom, scanners and CD-ROMs. Similarly, a study done by Nweze (2018) on utilization of ICT for quality teaching and learning in the 21st century outlined multimedia, e-learning, personal computer, projectors and television as ICT facilities available for teaching and learning processes.

In Tanzania, Ngalawa *et al.*, (2012) conducted a study on the use of ICT tools in Higher Learning Institutions in Tanzania. The study revealed that desktop computers, laptops, computer laboratories, internet facilities, email platforms and projectors were available in the surveyed universities. This implies that majority of universities surveyed had ICT tools, which are essential for teaching and learning processes. Similarly, Mwanga *et al.* (2022)

conducted a study on extensiveness of utilization of computers for improving teaching and learning in teacher colleges in Kilimanjaro Region. The study found that teacher colleges had computers, computer laboratories and computer software as ICT facilities used for teaching and learning process.

Extent of ICT facilities Utilization in Teaching and Learning of Agricultural Sciences

Utilization of ICT facilities has always been accompanied with mixed reactions on the part of the users across various education institutions. While some studies indicate the extent of utilization of ICTs to be high, other studies proclaim it to be low. For example, Yushau and Nannim (2020) a study about utilization of ICT facilities for teaching purposes among university lecturers in Nigerian universities. The study revealed that educators had the knowledge of using ICT facilities in teaching; however they rarely used the facilities in teaching and learning processes. This study is similar to the one done by Olatunde-Aiyedun, *et al.* (2022) which revealed that science resources especially ICT facilities were not effectively utilized by academic staff in universities due to low level of ICT literacy among the instructors.

Rahman (2016) investigated the use of ICTs in the teaching of agricultural education at in the University of Gezira, Sudan. The study revealed that the majority of instructors utilized ICT facilities irregularly. This phenomenon was attributed to lack of ICT facilities in majority of the classrooms, which made instructors to rely on traditional methods of teaching including the use of black/green boards. Furthermore, Hamilton-Ekeke and Mbachu (2015) conducted a study on the place of ICT in teaching and learning in Nigerian tertiary institutions. The study revealed that basic ICT facilities like computers, printers and internet connection were found to be unavailable. On the other hand, Noyi (2013) conducted a study on applicability of ICTs in enriching curriculum implementation in selected teachers' colleges in Tanzania. The study revealed that instructors in the surveyed colleges utilized the ICT facilities in teaching and learning process to a greater extent. This was attributed to the availability of these facilities in the surveyed colleges and the willingness of instructors to use the ICT facilities in teaching and learning processes.

Theoretical Framework

This study adopted the Technology Acceptance Model (TAM) introduced by Davis (1989) as a

framework to explain and predict how people adopt and use technology, particularly ICT. TAM is widely recognized and frequently applied in studies related to user acceptance and usage of ICT. TAM replaces certain attitude measures from the Theory of Reasoned Action (TRA) with two key factors: perceived usefulness and perceived ease of use. Perceived usefulness refers to the extent to which users believe that a specific technology or ICT system will enhance their job performance and efficiency. Perceived ease of use, on the other hand, refers to users' perception of the effortlessness associated with utilizing the technology. Both perceived usefulness and perceived ease of use are influenced by external factors, including individual differences (such as age, sex, teaching experience, education level and technology self-efficacy) and facilitating conditions (such as the availability and accessibility of ICT facilities, preparation time and administrative support).

The TAM suggests that instructors' use of ICT in teaching may be predicted by their perceived ease of use and perceived usefulness. Instructors' perceived ease of use (e.g. instructors readiness, confidence, positive attitude toward the technology) and perceived usefulness (e.g. increased attention by the students as well as students becoming more engaged in learning) may be influenced by their individual differences (age, sex, teaching experience, education level, technology self-efficacy), facilitating conditions i.e. availability and accessibility of ICT facilities like computers, projectors, internet access etc., time to prepare necessary materials, administrative support like regular trainings and provision of funds. Both perceived use and perceived ease of use influence the actual use/utilization of the ICT facilities. These variables are demonstrated on the framework in Figure 1.

Methodology

This study employed a mixed -method research approach. The mixed approach involves the collection and analysis of both qualitative and quantitative data within a single study. The researchers used this approach to obtain both quantifiable and non-quantifiable information associated with the problem under investigation.

Research Design

The study adopted a descriptive survey research design. According to Nworgu (2006), descriptive survey research design is one in which a group of

people or items is studied by collecting and analyzing data from only a few people or items considered to be representative of the entire group. The descriptive survey method was used as the appropriate design for this study because the study was directed towards instructors, their opinions, attitude and behaviors toward using ICTs in the teaching and learning of agricultural sciences.

Population and Sampling

This study was conducted at the Sokoine University of Agriculture (SUA). SUA is one of the public universities in Tanzania. It is located in Morogoro Municipality. The University is best known in the

country for offering various degree programs in agricultural and allied sciences since its establishment as a College in 1965. The University has five campuses in different regions and seven academic units (SUACSP, 2021). This study was conducted at the College of Agriculture (CoA) in the Edward Moringe Campus, involving four departments: Department of Agricultural Extension and Community Development, Department of Crop Science and Horticulture, Department of Soil Science and Geological Sciences and Department of Animal, Aquaculture and Range Sciences.

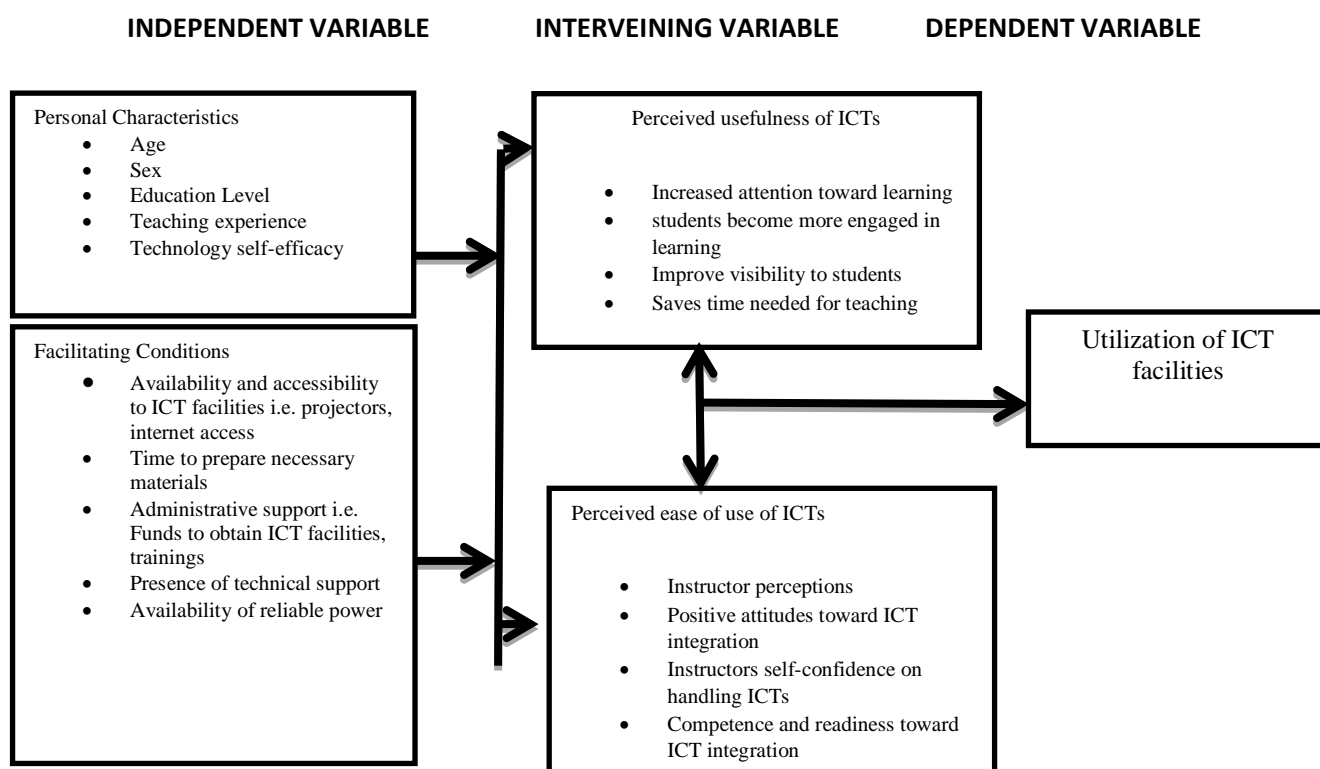


Figure 1: Theoretical Framework (Adapted from Venkatesh and Davis (2000))

The population of the study comprised 65 instructors from the College of Agriculture (CoA) with a minimum of ten years in teaching at the university, 4 Head of ICT services at the university and the Heads of Department from the randomly selected departments. Students were only involved for corroboration of the findings. Purposive sampling was used to select the research participants to participate in the study.

Research Instruments

The instruments involved in this study were questionnaire, interview schedule and focus group discussion guide (FGD). Data from instructors were collected using a self-administered semi-structured

questionnaire. A total of 65 questionnaire sheets were administered to agricultural science instructors with 53 questionnaires recovered and used for the analysis. This indicates that the response rate was 81.54%. Data from the Heads of Departments and the Head of ICT services were collected using the semi structured interview schedule. The FGD guide was developed to guide the researchers in following up the questions on the availability and utilization of ICT facilities at the university. The FGD guide was developed to find out from the group of 10 students from the four randomly selected departments regarding what ICT facilities were available at the University and how

often the instructors utilized the ICT facilities in delivering their instructions.

Validity and Reliability

The instruments were given to experts from SUALISA to critically examine the face and content validity. The expert were given a copy of the instrument and asked to comment on its contents. The comments and suggestions from the experts were incorporated into the final instrument. To establish the reliability of instrument, several copies of the questionnaire were administered to agricultural science instructors from the Department of Human Nutrition and Consumer Studies for pre-testing. Cronbach's Alpha statistical technique was used to determine the internal consistency of the instrument, and it yielded the coefficient of 0.89. This indicated that the instrument was reliable and capable of yielding the desired results for the study.

Statistical Treatment of Data

Quantitative data was analyzed through descriptive statistics. Since the questionnaires were prepared having five point Likert scale range from Very High Extent (=5) to Very Low Extent (=1), mean and standard deviation were used to determine the average of responses. Within the five point ranges, three trisecting scores were used to make the analysis clear as suggested by Creswell and Creswell (2018); these scores were 2.49, 3.49 and 4.49. Thus, the extent of instructors' use of ICTs in teaching and

learning of agricultural sciences were analyzed based on the responses of the respondents. The Remark was reached upon the mean value, whereby a mean value from ≤ 1.49 were to a Very Low Extent, 1.5 to 2.49 were Low Extent, from 2.5 to 3.49 were Moderate, from 3.50 to 4.49 were High Extent and from 4.50 to 5.00 were Very High Extent. Qualitative data was analyzed by using content analysis. Constant comparison analysis was applied where by words were systematically reduced to codes inductively, and then themes were developed from the codes.

Results and Discussion

This section presents findings and the discussion of the findings by the use of literature.

Demographic Information of Participants

Study findings in Table 1 present details about the participants' demographic characteristics. The table shows the frequency and percentage of participants in different categories, including sex, age, teaching experience and academic rank. In regard to sex, the majority of respondents (67.9%) were males. The table also shows that 41.5% of the participants fell within the 40-49 age range. With regard to teaching experience, a bigger portion of respondents (45.3%) had been teaching at the university for 10-15 years. In terms of academic rank, a bigger portion of respondents (41.5%) were lecturers.

Table 1: Demographic Information of participants

Category	Item	Frequency	Percent %
Sex of Respondents	Male	36	67.9
	Female	17	32.1
	Total	53	100.0
Age of Respondents	30-39	10	18.9
	40-49	22	41.5
	50 and above	21	39.6
	Total	53	100.0
Teaching Experience(years)	10-15	24	45.3
	15-20	11	20.8
	20-25	6	11.3
	More than 25	12	22.6
	Total	53	100.0
Academic Rank	Assistant Lecturer	6	11.3
	Lecturer	22	41.5
	Senior Lecturer	11	20.8
	Associate Professor	5	9.4
	Professor	9	17.0
	Total	53	100.0

Table 2: Availability of ICT Facilities for Teaching and Learning of Agricultural Sciences

S/N	ICT Facilities	Available		Not Available	
		Frequency	Percent %	Frequency	Percent %
1	Desktop Computer	35	66.0	18	34.0
2	Laptops	25	47.2	28	52.8
3	Projectors (Overhead, LCD)	52	98.1	1	1.9
4	Print materials (handouts, text books, posters, brochures)	51	96.2	2	3.8
5	Boards (whiteboard, green boards and blackboard)	50	94.3	3	5.7
6	Department computer laboratory	3	5.7	50	94.3
7	Video conferencing media	4	7.5	49	92.5
8	Internet services (WIFI, cable connection)	50	94.3	3	5.7
9	Printer and photocopy machines	49	92.5	4	7.5
10	Scanner	40	75.5	13	24.5
11	Emailing platforms (Gmail, Yahoo)	52	98.1	1	1.9
12	Zoom and Moodle platforms	27	50.9	26	49.1
13	Microsoft Office (Ms. Word, Ms. PowerPoint, Ms. Excel etc.)	50	94.3	3	5.7
14	Television Sets	17	32.1	36	67.9
15	Audio facilities (microphones, speakers)	33	62.3	20	37.7

Research question 1: What ICT facilities are available for the teaching and learning of agricultural sciences at SUA?

This research question sought to establish the ICT facilities available for the teaching and learning of the agricultural sciences at SUA.

The results in Table two indicate that the majority of the ICT facilities were available (i.e.>50%) at the university for teaching and learning purposes. The available ICT Facilities include desktops computers (66%), projectors (98.1%), print materials (96.2%), boards (94.3%), internet services (94.3%), printer and photocopy machines (92.5%), scanners (75.5%), emailing platforms (98.1%), Microsoft office software (94.3%) and audio facilities (62.3%). The findings are in line with TAM as it is seen that the university administration perceived these facilities as useful in teaching and learning process. The findings are also in line with the existing literature on ICT integration in higher education institutions. For instance, studies conducted by Mchalo *et al.* (2021); Noyi (2013) and Mandari (2018) in various educational institutions in Tanzania found that computers, photocopy machines, scanners, printers and Internet facilities were readily available. These findings also align with the findings of Toyo (2017) and Okorieocha *et al.* (2019) who designed studies to investigate ICT adoption on the educational growth of colleges in Nigeria and found that computers, photocopy machines, scanners, printers and Internet facilities were available.

On the other hand, Laptops (47.2%) were found to be slightly available (<50%). However, when instructors were asked about what type of ICT facilities they mostly used in teaching and learning processes, 48(90.6%) said they used their personal laptops. This indicates that, the laptops were available but they are privately owned by instructors and not provided by the university. This implicates instructors' readiness to adopt and change to new teaching technologies in order to enhance the teaching and learning process (Omondi & Jain, 2018).

The interview with key informants sheds light on the availability of ICT facilities for the teaching and learning of agricultural sciences at the university. For instance, the interview with one of the Heads of Departments, revealed,

At the Department level, there are computers, printers, photocopy machines and scanners as well as projectors (LCD and OHP) used for teaching undergraduates and master's students. Individual instructors have their own LCD projectors and laptops. Due to the outbreak of COVID-19, the Department adopted teaching using the Zoom platform, especially for post-graduate students. For undergraduate students, few instructors have been using Zoom facility following the large number of students in

the respective classrooms. Additionally, there is an e-learning platform at the university known as Moodle, where instructors have been directed to upload their teaching notes so that students can easily access the notes (Head of Department, 12th April 2023).

Another Head of Department responded,

We have desktop computers, projectors, laptops and print materials that are used for teaching and learning purposes. In some Departments we have installed smart boards and in both Campuses, Edward Moringe and Solomon Mahlangu, we have established and equipped computer laboratories; we also have ensured there are video conferencing centers, internet services both cable connection and Wi-Fi installed; we have zoom and Moodle platforms and television sets to support e-learning. Additionally, there are audio facilities including several microphones, installed PA systems and mobile PA systems (HOD ICT services, 14th April 2023).

Observations made during the study also indicated that desktop computers, laptops, projectors (both

LCD and OHP), printers, photocopy machines, scanners and internet facilities were available at the university. These findings however are in contrast with the findings of Apagu and Wakili (2015), Nweze (2018) and Onu and Ezhim, (2019) who found that most of the ICT facilities were not available for teaching and learning at different Nigerian tertiary institutions.

On the other hand, when instructors were asked if the available ICT facilities are adequate to accommodate the number of academic staffs present at their respective departments, 49 (92.5%) of the instructors responded by saying they are inadequate while only 4(7.5%) instructors said the facilities are adequate. These findings indicate that while ICT facilities were found to be available, they were inadequate to meet the needs and demands of the instructors. This can potentially be due to the higher number of instructors in these departments compared to the number of ICT facilities at their disposal. This can be attributed to shortage of funds in purchasing enough ICT facilities and shortage of ICT facilities in respective departments (Nweze, 2018).

Research question 2: To what extent are the ICT facilities utilized in the teaching and learning of agricultural sciences at SUA?

Table 3: ICT Facilities Utilization Extent

S/N	ICT Facilities	Mean	Std. Deviation	Remark
1	Desktop computer	1.72	1.265	LE
2	Laptops	4.72	0.822	VHE
3	Projectors (Overhead, LCD)	4.64	0.71	VHE
4	Print materials (handouts, text books posters, brochures)	4.02	0.92	HE
5	Boards (whiteboard, green boards and blackboard)	3.64	1.094	HE
6	Department computer laboratory	1.43	0.951	VLE
7	Video conferencing media	1.28	0.601	VLE
8	Printer and photocopy machines	3.47	1.187	ME
9	Scanner	2.92	1.342	ME
10	Internet Facilities(WIFI, cable connection)	4.34	0.999	HE
11	Emailing platforms (Gmail, Yahoo)	4.08	1.158	HE
12	Zoom and Moodle platforms	2.38	1.18	LE
13	Microsoft Office (Ms. Word, Ms. PowerPoint, Ms. Excel etc.)	4.62	0.765	VHE
14	Television Sets	1.51	1.067	LE
15	Audio facilities (microphones, speakers)	3.02	1.587	ME
	Grand Mean	3.182		

Note: VHE=Very High Extent (5), HE=High Extent (4), ME=Moderate Extent (3), LE= Low Extent (2), VLE= Very Low Extent (1).

Data presented in Table 3 shows the extent of utilization of ICT facilities in teaching and learning of agricultural sciences at the university. Looking at the mean scores, laptops (4.7), projectors (4.64) and Microsoft Office (4.62) were the most utilized ICT facilities, with mean scores indicating a very high extent of utilization. Internet facilities (4.34), emailing platforms (4.08), print materials (4.0) and boards (3.64) were also utilized. These results suggest that instructors at the university have embraced the use of ICT in their teaching and learning activities. This aligns with the increasing recognition of the role of ICT in enhancing teaching and learning outcomes in the university (Omondi and Jain, 2018; Onu and Ezhim, 2019).

This is mainly because the use of these facilities enhances students learning and understanding, improves visibility to students as well as it saves time needed for teaching as indicated on the TAM. The findings also align with the existing literature on ICT integration in higher education institutions. For instance, a study conducted in Kenyan universities found that laptops were widely used by both students and instructors for various educational activities (Chepkoech & Misigo, 2016). Another study in Tanzanian universities highlighted the increasing use of projectors to enhance classroom presentations and facilitate interactive learning (Mshenga & Kitta, 2018). These findings also align with the findings of Toyo (2017); Okorieocha *et al.*, (2019) and Noyi (2013) who reported computers, projectors, email platforms and Microsoft office software were highly utilized in various teaching and technical colleges. The reliance on print materials, internet facilities, and emailing platforms is in line with the growing adoption of digital resources and online communication tools in universities (Kayode *et al.*, 2017).

On the other hand, printer and photocopy machines (3.47), scanner (2.92), and audio facilities (3.02) were moderately utilized, with mean scores indicating that these facilities are utilized at an average level compared to other ICT facilities. The printer and photocopy machines as well as scanners were moderately utilized since these facilities are mostly fixed in instructors offices as highlighted by Mandari (2018). The moderate utilization of audio facilities is directly linked to ability/skills on setting these facilities since some instructors face difficulties in fixing them (Kiboss and Kosewe, 2017).

The moderate utilization of audio facilities was also supported by students during FGD as students proclaimed,

While the number of students in our classes is large, some instructors do not always use audio facilities to ensure effective communication or make sure they are heard when they are teaching. This is mostly due to the fact that some of them face difficulties in setting the speakers especially when the technical support is not available (FGD with students on 16th April, 2023).

Accordingly, desktop computers (1.7), Zoom and Moodle platforms (2.38), video conferencing media (1.28), television sets (1.51), and department computer laboratory (1.43) were the least utilized ICT facilities, with mean scores indicating a very low extent of utilization. This is because these facilities are not readily available (Nweze, 2018; Rahman, 2016; Apagu and Wakili, 2015; Cheserek *et al.*, 2019).

The low utilization of desktop computers in teaching and learning process may reflect a shift towards more portable and versatile devices (Chirwa, 2018b; Mchalo *et al.*, 2021). However, observations made by the researcher revealed that desktop computers were fixed in instructor's offices. Zoom and Moodle platforms were also found to be less utilized. This is attributed to lack of familiarity with the technology or low level of ICT literacy among the instructors since zoom and Moodle platforms are still new teaching technologies (Olatunde-Aiyedunet *al.* 2022; Bao, 2020).

The Overall mean score of 3.182 indicates that the extent of utilization of ICT facilities in teaching and learning of agricultural sciences at the university is moderate. This demonstrates the fact that despite availability of most of the ICT facilities at the University, the utilization of these facilities in teaching and learning of agricultural sciences is still moderate with some facilities being highly utilized and others being underutilized.

Conclusion and Recommendations

Conclusions

The study concludes that a greater number of ICT facilities are available for enhancing the teaching and learning of agricultural sciences at the university. However, these facilities are inadequate to accommodate the number of academic staff

present. As such, instructors do not effectively leverage ICT resources to enhance the teaching and learning processes. The extent of utilization of ICT facilities in the teaching and learning of agricultural sciences was also moderate with some ICT facilities being over utilized and others underutilized. The moderate utilization of ICT facilities suggests a missed opportunity for fully integrating technology into the teaching and learning process.

Recommendations

Based on this conclusions the study recommends the following:

A comprehensive capacity needs assessment should be carried out to determine the specific requirements of each department in terms of ICT facilities and capacity or competencies to use them. This assessment should consider factors such as the number of instructors, the nature of courses taught, the desired pedagogical approaches and staff competencies. The findings will inform resource allocation and help prioritize the areas that require immediate attention.

The university administration should see the necessity of addressing the inadequacy of ICT facilities by investing in infrastructure upgrades and expansion. This includes providing new updated laptops to instructors, increasing the number of projectors and providing necessary software and hardware to support instructors' needs.

The university administration through UTLIP workshops should offer professional development programs that focus on enhancing instructors' technological proficiency, pedagogical integration of ICT tools and troubleshooting common technical issues. This will include putting in line a knowledgeable coordinator together with supporting staff to carry out the UTLIP workshops. There is a need to ensure that the university administration recognizes the importance of ICT facilities in the teaching and learning process. There is also a need to advocate for sufficient resource allocation at both the university and departmental levels to meet the growing demands of instructors and students.

Finally, the University should ensure that there is a dedicated technical support system within each department to assist instructors with any ICT-related challenges. This includes a team of technicians who can provide timely assistance and address technical issues promptly. Regular

maintenance and upgrades of ICT infrastructure should also be part of the support system.

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