APPLICATION OF TECHNOLOGIES TO EDUCATION, TRAINING AND RESEARCH IN LIBRARY AND INFORMATION SCIENCE SCHOOLS IN NIGERIA

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Abstract.

The paper was based on the research conducted on the application of technologies to teaching, learning, and research in the Library and Information Science (LIS) schools in Nigeria. The survey research method was employed. The population of the study was the LIS schools in the country while the respondents were the lecturers, the students (including those who are still working and studying) and the graduates of the programmes irrespective of their places of work and residence. The instrument used for data collection was a web-based self-designed questionnaire patterned along the research questions using the Google Doc. form (Drive.google.com). The online questionnaire was hosted on the Nigerian Library Association (NLA) Online Forum, where every NLA member has the right and privilege to access and utilise the services anytime. Six (6) weeks were given to ensure that all intended respondents participated fully and responded to the questions raised in the questionnaire. It has been discovered that about 20 types of technologies are available and are being used for teaching, learning and research in the LIS Schools in the country. However, while it has also been discovered that even though the stakeholders in the teaching, learning and research endeavours in the LIS schools in Nigeria are aware of the relevance, usefulness and the impacts of technologies on the scheme of education and training generally, this has not been adequately translated and refected on the availability and effective utilisation of the technologies in the LIS schools in the country. The paper concluded that despite the obvious infringing factors inhibiting the adequate availability and effective utilisation of technologies for teaching, learning and research in the LIS schools in Nigeria, concerted efforts have to be made by the primary and secondary stakeholders to change the course of the ship to the right direction through encouraging the relevant authorities' direct interventions; employment of diplomatic and managerial tactical strategies; appeals for assistance from within and outside the country; deliberate provision of training and retraining of the stakeholders in the provision and management of technologies especially through special training schemes; deliberate employment of technologies experts and technicians to domesticate them especially through on-demand education and training for them to fit into the LIS ideals and expectations in education and training; and re-engineering of the internal management structures, mechanisms and strategies in the LIS schools in Nigeria.

Introduction

Basically, the philosophy of education and training is to improve the quality of the life of the educated to be useful to the self and the society especially by contributing positively to its overall development and advancement. This presupposes that education in itself is a process of getting enlightened, informed and knowledgeable in: What to do; Why do it, How to do it;

When to do it; and Where to do it. In the same vain, the philosophy of teaching at all levels of educational attainment and knowledge acquisition is to: encourage and motivate the learner to develop critical thinking and innovative tendencies; conceptualise and develop problem solving mechanism and strategies; develop capacity to appreciate, tolerate and accept others' view points; engage informal and informal cooperative and collaborative endeavours; and possess requisite skills and competencies in the application and utilisation of education, training and learning principles, theories and practices aimed at coping with the exigencies of the philosophy of education, training and knowledge acquisition. Teaching, training and learning normally take place in variety of styles, approaches, methods and strategies which include (a) synchronous/ direct approach in form of classroom face-to-face interactions between the students and the lecturer through: lecture; discussions; debates; essay writings; tests/ pop quizzes; examinations; simulation and modelling; role-playing/modelling; guest lecturing/ speaking; and practical sessions in laboratory and workshop; etc. (b) asynchronous/indirect approach such as: take-home assignments; tutorials; project execution; research and report writing; visits and excursions; group/ individual assignments; group/individual project presentations; internship; exhibitions/ displays; demonstrations; etc. Apparently, teaching, training and learning styles/approaches are needed and are normally being applied in the education, training, teaching and learning courses requiring theoretical or practical groundings in the LIS schools to make the products professionally skilful, experienced, competent and more forthcoming in the labour markets.

Undoubtedly, there are various ways and means of getting educated, trained, informed and knowledgeable, some of which could be through direct contact with the source materials personally or through the assistance of a mediator in the person of a tutor/teacher/lecturer who serves as moderator, facilitator or resource person to make it much more easier for the learner or trainee to effectively access, comprehend and utilise the acquired education, training, information and knowledge. Traditionally, trainees and learners are taught mostly through direct contact with the lecturer in a face-to-face classroom lecture situations and in a linear text mode where the physical presence of both the lecturer and the students in the classroom/lecture theatre is critical and necessary. Also, more often than not, references to additional sources of information in the library are text- based, and may require the user's physical presence. By and large, the gamut of teaching, training and learning activities are teacher-centred and the lecture methods are being employed rather than being student-centred which is prone to independent learning, creativity, innovation, motivation, self-actualisation, and career application irrespective of the time and location of both the students and the lecturer.

The contemporary learning, teaching and training environments are not solely teacher-centred and are not necessarily classroom and lecture methods dependent. Thus, with the application of new technologies, the lecturer's efforts at supporting and enhancing teaching, training, learning and research are made easier with the application of variety of teaching, training and learning technologies especially by the students (as the learner), the lecturer (as a facilitator/guide) and researcher (student/graduate). Technology application approach in teaching, training, learning and research makes the whole exercise learner/user-centred where access to education, training, knowledge and information is not affected by time and location of the students, the lecturers and the researchers. Anusha and Rama (2014) remarked that the usage of technologies in classrooms makes the process of education innovative and it helps to make classroom a site of active learning and critical thinking, furthering student and related with the materials. They added that, technological application makes the students to explore fundamental areas and enable them to understand the concept whereby they can answer the core questions. In another dimension, it could also be said that the emerging web technologies of this digital age can offer varieties of opportunities for education, training, teaching, learning and research in the LIS schools as both the lecturers and the students will be engaged severally and collectively in online network based teaching, training, learning and research activities directly and remotely thereby enhance their creativity, innovativeness, collaboration, information sharing skills and teamwork in multidisciplinary perspectives rather than being independent problem- solvers.

It is unarguable that the LIS schools are undergoing structural shifts and changes especially in terms of the composition of the lecturers and students, training, learning and research paradigm, curricula, methodology of teaching from teacher- centred to student-centred and certification to cope with the expectations of the digital age. This suggests the need for variety of technologies of all sorts, formats, designs and make, to be utilised individually and collectively as they will continually have much consequent impacts on the individuals' and the publics' daily affairs and environments in performing given tasks to the extent that all and sundry, irrespective of the system, environment and one's socio-economic, political and cultural strata, would be technology dependent. Invariably, the continued advances in Information Technologies (ITs) have progressively provided veritable sources of education, training, information, teaching, learning and research resources that are succeedingly changing the landscape of teaching, training, research and learning at all levels of educational systems such that while the lecturers have the liberty to employ more than one relevant technologies for teaching and research purposes, the students' capacity to remember, comprehend, create, innovate, analyse, apply /model and evaluate things and also generate and utilise information for learning and research purposes is greatly enhanced. Frost and Fukami (1997) are of the view that,' as teachers have progressed from the use of blackboards and chalkboards to overhead transparencies and computer-aided presentation, and now to multimedia, more research is needed to help guide the use of these tools to enhance learning'. It is envisioned that technology applications in teaching, learning and research at all levels is result-oriented, cost effective, affordable, accessible, learner-centred, and promotes learner creativity and innovation, motivation, self-satisfaction and actualisation, self-paced modulation, teacher-learner integration and collaboration.

Concepts of Technology in the Scheme of Education, Training, Teaching, Learning and Research in LIS

Conceptually, technology, whether manually driven (technical/mechanical) or electronically dependent(technological/automated), can be conceived as a device, instrument, equipment, tool, facility or physical hardware employed to facilitate and enhance the performance of a given function, activity, operation and other human or systemic expectations. In education and training parlance, such technologies could collectively be considered as educational technologies; for they are being effectively utilised to support, facilitate and enhance result-oriented teaching, training, learning, information access and management, and research by the stakeholders in perspectives. Educational technologies include: multimedia; slide/digitised projectors; still/digitised camera; collaborative learning suites/ commons (such as classroom2.0/3.0 and E-learning 2.0/3.0); computer /automated technologies; smart/ mobile phones; Internet technologies; communication devices and tools; audio-visual devices; learning environments/ commons; networked environments/commons; virtual learning environments/commons(VLE); library environments/commons; Information and Communication Technologies (ICTs); social network media/tools; white/smart boards; synchronous environments(for direct or on-the-spot exchange of ideas, skills, experiences and information with one or more participants at same time- face-to-face), and asynchronous environments(for indirect exchange of ideas, experiences, skills and information among or in-between remote participants- blogging, web2.0/3.0); video games; Open CourseWare (OCW); Computer-Mediated Communication (CMC) environments (for self-study and teacher-students interactions); teleconferencing platforms/facilities; and the likes. Proserpio & Gioia (2007) remarked that, we are no longer teaching a verbal or even just visual, but now a virtual generation of students.

From operational perspectives, educational technology can be conceived as the use of technological and electronically physical hardware, tools and devices as well as educational and learning theories to support and enhance education, training, teaching, learning, research, and knowledge and information acquisition and access. As enablers, supporters and facilitators of robust training, teaching, learning and research endeavours, technologies are being utilised within and outside the classroom to: promote and support: collaborative teaching, learning and research in-between or among lecturers, students and researchers irrespective of their locations; have easy access to variety of information resources regardless of formats; develop independent learning and research skills, competencies and improved outcomes; reduce overdependence on the facilitator/lecturer for learning and research; promote confidence and independent competences in learning and research; enhance and expand teaching and learning beyond the traditional linear text-based learning platforms to other non-text environments especially using automated/ virtual systems to create, demonstrate, simulate and model concepts, thoughts, operations, systems and situations; stimulate creativity and enhance motivation between or among lecturers, learners and researchers; and facilitate formal and informal communication between and among peers, colleagues, lectures, students and researchers regardless of their location. Essentially, this suggests that there is mutually inclusive and symbiotic relationship between technology applications/utilisation and access to education, training, knowledge and information. This is even more obvious where the lectures, students and researchers are privileged to access and utilise network environments, online databases resources, computer facilities and Internet facilities, and other types of web-based technologies to effectively access and gather relevant information as well as make use of Microsoft Window facilities to secure, organise and analyse data and also write and publish reports (desktop publishing); play and edit video and audio recordings; and perform graphic presentations to facilitate teaching, learning and research.

Technology Applications to Education, Training, Teaching, Learning and Research in LIS

The application of technology to education, training, teaching, learning and research in LIS is better appreciated within the framework of Bloom taxonomy of cognitive domain: knowledge acquisition, comprehension, application, analysis, synthesis and evaluation. In another dimension, Anderson and Krathwohl (2001) conceived the Bloom Taxonomy of cognitive domain to mean: remember, understand, apply, analyse, evaluate and create. In reality, the cognitive domains can be effectively realised through technology application to education, training, teaching, learning and research, as the students' capacity and ability are enhanced to remember and understand things taught better; can analyse and evaluate situations better; can apply outcomes of analysis better (especially through case study, games, simulations and modelling); and can generate and manage relevant information appropriately for effective utilisation in the education, training, learning, research, and information and knowledge acquisition processes. These lead to the actualisation of the general expectations and desires of trainees and learners which usually centre on: being excited about the topic/theme being taught; enjoying and being happy with the class/ laboratory sessions; become excited and motivated to learn more about the things being taught; and being able to apply lessons learnt to their respective career expectations and competences. In order to succeed in technology applications to education, training, teaching, learning and research, the lecturer has to possess some competences and skills in varying dimensions such as: pedagogical dimensions-competences related to the use of technology for instructional process, planning , designing, implementing, monitoring and evaluating appropriate technology supported learning and research environment strategies and experiences to enhance and promote performances; professional dimensions- competences and skills related to professional growth, development, advancement, innovations, creativity, cooperation and collaboration and research; technology savvy dimensions-being competent in areas related to technical concept development and operations, systems development functionality, applications and productivity; and social dimensions- competences in related sociological issues such as legal, ethical, social, managerial, economic, cooperative, networking and human affairs. However, the extent to which technologies applications to education, training, teaching, learning and research will be accepted and utilised optimally, will largely be contingent upon: availability of guides and dossiers on the existing relevant technologies and information resources regardless of their location; the user' ability to locate the relevant technologies and information resources for access and utilisation; availability of qualified staff or technicians to facilitate access and use of the technologies and information resources; availability of the relevant technologies and information resources for access and use within the reach of the users; and availability of information on the location of other relevant technologies and information resources in remote locations for access and utilisation.

It is natural that depending on only one type of classroom technology may not satisfy the needs and expectations of the students. Thus, in order to ensure effective teaching and enhanced learning performance, the choice of which technology or a combination of them to be applied will largely depend on the lecturer's teaching skills; the type and levels of the students; students' learning style preferences; type of learning environment; and the topic/theme of study. Application of variety of technologies for different training and learning styles and objectives are needed for the students to appreciate things and get motivated to learn, comprehend, understand, evaluate, analyse, create and apply things better and much more. In their own contribution, Kolb & Kolb (2005) observed that the best classroom learning depends on a good fit among: Professor's cognitive styles, students' cognitive styles; types of materials to be presented; the best technology to deliver these course materials; Professors' cognitive styles and the preferred teaching technology; and students' cognitive style and the preferred teaching technology, and among others.

Arguably from both theoretical and practical perspectives, the extent of technology adoption and application to teaching, learning and research can greatly be affected by the consequences of the implications of the impact of psychology of and theories of learning, particularly, as it relates to behaviourism (human learning- characteristics/attitudes), cognitivism (brain-based learning- human memory/perceptions) and constructivism (learner's own construct of meanings- experience/perspectives). In like manner, technology adoption, acceptability and application to teaching, learning and research at all levels of educational and research processes can significantly be affected positively or otherwise by variety of factors such as: the peculiar predispositions of the lecturers, students and researchers; the prevailing circumstances surrounding the teaching, learning and research environments; the stakeholders' perceived usefulness, relevance, availability, adequacy and appropriateness of the technology being adopted/adapted; and the type and functionality of the technologies in use. By and large, the application and/or non-application of technologies to teaching, learning and research can be influenced by: the lecturer's characteristics, skills and experiences in using the technology; the type of teaching and learning technologies available; the teaching and learning environments; the students' perceived usefulness and relevance of the technology in the learning and research process; the context of the subject area of study; the level of access and ease of use of the technology by the stakeholders for teaching, learning and research; the perceived attitudes, experiences and opinions of others on the usefulness, relevance and ease of use of the technology for teaching, learning and research process; the stakeholders' technology fluency and competence; the perceived levels of the stakeholders' communication , creativity, evaluation, analysis, problem-solving , task execution, and innovative skills and potentials; the perceived implications of the cognitive outcome of applying the technology; and the teaching styles and methods adopted.

Factors affecting Technology Applications to Education, Training, Teaching, Learning and Research in LIS

It is natural that every technology in use in any environment, platform and for what purpose, has its limitations and weakness. Technology application to teaching, learning and research is not an exception. The design and development of modules and course materials could be laborious and time consuming. Much technology fluency and competence is needed of the staff to effectively manage and utilise the technology for the good of the lecturers, students, and researchers. While the application of technology to teaching, learning and research may be promoted and adopted in educational institutions for all levels of educational process, the technology may not necessarily promote the students' and researchers' experience. In addition to availability of technology compliant lecturers, full complement of technology technicians and readily available funds and genuine spare parts are needed for easy maintenance and replacement of broken down and obsolete technologies .There could be over dependence on technology, especially online/mobile/virtual technologies, which could also lead to information overload and confusion resulting to less learning achievements as some of the students may not have possessed some rudimentary technology skills before enrolling for the LIS programme.

Statement of the Problem

As at 2014, Nigeria has 25 University based Library and Information Science (LIS) Schools approved and accredited by the university education regulatory agency (National University Commission (NUC) and also recognised by the professional regulatory agency (Librarians' Registration Council of Nigeria (LRCN). While some of them only run undergraduate programmes, others offer both undergraduate and postgraduate programmes ranging from Postgraduate Diploma, Masters, M.Phil. and Ph.D in different areas of specialisation in LIS. A review of their undergraduate student annual enrolment which used to be around 20-30 students in the mid-1960s to 1970s has gradually risen to 40 to 50 in the mid-1980s up to the early 1990s. By the late 1990s to date, the average undergraduate student enrolment is between 100 to 200 students and could sometimes rise up to 300+ students. In another dimension, while at the Postgraduate Diploma and Masters Programmes, the annual student enrolments over the years has gradually risen from 10 to 50 students and sometimes more, at the M.Phil. And Ph.D levels, the student annual enrolment oscillates between 5 to 10 students and sometimes less than 3 students, depending on the availability of qualified and competent teaching staff, the number of the students on ground that are yet to graduate and the area of specialisation of the prospective student. Due to continued annual increase in the number of applicants for the LIS programmes at all levels, some of the LIS schools in the country conduct annual entrance/ qualifying examinations and interview in order to admit the competent ones. In addition, some of them offer Long Vacation Training (LVT) and Open and Distant Learning Education (ODLE) programmes to accommodate the working class candidates who may not have the opportunity for to attend full-time academic sessions on the campuses. As for the working class postgraduate students who may not have the privilege to combine working and schooling at the same time, some LIS Schools offer weekend programmes to accommodate them. It can however be argued that the spiral rise in the student annual enrolments for LIS programmes at all levels in the LIS schools in Nigeria is attributed to the direct response to the growing population of candidates struggling for the limited space available for admission; versatility and diversity of the programmes which make the graduates employable in places other than libraries; institutions and organisations, and indeed Nigeria's general public/society are increasingly being appreciative and receptive of the vital roles of Library and Information Management professionals in the provision and management of information in their respective domains; the inclination of the LIS curricula towards ICT which has further popularised the programme among candidates wishing to be admitted without Computer Science background; the ability of the programme to attract especially postgraduate students with no LIS background; and the graduates of the programmes can be self-employed and also secure jobs in various public and private establishments and institutions other than libraries. However, an assessment of the state- of-the- art of the LIS programmes' curricula, teaching, learning, research potentials and supervision of the students; as well as the experiences gathered over the years from the LIS schools' Resources Verification and Programme Accreditation exercises organised by the NUC at all programme levels point to some inadequacies especially in terms of: the quality and quantity of qualified and competent teaching and supervisory staff at the undergraduate and postgraduate levels; the availability and adequacy of digitised teaching and learning facilities; and the extent of the available and sufficient state–of-the-art libraries/information centres in some of the departments. Some of the Departments rarely met the NUC Bench Mark of staff/Students ratio of I lecturer to 30 students (1:30) and staff mix of 20% Graduate Assistants-Lecturers 1 cadre, 35% Senior Lecturer cadre and 45% Associate Professor (Reader) and Professorial cadre(20:35:45). However, some of the Departments have to rely on Part-Time lecturers, Visiting Lecturers and Sabbatical Leaves lecturers to cope with the challenges of staff deficits. In another dimension, there has been some appreciable inter-departmental cooperative and collaborative endeavours between the LIS Departments and others in the teaching and supervision of especially postgraduate students specialising in other related areas of information services delivery and management. It is due to the foregoing state of things in the LIS schools in Nigeria that research on the application of technologies to teaching, learning and research is found to be necessary, relevant and apt.

Research Questions

This research was designed to provide answers to the following questions

1. What types of technologies are available and are being used for education, training, teaching, learning and research in the LIS schools in Nigeria?
2. How adequate are the available technologies used for education, training, teaching, learning and research in the LIS schools in Nigeria?
3. What benefits are derived from the utilisation of technologies for education, training, teaching, learning and research in the LIS schools in Nigeria?
4. What is the pattern and frequency of use of the technologies for education, training, teaching, learning ad research in the LIS schools in Nigeria?
5. What are the challenges to the use of technologies for education, training, teaching, learning and research in the LIS schools in Nigeria?

Research Method Adopted

Due to the scattered locations of the LIS schools across the 6 geo-political zones of Nigeria, the survey research method was adopted for the study. The population of the study is therefore all the LIS schools in Nigeria, while the respondents are the teaching staff, undergraduate and postgraduate students (including those working and studying), and the graduates of the LIS schools irrespective of their places of work and residence. The instrument used for data collection was a web-based self-designed questionnaire patterned along the research questions using the Google Doc. form (Drive.google.com). The online questionnaire was hosted on the Nigerian Library Association (NLA) Online Forum where every NLA member has the right and privilege to access and utilise services anytime. In the first instance, the respondents were given one month to complete and submit online the completed questionnaire. However, the response time was further extended by two weeks to ensure that no intended respondent was left out.

Data Analysis, Presentation and Discussion of the Findings

The data collected for the study were analysed using descriptive statistics and the results were presented and discussed in relation to the research questions raised.

Response Rate

Based on the research methodology and instrument employed for the study, the respondents from the 10 participating LIS schools in Nigeria responded to the online questionnaire designed to elicit answers to the research questions raised. The LIS schools studied and the numbers of the respondents were presented in table 1 and fig.1

Table 1: **LIS schools whose respondents participated in the study**

S/N	Name of LIS schools	No. of Respondents	Percentage (%)
1	Babcock University Library	5	4.3%
2	Ahmadu Bello University Zaria	60	52.5%
3	Federal University of Technology Minna	10	8.7%
4	University of Ilorin	10	8.7%
5	University of Maiduguri	5	4.3%
6	African Regional Centre for Information Science (ARCIS)	5	4.3%
7	Federal College of Education Zaria	5	4.3%
8	Bayero University Kano	5	4.3%
9	University of Ibadan	5	4.3%
10	Kaduna State University	5	4.3%
Total		**115**	**100%**

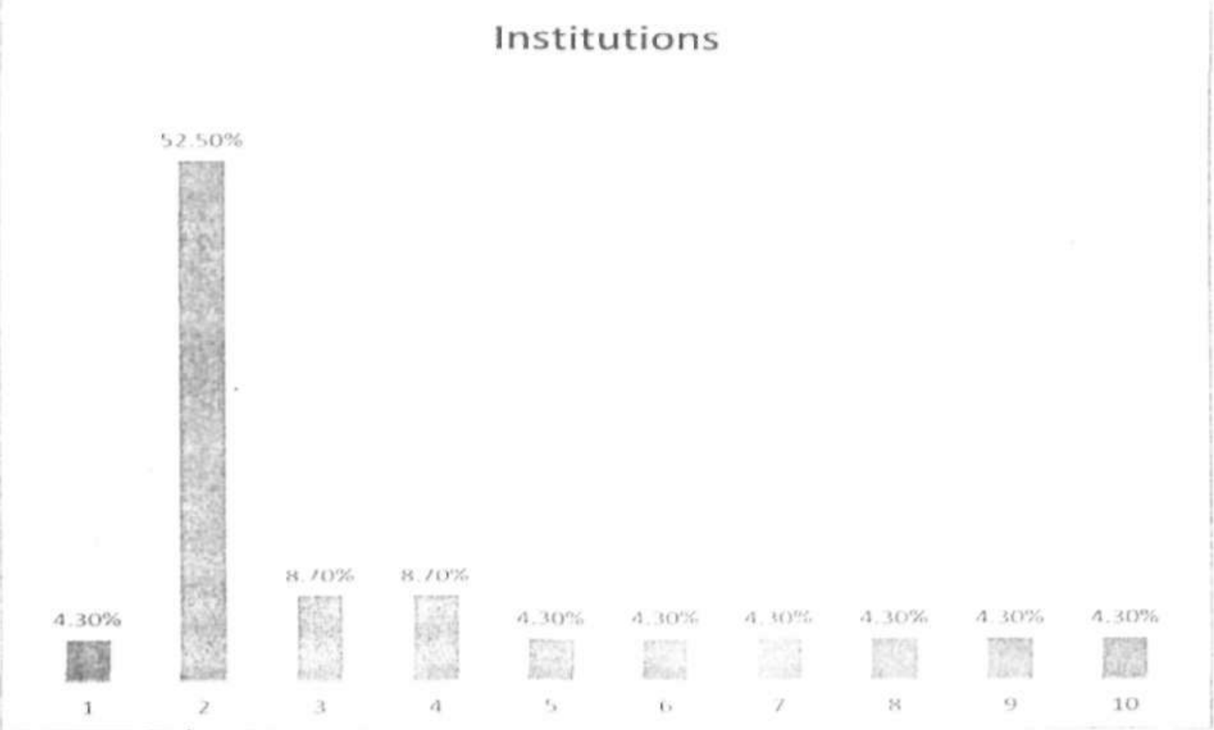

Fig.1: LIS schools whose respondents participated in the study

It is of interest that of the dozens of LIS schools operating in Nigeria, only ten of them could avail themselves the opportunity to participate in the study. Given the six weeks response time and the successful hosting of the online questionnaire on the NLA Online Forum which all the NLA members are entitled to access and utilise at will, it can be said that the response rate is fair enough a representation of the LIS schools (40% of 25 NUC/LRCN approved/accredited) in the country. On the other hand, it can as well be assumed that perhaps the non-responding LIS schools may not have been effectively applying technologies to teaching, learning and research in their respective domains.

The Respondents' Status in the LIS Schools Studied

For records, the researcher analysed the status of the respondents from the LIS schools that participated in the study. The result is presented in table 2 and fig.2

Table 2: Respondents' Status in the LIS Schools Studied

S/N	Status of Respondents in LIS schools	Frequency	Percentage (%)
1	Studying /Working	45	32.6
2	Graduate	27	19.5
3	Lecturing	66	47.9
N	Total	138	100

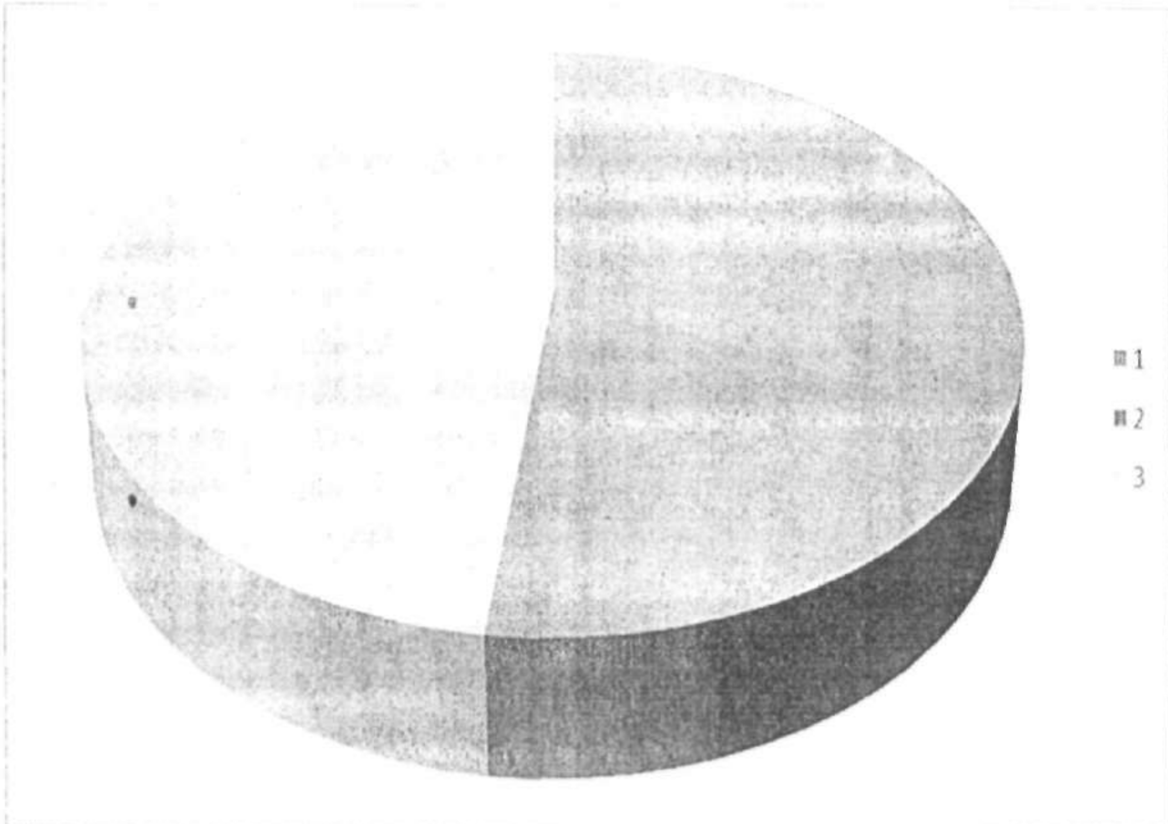

Fig. 2: Respondents' Status in the LIS Schools Studied

Table I and fig.1 above shows that of the 138 respondents, 66 (47.9%) of them were lecturers in the LIS schools studied. While 45(32.6%) of them are currently students studying in the LIS Schools who may also be working, 27(19.5%) of them were graduates of the responding LIS schools engaged in one thing or the other. Considering the opportunity given to all the LIS schools in the country to participate in the study via the NLA Online Forum vis-à-vis the 10 responding LIS schools (40% of the 25 NUC/LRCN approved and accredited LIS schools), and the mixture of the status of the respondents (138), it is sufficient enough to make generalised acceptable statements on the findings of the study on the application of technologies to teaching, learning and research in the LIS schools in the country.

Types of Technologies Used for Education, Training, Teaching, Learning and Research in LIS schools

The researcher tried to find out the type of technologies available and being used for education, training, teaching, learning and research in the LIS schools in the country. The respondents were given several options from which to tick as many responses found relevant. The results of their responses were shown in table 3 and fig.3.

Table 3: Types of Technologies Used for Education, Training, Teaching, Learning and Research in LIS schools.

S/N	Types Technologies Used	Frequency	Percentage (%)
1	Computer and its accessories	19	83%
2	Internet and its facilities	22	96%
3	Mobile /portable devices	12	52%
4	Video Conferencing	9	39%
5	Modules (Learning Plat Form)	7	30%
6	Television	11	48%
7	Radio	13	57%
8	Projector	20	87%
9	Graphics	9	39%
10	CD-ROMs	20	87%
11	E-lecture	12	52%
12	Slide/PowerPoint Presentation facilities	21	91%
13	Social network	21	91%
14	Electronic Board	11	48%
15	Skype	10	43%
16	Viber	6	26%
17	Online Discussion	11	48%
18	Smart Board	17	74%
19	GSM/SMS	17	74%
20	Conference Call	4	17%

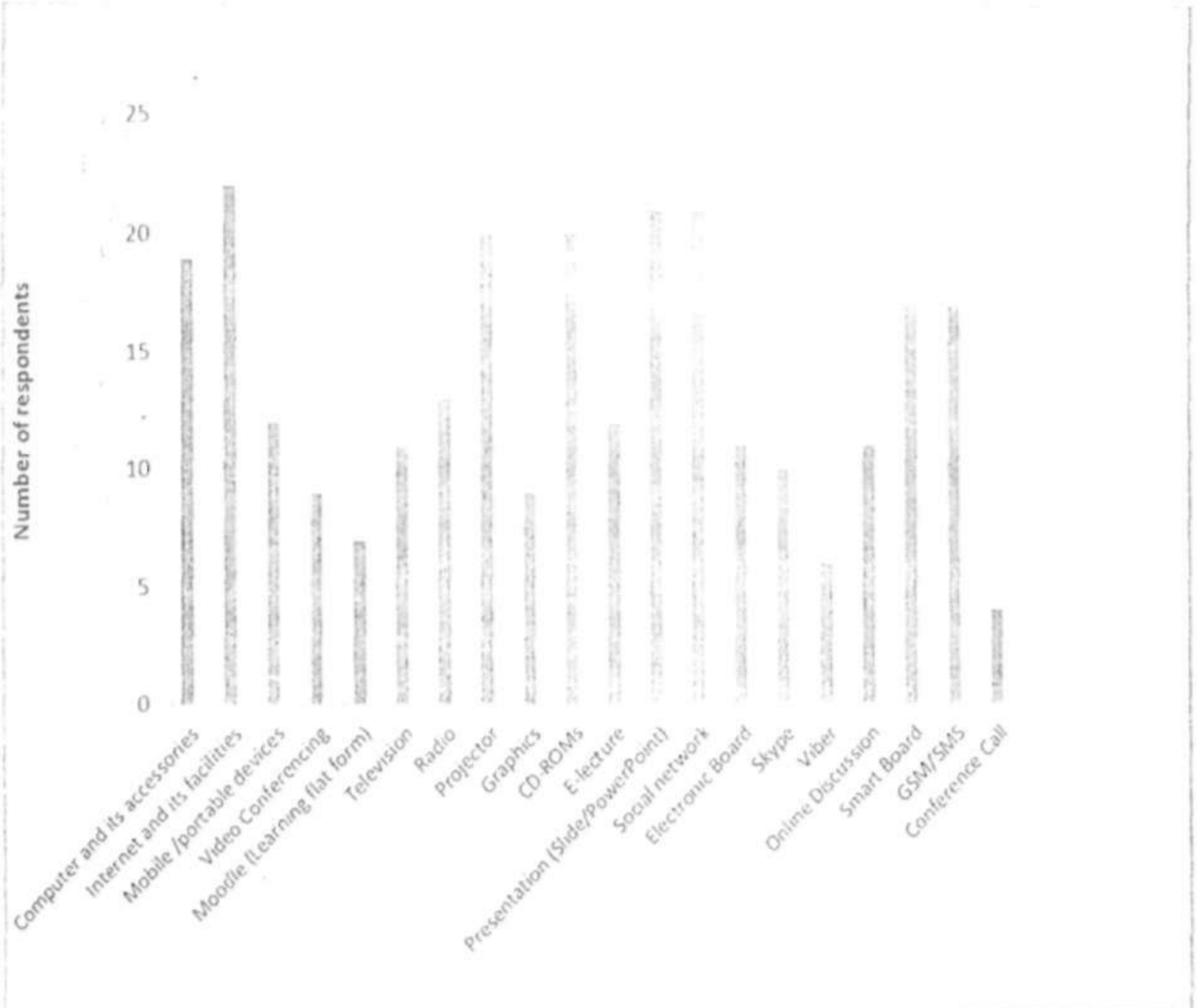

Fig. 3: Types of Technologies Used for Education, Training, Teaching, Learning and Research in LIS Schools

An assessment of table 3 and figure 3 above indicated 20 different types of technologies available and are being used for education, training, teaching, learning and research in the LIS schools in the country. The mostly available and used technologies for teaching, learning and research in the LIS schools studied in the country were Internet and Facilities (96%); Slide/Power Point Presentations and Social Networking (91%) each; CD-Rooms (87%); Computer and Accessories (82%); and Smart Boards and GSM/SMS (76%) each. However, the least available and used technologies include: Modules (Learning Plat Form: 30%); Viber (26%), and Conference Calls (17%). Considering the type of technologies available and are being used for education, training, teaching, learning and research in the LIS schools, it could be said that the schools are faring in the application of technologies for such purposes at varying levels. However, the extent of their adequacy may sufficiently influence their effective usage by all the stakeholders .It is expected that students are given ample opportunities to access and effectively utilise training, teaching, research and learning technologies individually and collaboratively to enhance their learning performance and knowledge achievement.

Availability and Adequacy of Technologies Used for Education, Training, Teaching, Learning and Research in LIS schools

As a follow up to the assessment of the technologies available and are being used for teaching, learning and research in the LIS schools in Nigeria, the researcher attempted to determine their levels of adequacy for the purposes they have been acquired for. The respondents were given several options to choose from and tick as many options found relevant. The results of their responses were presented in table3 and figure 3.

Table 4: Availability and Adequacy of the Technologies Used for Education, training, Teaching, Learning and Research in LIS schools

S/N	Availability and Adequacy of Technologies Used	Adequate	Undecided	Not adequate
1	Computer and Accessories	19 (83%)	3 (13%)	1(4%)
2	Internet and facilities	15 (65%)	7 (30%)	1(4%)
3	Mobile/Portable devices	11 (48%)	6 (26%)	6 (26%)
4	Video Conferencing	2 (9%)	15 (65%)	6 (26%)
5	Moodle (learning flat form)	4 (17%)	13 (57%)	6 (26%)
6	Television	6 (26%)	11 (48%)	6 (26%)
7	Radio	7 (30%)	8 (35%)	8 (35%)
8	Projector	14 (61%)	6 (26%)	3 (13%)
9	Graphics	7 (30%)	11(48%)	5 (22%)
10	CD-ROMs	14(61%)	7(30%)	2 (9%)
11	E-lecture	5 (22%)	12 (52%)	6 (26%)
12	Slide/Power Point Presentation facilities	16 (70%)	5 (22%)	2 (9%)
13	Social network	14(61%)	6 (26%)	3 (13%)
14	Electronic Board	10 (43%)	9 (39%)	4 (17%)
15	Skype	7 (30%)	11 (48%)	5 (22%)
16	Online Discussion	7 (30%)	12 (52%)	4 (17%)
17	Smart Board	13 (57%)	6(26%)	4(17%)
18	Viber	6 (26%)	14 (61%)	3 (13%)
19	GSM/SMS	15(65%)	4 (17%)	4(17%)
20	Conference Call	14(17%)	6(26%)	3(13%)

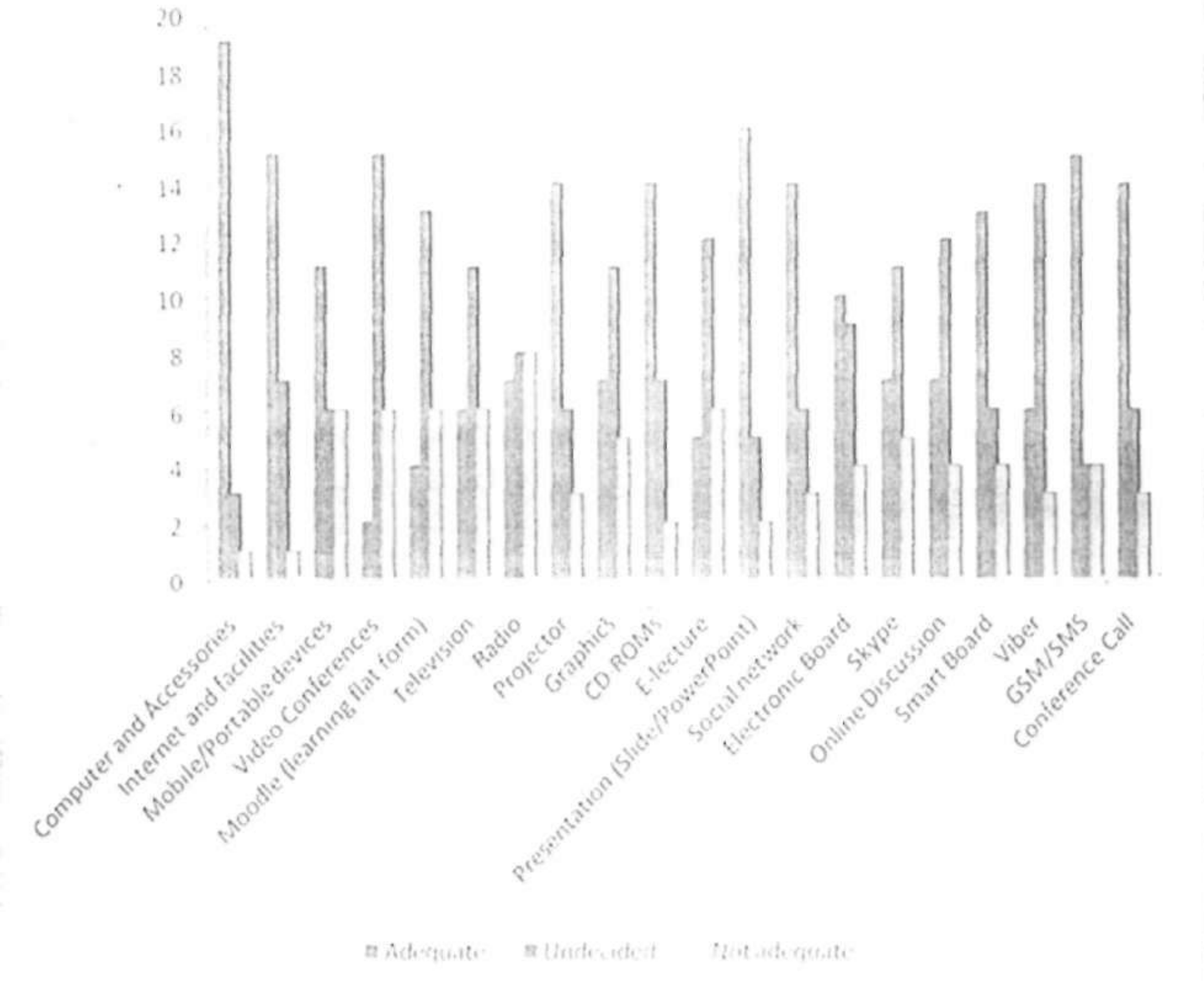

Fig.4: Availability and Adequacy of the Technologies Used for Education, Training, Teaching Learning and Research in LIS schools

The analysis in table 4 and fig.4 showed that of all the 20 types of technologies available and are being used for education, training, teaching, learning and research in the LIS schools studied and based on a cut-off point of 60% and above, it has been discovered that: Computer and Accessories (83%); Slide/Power Point Presentation Facilities (70%); Internet and Facilities and GSM/SMS (65%) each; and Social Network, Projectors and CD-Rooms (61%) each were found to be adequately available for the intended use by the lecturers, researchers and students. Apparently, it can be said that of the 20 types of technologies available and are being used for teaching, learning and research, only seven (7) of them were adequately available for use in the LIS schools. On the other hand, technologies such as: Viber and Television (26%) each; Modules (learning flat form) and Conference Call (17%) each; and Video Conferencing (9%) were found to be inadequately available for use for teaching, learning and research in the LIS schools studied. According to the IFLA (2012) Guidelines for Professional Library /Information Education Programme, there should be information technology resources such as computer hardware and software and multimedia resources as well as Internet resources adequately available and sufficient for students and staff for the level of use required for the coursework and faculty research.

It is necessary that technologies for education, training, teaching, learning and research are made sufficiently available for use by the lecturers, students and researchers. Technologies are needed to reduce the negative impact of over-population of students in classes and laboratories/workshops; the stress in organising and assessing students' performances; the hurdles in engaging in individual learning; hick-ups in effectively participating in informal peer group social interactions, communication and learning; and the difficulties in quick search for relevant and current information for research and class works in libraries, online databases, Internet and other web-based technologies. Knowledge acquisition and Information sharing and communication between and among students and lecturers, irrespective of their location and time of contact, is made easier and simplified with effective use of technologies.

From the researcher' interactions with some lecturers, graduates and students of some LIS schools in Nigeria at different formal and informal fora and the experiences gathered during the NUC programme accreditation and resource verification exercises in several LIS schools in the country, it has been observed that the inadequate availability of technologies for education, training, teaching, learning and research in the LIS schools in the country can be associated with: the costs of purchases and maintenances; lack of genuine spare parts and competent technicians; unconducive atmosphere of the laboratories/workshops for housing and utilising the technologies; inadequate fluency and competence in technology applications/use by the primary stakeholders leading to frequent break down of the facilities/equipment; and in ability to replace obsolete and broken down facilities/equipment due to non-availability of funds for handling emergency cases and situations.

Uses/Benefits Derived from Use of Technologies for Education, Training, Teaching, Learning and Research in LIS schools

In this era of digital age, the need to adopt and continually embrace the application of technologies to facilitate and ease execution of tasks and performances require no emphasis. In identifying the uses and benefits derived from technology application to education, training, teaching, learning and research in the LIS schools in Nigeria, the respondents were asked to tick as many responses found relevant from the several options provided to choose from. The outcome of their responses were analysed and presented in table 5 and fig.5.

Table 5: The Uses/Benefits Derived from Use of Technologies for Education, Training, Teaching, Learning and Research in LIS Schools

S/N	Uses/benefits derived from Use of Technologies	Frequency	Percentage
1	Ease of access to lecture/notes/presentation	18	78%
2	Ease of importing/exporting lectures/presentation	21	91%
3	Ease of updating of lectures/presentation	22	96%
4	Ease of retrieval of lectures/presentation	21	91%
5	Technologies bridges time and locations	23	100%
6	Ease of Playback	21	91%
7	Ease of Storage of lectures/presentation	22	96%
8	Ease of Security of lectures/presentation	22	96%
9	Ease of Review of lectures/presentation	21	91%
10	Ease of Duplication	19	83%
11	Ease of Adoption	16	70%
12	Ease of Adaption/Customisation	15	65%

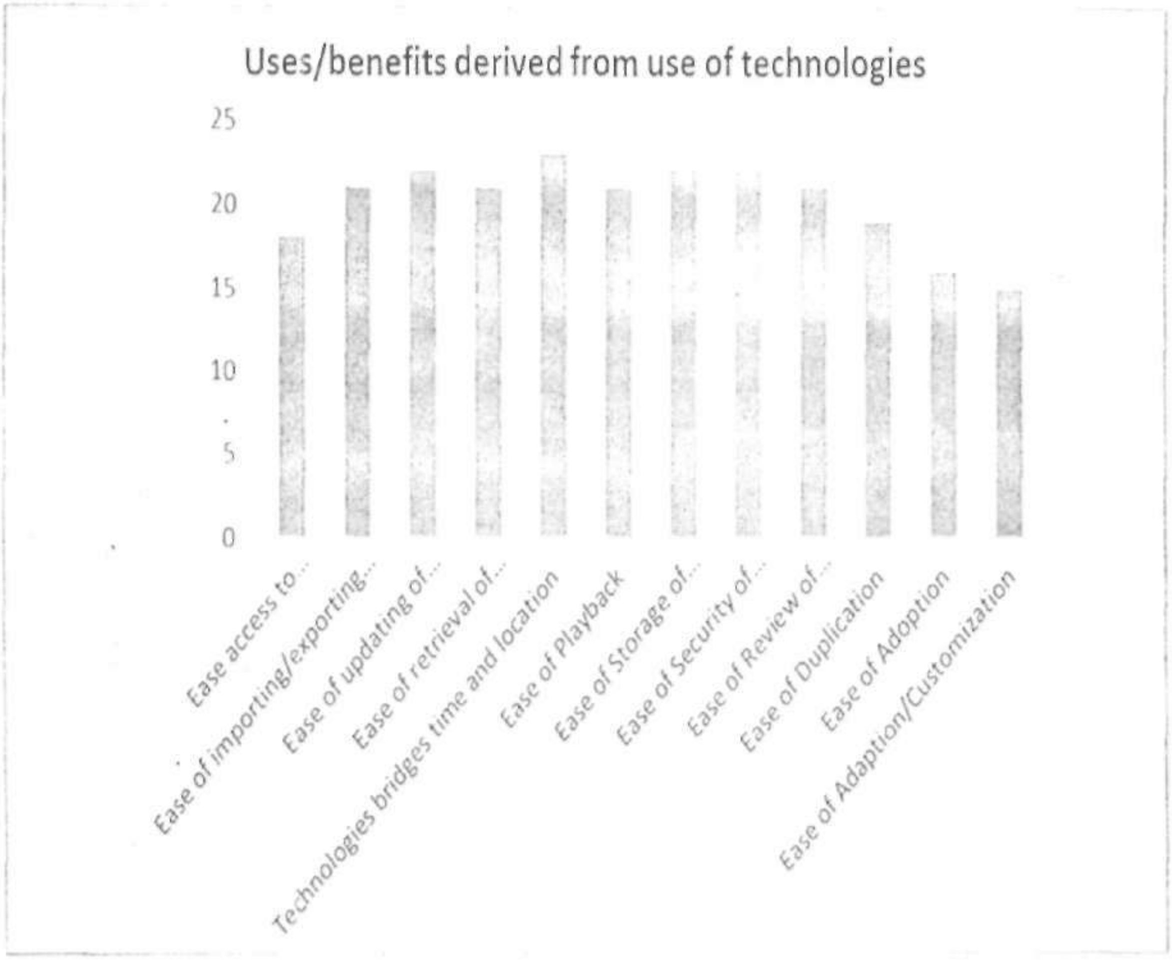

Fig. 5: Uses/Benefits Derived from Use of Technologies for Education, Training, Teaching, Learning and Research in LIS Schools

An analysis of the responses presented in the above table 5and figure 5 indicated 12 types of uses and benefits derivable from the application of technologies to education, training, teaching, learning and research in the LIS schools in Nigeria. Virtually, all responses scored over 60% with '*Technologies bridge time and location*' *having 100% score and* 'Ease of Adaption/Customisation' with the least score of 65%. This finding implies that apparently all the stakeholders in the application of technologies to education, training, teaching, learning and research in the LIS schools in Nigeria are not oblivious of the advantages of technology applications and are amenable to their adoption and utilisation in their places of work and residence.

Pattern and Frequency of Use of Technologies for Education, Training, Teaching, Learning and Research in LIS schools

Based on the respondents' responses to their levels of awareness of the uses and benefits derivable from technologies applications to education, training, teaching, learning and research in the LIS schools in Nigeria, the researcher tried to identify their pattern and frequency of use of technologies in the LIS schools. The respondents were given several options to tick as many responses as found relevant using the Lerket scale of measurement.

Table 6: Pattern and Frequency of Use of Technologies for Education, Training, Teaching, Learning and Research in LIS Schools

S/N	Pattern and frequency of use of the technologies	Seldom	Daily	Weekly	Monthly	Annually
1	Computer and Accessories	4 (17%)	10 (43%)	5(22%)	3(13%)	4(4%)
2	Internet and Facilities	1 (4%)	14 (61%)	6(26%)	1(4%)	1(4%)
3	Mobile /Portable Devices	6 (26%)	5 (22%)	7(30%)	4(17%)	1 (4%)
4	Video Conferencing	11 (48%)	2 (9%)	3(13%)	4(17%)	3 (13%)
5	Module (Learning flat form)	14 (61%)	1 (4%)	1(4%)	4(17%)	3(13%)
6	Television	10 (43%)	3 (13%)	6(26%)	3(13%)	1(4%)
7	Radio	10 (43%)	3(13%)	7(30%)	2(9%)	1(4%)
8	Projector	4(17%)	8(35%)	8(35%)	2(9%)	1(4%)
9	Graphics	11(48%)	5(22%)	2(9%)	2(9%)	3(13%)
10	CD-ROMs	5 (22%)	6 (26%)	9(39%)	2(9%)	1(4%)
11	E-lecture	8(35%)	2(9%)	7(30%)	4(17%)	2(9%)
12	Slide/PowerPoint Presentation Facilities)	2(9%)	8(35%)	7(30%)	4(17%)	2(9%)
13	Social Network	4(17%)	7(30%)	6(26%)	3(13%)	3(13%)
14	Electronic Board	7(30%)	6 (26%)	6(26%)	3(13%)	1(4%)
15	Skype	12(52%)	2(9%)	6(26%)	2(9%)	1(4%)
16	Online Discussion	7(30%)	9(39%)	4(17%)	2(9%)	1(4%)
17	Smart Board	6(26%)	6(26%)	7(30%)	2(9%)	2(9%)
18	GSM/SMS	4(17%)	8(35%)	7(30%)	3(13%)	1(4%)
19	Conference Call	12(52%)	1(4%)	3(13%)	5(22%)	2(9%)
20	Viber	7(30%)	9(39%)	4(17%)	2(9%)	1(4%)

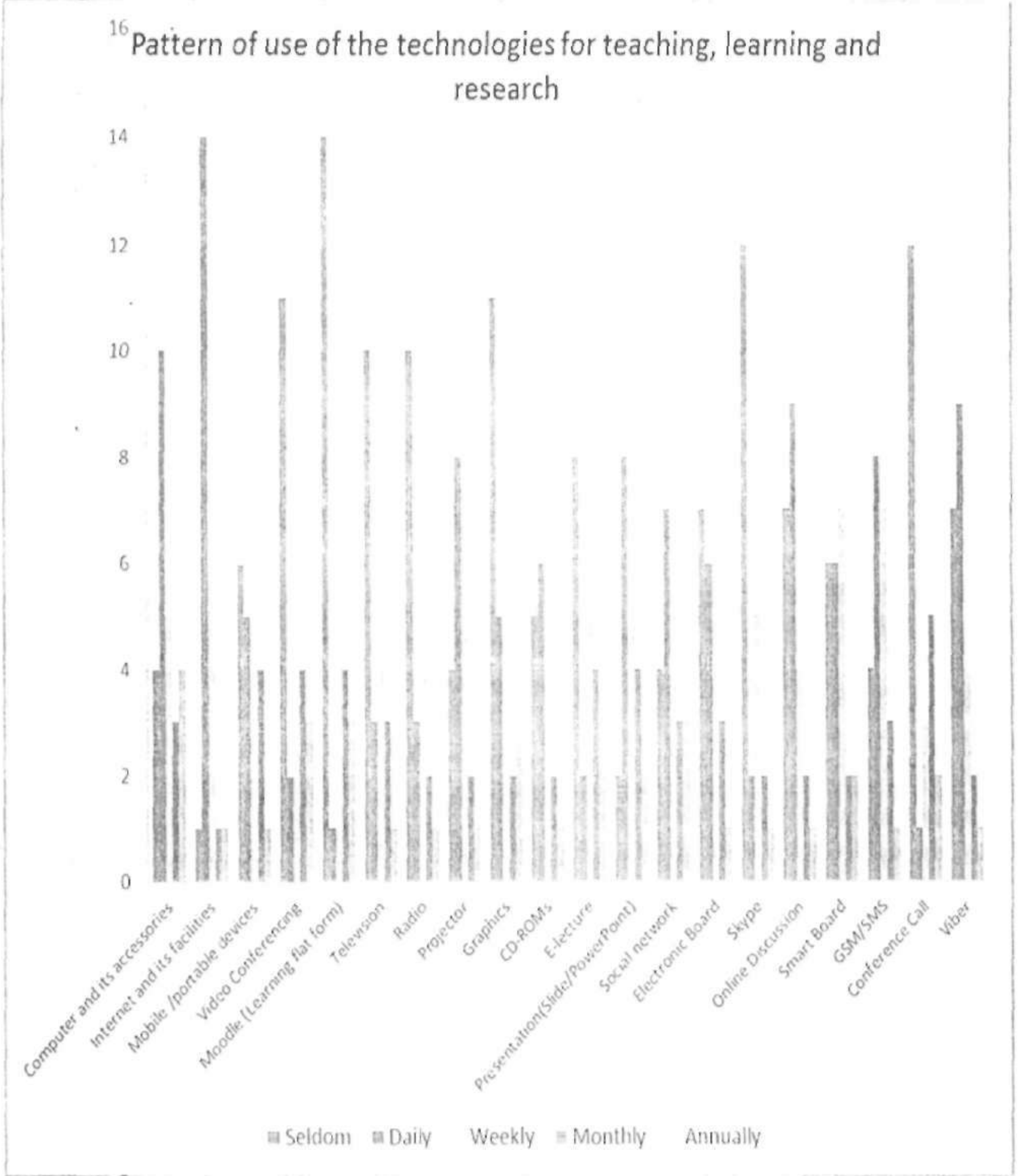

Fig.6: Pattern and Frequency of Use of the Technologies for Education, Training, Teaching, Learning and Research in LIS schools

Using a cut-off average percentage score of 35%, the technologies found to be in use daily in the LIS schools in Nigeria are: Computer and Accessories (43%); Internet and Facilities (61%); Projector, GSM/SMS and Slide/PowerPoint Facilities (35%) each; and Online Discussion and Viber (39%) each. In the same vain, the technologies found to be in use on about weekly basis are mostly overhead/digital Projector (35%) and CD-ROMs (39%).

However, in retrospect, despite the acclaimed awareness of the use and benefits of technologies applications to education, training, teaching, learning and research in the LIS schools in the country as shown in table 5 and fig.5 above, it has generally been observed that none of the technologies identified are being effectively utilised in the LIS schools on daily or weekly basis with an average percentage score of about 50% and above. It could thus be said that the technologies are indeed not being fully utilised optimally by the stakeholders.

The researcher's assessment of the causes of low utilisation of the technologies in the LIS schools in the country point to variety of infringing factors which include: technology application/use phobia and non-fluency especially by the old generation lecturers and the elderly students/graduates; electricity supply challenges leading to over dependence on electric generators; Internet connectivity challenges and sustenance; proliferation of the technology laboratories/workshops with outdated and broken down technologies; poor maintenance culture where things are allowed to rout away for so long before they are being taken care of; and non-availability of competent technicians to effectively handle the various technologies challenges; and unconducive atmosphere of the laboratories/workshops for housing and utilising the technologies. In today's digital age, the new generation lecturers, students and researchers are reasonably computer/ technology savvy such that with their varying digital experiences and skills, they can easily access and manage information efficiently and economically.

Challenges to Use of Technologies for Education, Training, Teaching, Learning and Research in LIS Schools

In an attempt to identify the challenges to technology application in the LIS schools in the country, several options were provided for the respondents to tick as many options found relevant. Their responses were presented in table 7 and fig.7.

Table 7: Challenges to Use of Technologies for Education, Training, Teaching, Learning and Research in LIS Schools

S/N	Challenges to the use of technologies	Frequency	Percentage
1	Lack of supportive infrastructures	14	61%
2	Lack of time to spend on technology	11	48%
3	Lack of training	14	61%
4	High cost of technology	16	70%
5	Wrong choice of software or software	17	74%
6	Lack of understanding of the value or possible benefits	15	65%
7	Lack of perceived economic and other benefits	18	78%
8	Too hard to use	11	48%
9	Not being user-friendly	15	65%
10	Problem of ICT / Computer Literacy	14	61%
11	Network access problem	15	65%
12	Inadequate training	12	52%
13	Software inadequacy	14	61%
14	Administrative apathy	12	52%
15	Administrative Bottleneck	15	65%
16	Inadequate funding/financing	15	65%
17	Lack of Technical Know How	12	52%
18	Unavailability of accessories/peripherals	9	39%
19	Technology Phobia	14	61%
20	User Illiteracy	14	61%
21	Lack of Users Commitment	10	43%
22	Lack of trainee Commitment	12	52%
23	Inadequate Electricity Supply	15	65%

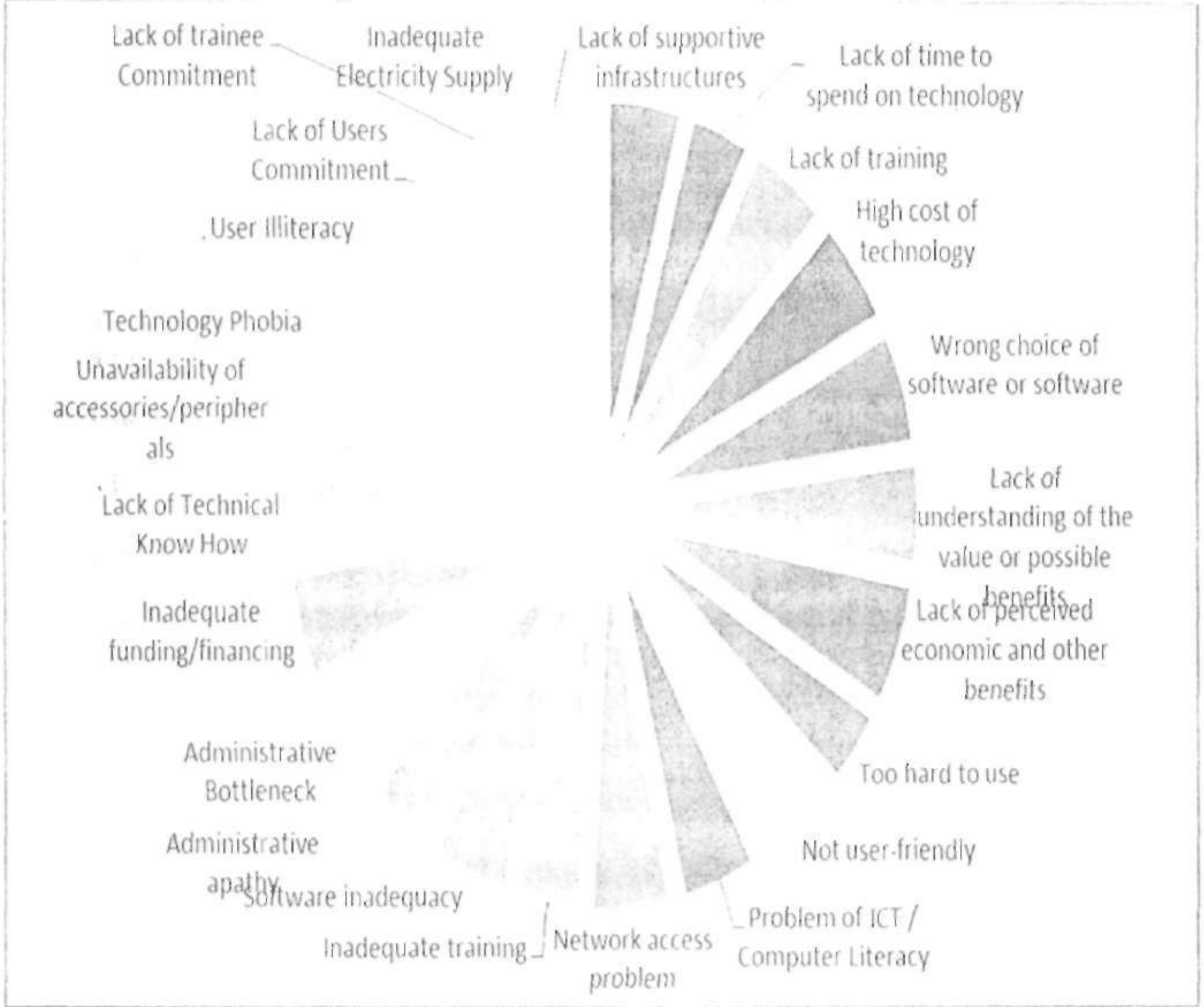

Fig.7: Challenges to Use of Technologies for Education, Training, Teaching, Learning and Research in LIS Schools

From the responses of the respondents in the LIS schools under investigation, it has been discovered that 23 challenges were identified. The principal challenges were: Lack of perceived economic and other benefits (78%); Wrong choice of software or software (74%); High cost of Technology (70%); Network Access Problem, Not Being User-friendly, Lack of Understanding of the Value or Possible Benefits, Administrative Bottleneck, Inadequate Funding/Financing, and Inadequate Electricity Supply (65%) respectively. However, the least challenges identified were: Too hard to Use and Lack of Time to Spend on Technology (48%) each, Lack of Users Commitment(43%), and Unavailability of Accessories/Peripherals(39%). Considering the relevance and effectiveness of technologies to teaching, learning and research, it is important that effort is being made to effectively ameliorate the factors inhibiting the effective application of technologies to teaching, learning and research. Going by the concomitant effects of multimedia, computer networks and Social Networking and other web-based technologies on the just concluded 2015 General Elections in Nigeria where it can conclusively be said to be technologically inclined, through the application and effective utilisation of variety of technologies, especially computer networks and Internet facilities and particularly the Social Network media and tools, the lecturers, students and researchers alike can effectively exploit their potentials and opportunities to create and develop their individual and collective ways and means of easy access to and effective utilisation of the information relevant to their needs at will; effectively share information and knowledge amongst the stakeholders irrespective of their locations and time; effectively manage information and knowledge for their common good; create their learning contents and schedules; create their communities to facilitate education, training, teaching, research and learning performance as well as knowledge and information acquisition within and beyond the LIS schools in Nigeria.

Concluding Remarks

Deducting from the inconclusive potentials and impacts of technologies on our various endeavours and daily affairs, there is no doubt in the fact technologies shall continually play strategic roles in education, training, teaching, learning and research in the LIS schools and indeed in other institutions of learning within and outside Nigeria. While it has been discovered that even though the stakeholders in the education, training, teaching, learning and research endeavours in the LIS schools in Nigeria are aware of the relevance, usefulness and the impact of technologies on the scheme of education generally, this has not been adequately translated and reflected on the availability and effective use of technologies in the LIS schools in the country. Despite the obvious infringing factors inhibiting the adequate availability and effective utilisation of technologies for education, training, teaching, learning and research in the LIS schools in Nigeria, concerted efforts have to be made by the primary and secondary stakeholders to change the course of the ship to the right direction through: the relevant authorities' direct financial and material interventions; employment of diplomatic and managerial tactical strategies to encourage sustained application of technologies in the schemes of LIS education, training, teaching, learning and research; appeals for assistance for provision of technologies and information resources within and outside the country; deliberate provision of training and retraining of the stakeholders in the provision and management of technologies, especially through special schemes; deliberate employment of technology experts and technicians to be domesticated through trainings to meet up to LIS programmes expectations; and re-engineering of the internal management structures, mechanisms and strategies in the LIS schools in Nigeria.

The Way Forward

In view of the strategic role of technologies in facilitating education, training and research in LIS Schools and indeed in other type educational institutions and in public and private establishments generally, efforts towards encouraging technology acceptance and effective applications to education, training and research should be guided by such questions as:

- How can the culture of sustained application of technologies to education, training, teaching, learning and research should be effectively encouraged and sustained?
- What should be the minimum human capital required of the LIS Schools to ensure effective application and utilisation of technologies for education, training, teaching, learning and research?
- What should be the minimum technologies required of LIS Schools to cope with the digital age expectations for education, training, teaching, learning and research?

- Which technologies and information resources are available outside the LIS Schools but are within the reach of both the staff and students for their easy access and utilisation?
- What minimum training and skills are required of the lecturers to effectively employ technologies in education, training, teaching and research in the LIS Schools?
- What mechanisms are available in the LIS Schools for quality control and evaluation of the extent of technology applications to education, training, teaching, learning and research?
- What mechanisms are put in place for monitoring and evaluation of staffs' and students' attitudes towards employment of technologies for education, training, learning, teaching and research in the LIS Schools?
- What minimum trainings and skills acquisition are required of the students to enhance their learning and research capacity and performance using technologies?
- What minimum financial and material supports are required of the LIS Schools to cope with the exigencies of sustained technology applications to education, training, teaching, learning and research?

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