

Global Trends in Information and Communication Technology: Implication of Sustainable Development in Education

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Abstract

The global trend in Information and Communication Technology (ICT) has changed the way we communicate today, the way we learn and the way we work respectively. For this reason ICT in Education has become the irreversible driven tool in institutions of learning which no one or institution or nation could ignore. ICT device is also penetrating into all sectors of our society and they are important components of the education which its skill and mastering must be learnt. ICT have some characteristics that make them an indispensable tool if we are to catch up with the emerging impact of the ongoing global trend in all works of life. The global processes can be actualized only if we admit that education is irreversible basic human right and to resist the tendency not to reduce education into a mere routine.

Introduction

In the world of ICT, education is becoming both more competitive, more interdependent, and their future ever more dependent on the knowledge, skills and resourcefulness of its policymaker, creating new opportunities and difficulties. These opportunities are created by global processes and can only be actualized if key actors continue to insist that education is a basic human right and to resist the tendency to reduce education into a mere routine of life, Power(2000). But if we fail to recognize the global change in education, I am afraid but just have to say it, that our world will become increasingly unequal, competitive, polarized, conflicted and dangerous for incoming generation. Global trends in ICT according to Laudon and Laudon (2010), is the most important drive behind globalization which has been the explosion in Information and Communication Technologies (ICTs) sectors. ICT by UNESCO (2010), is refer to a great technologies and it is an all encompassing term that includes the full gamut of electronic tools by means of which we gather, record and store information, and by means of which we exchange and distribute information to others. ICTs are defined as diverse set of technological tools and resources used to communicate, and to create, disseminate, store, and manage information. These technologies include *computers, the Internet, broadcasting technologies (radio and television), telephony and so on.*

Based on the UNESCO submission (2014), policymakers accept that access to information and communication technology (ICT) in education can help individuals to compete in a global economy by creating skilled work force and facilitating social mobility. The study emphasize that ICT in education has a multiplier effect throughout the education system, by enhancing learning and providing students with new sets of skills; through reaching students with poor or no access (especially those in rural and remote regions), facilitating and improving the training of teachers, and by reducing costs associated with the delivery of traditional instructions or resources.

Globalization

Globalization and technological changes (trends) processes have accelerated in tandem over years and have created a new global economy "powered by technology, fueled by information and driven by knowledge" as supported by Tinio (2003). The emergence of this new global trend has serious challenging implications for the nature and purpose of educational institutions. As the half-life of information continues to shrink and access to information continues to grow exponentially, schools cannot remain watchers of mere venues for the transmission of a prescribed set of information from teacher to student over a fixed period of time if they are or must catch up with their international counterpart. Rather, schools must promote "learning to learn," that is, the acquisition of knowledge and necessary skills that make possible continuous learning over the lifetime (Thornburg, 2000).

The Schools systems have been using ICT in many decades to address various goals ranging from the teaching of programming to increased participation in distance education to supporting language-acquisition in early childhood and ease of educational operations. During this period, an advance in hardware, software, telecommunication and networking has appreciated the potential that ICT holds for schools, Colleges and education as whole (Curban, 2001). However, successful implementation of these practices irrevocably and tightly linked to resources including;

- Financial and human resources within education systems;
- National Infrastructure;
- Private Sector Capacity;
- Attitudes about Knowledge and Technology.

The shortfall in ICT faced is that several of the technologies and models that are emerging at this time are unproven. Others require specific circumstances, such as highly trained teachers or authentic-assessment practices, to be deployed successfully. This article is intended to help actors in education to stay informed about trends and new developments that can enable them to gauge current practices and plans in relation to contemporary and emerging norms.

Education

Education is the mother of courses from science, technology, arts engineering, and humanities etc, to mention and so on. All over the world an instrument ever conceived, known and applied courses in teaching and learning same in institution of learning is always to impart learning, knowledge, broaden, and sharpen skills, intellectual development and knowledge acquisition. Education from time immemorial has been known, admitted and adopted to be in dispensible instrument (panacea) globally by mankind for the achievement of meaningful and sustainable development. So far, there is yet no finding/study to refute this, or replace education for something as instrument of sustainable achievement or attainment. Be that as it may, no man and no nation rise above aggregate of knowledge attainment of her citizenry or nation by extension. On that aggregate knowledge/skill to deal with emerging challenges/issues in life of any nation that affects such nation (Wasagu, 2013) The provision of adequate necessary educational strategies to initiate and foster sustainable development in all ramifications in term of building diverse human capitals, skill acquisition, and known-how to its citizenry who will ultimately drive the country economic, social, social-economic etc can therefore not be over emphasized.

Global Trends and Education

There have been so many clamors and explanation about globalization. Globalization is define with the support of Power(2000) as a multi-faceted set of processes which include not only the changes which have flowed from the new Information Communication Technologies (ICT) and opening up of markets, but also new concepts which mean that 'shrinking space, shrinking time and disappearing borders and linking people's lives more deeply, more intensely and more immediately than ever before. Carmona and Marin(2013) said the global processes will not only make our societies increasingly multi cultural and ever more intercultural as the interactions among cultural groups intensify, but also they will force shifts in our educational and development priorities making it education for all. It is productive life of every society, full development of the human personality, strengthening of respect for human rights and fundamental freedoms. Education also promotes understanding, tolerance and friendship among all nations, racial and religious groups.

The Sustain ability of ICTs in Education

For developing countries ICTs have the potential for increasing access to and improving the relevance and quality of education. It thus represents a potentially equalizing strategy for developing countries. *ICT greatly facilitates the acquisition and absorption of knowledge, offering developing countries unprecedented opportunities to enhance educational systems, improve policy formulation and execution, and widen the range of opportunities for business and the poor. One of the greatest hardships endured by the poor, and by many others, who live in the poorest countries, is their sense of isolation. The new communications technologies promise to reduce that sense of isolation, and to open access to knowledge.* However, the reality of the Digital Divide-the gap between those who have access to and control of technology and those who do not means that the introduction and integration of ICTs at different levels and in various types of education will be a most challenging undertaking. Failure to meet the challenges would mean a further widening of the knowledge gap and the deepening of existing education and social inequalities.

Uses of ICTs in Education

Education policymakers and planners must first of all be clear about what educational outcomes (what they intend to achieve for the nation) are being targeted. These shall guide the choice of technologies to be used and their modalities of use. The potential of each technology varies according to how it is used. Haddad and Draxler (2002), identify some levels of technology use in education: presentation, demonstration, drill, practice, interaction, and collaboration. Each of the different ICTs print, audio/video, radio and TV broadcasts, computers or the Internet, may be used for presentation and demonstration. On the other hand, networked computers and the Internet are the ICTs that enable interactive and collaborative learning best; their full potential as educational tools will remain unrealized if they are used merely for presentation or demonstration. Other ICT driven technology use in education for sustainable development era;

Teleconferencing: The term teleconferencing refers to interactive electronic communication among people located at two or more different places. Tinio (2003), list four types of teleconferencing based on the nature and extent of interactivity and the sophistication of the technology:

- Audio-conferencing;
- Audio-graphic conferencing;
- Videoconferencing; and
- Web-based conferencing;

Audio-Conferencing: *Audio-Conference is* involves the live (real-time) exchange of voice messages over a telephone network.

Audio-Graphic: **Audio-Graphic** is when low-bandwidth text and still images such as graphs, diagrams or pictures can also be exchanged along with voice messages.

Video-Conferencing involves the live exchange of visual interaction over a television network.

Web-based conferencing connect learners to other learners, teachers, educators, scholars and researchers, scientists and artists, industry leaders and politicians in short, to any individual with access to the Internet who can enrich the learning process. Web-based collaboration tools, such as email, list serves, message boards, real-time chat.

Tele-collaboration is online learning involving students logging in to formal courses online is perhaps the most commonly thought of application of the Internet in education. However, it is by no means the only application.

Benefit of ICT in Driven Sustainability of Education

Perry (2003), postulate that ICT has transformed not only the process of teaching and learning but has opened access to education, and thereby come out with the following benefit;

- i. **Curriculum, Teaching and Learning** -the degree of acceptance of ICT as educational tool in developing and even develops countries is so magnificent, there has been increasing focus on the interactions of ICT and teaching and learning among all the actors (student, teachers, donors and government).

- ii. *Collaborative Online Projects* – This is student-to-student online collaboration has been one of the more common methods of ICT integration by early adopters in schools.
- iii. *School-to-School Networking* -Within education systems, teachers and whole schools adopt technology at differing rates. While decision-makers at the ministry level must work to ensure gains by all schools, innovative and early adopting teachers and schools can draw significant benefits from participation in regional or national collaborative networks.
- iv. *Blogs, Wikis and Podcasts Created by Teachers and Students* – This is a variety(ies) of tools that emerged from the Web have been swiftly adopted by the education community. Web 2.0 refers to a “second generation” of Internet tools that emphasize user-developed content and social networking. Popular Web 2.0 tools used in schools include blogs, wikis, and podcasts. Both Apple's iTunes website and Yahoo! list hundreds of podcasts created by students in kindergarten, primary, and secondary schools. Outcomes that have been ascribed to podcasting include improved written and verbal communication skills, improved research skills, and increased motivation. Blogs (or Web Logs) are websites with content generated by individuals; entries appear in reverse chronological order and resemble journals in that they reference first-person experience or the thoughts and opinions of the author. Most blogs enable readers to post comments, as well as comments about comments.
- v. *Anti-Plagiarism Tools and Services* -at both secondary and tertiary levels, forestalling and detecting plagiarism increasingly occupies teachers' attentions. Search engines that provide students with access to a rich array of knowledge resources also provide the means to plagiarize these works (aided and abetted by cut and paste commands).
- vi. *Wireless networking* -Schools rapidly adopted wireless local networking in its operation. Wireless LANs reduce installation costs although they may increase support costs and increase the flexibility of school-based installations. In particular, laptops or workstation computers can be stored in carts and brought into classrooms on a temporary or as needed basis for use by teachers or students and in offices.

Demerit of ICT in Education

Despite the global trend of ICT in education, there are however, some weak points, experience as result of ICT driven application. They are:

- *Distraction to some students;*
- *Make some staff and students very lazy;*
- *Increase level of plagiarism;*
- *Some time it makes teachers/students who are computer novices to easily loss data or information;*
- *It destroyed students or teachers who are willing and interested in watching porn film if they are not properly checked.*

Does Global Trend (ICT) Sustainable in Educational?

One aspect of development programs that is often neglected is sustainability. The long history of development aid has shown that too many projects and programs start with a bang but all too soon fade out with a whimper, to be quickly forgotten. This is true for many ICT-based educational projects as well. In many instances, these projects are initiated by third party donors such as international aid agencies or corporations and not enough attention is paid to establishing a workable and reliable mechanism by which the educational institutions or communities involved can pursue the project on its own or in partnership with other stakeholders after the initiating donor exits. It is interesting to note that the cost and financing are not the only barriers to development and sustainability of educational project. According to Cisler (2002), the sustainability of ICT-enabled programs has many other factors: social, political, technological, and economic.

Technological sustainability involves choosing ICT technology that will be effective over a long time term. In a rapidly changing technology environment, this becomes a particularly tricky issue as planners

must not end with the threat of technological obsolescence. At the same time, there is the tendency to acquire only the latest technologies (which is understandable in part because these are the models which vendors are likely to push aggressively) generally, however, planners should go with tried and tested systems; stability issues plague many of the latest technologies. Again, the rule of thumb is to let the learning objectives drive the technology choice and not vice versa the latest technologies may not be the most appropriate tools for achieving the desired educational goals. When making technology decisions, planners should also factor in not just costs but also the availability of spare parts and technical support. That is why actors in educational and even beyond should look inward ensure the global trend in ICT is practice, in other to achieve the sustainability development.

Conclusion

The effective functioning of families, schools and educational systems is sensitive to the existence of supportive public policies at the community, national and international level in this global era. It is clearly seen that the education system is changing by adapting modern requirements and incorporating new technologies. By incorporating these technological trends into the educational system a higher quality education can be provided at a cheaper cost and spread over a larger segment of the population. Although they are difficulties in achieving that and the outcome may not be constant as may be expecting due to the global changes.

However, our common future will depend on the degree to which we all become better world citizens, creating the unity within diversity which stems from an intercultural education which helps us to build strong educational system with meaningful application of ICT.

Recommendations

From all that has been discussed some very valid recommendations are hereby recommended;

- A good numbers of Nigerian educationist in particular are ICT illiterate and are bound to be obsolete in this global trend, if they don't train and retrain.
- To breach the social digital divide between educationists, there is a need for training of staff in critical areas tangential to their jobs and also a need for constant training update.
- There is a need for educational actors to apportion more resources to acquire useful ICT resources in education.
- Practical hands on ICT facilities should be mandatory to all actors; students should be made to graduate with critical skills needed to discharge their duties as IT professionals, since we are in global world.
- ICT projects and programs should made to be sustain, in other to avoid been fade out with a whimper and forgotten quickly.

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Development and Validation of Web-based Courseware for Junior Secondary School Basic Technology Students in Nigeria: Implication for Sustainable Development

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Abstract

This research aimed to develop and validate a web-based courseware for junior secondary school basic technology students in Nigeria for sustainable development. In this study, a mixed method quantitative pilot study design with qualitative components was used to test and ascertain the ease of development and validation of the web-based courseware. Dick and Carey instructional system design model was adopted for developing the courseware. Convenience sampling technique was used in selecting the three content, computer and educational technology experts to validate the web-based courseware. Non-randomized and non-equivalent Junior secondary school students from two schools were used for field trial validation. Four validating instruments were employed in conducting this study: (i) Content Validation Assessment Report (CVAR); (ii) Computer Expert Validation Assessment Report (CEAR); (iii) Educational Technology Experts Validation Assessment Report (ETEVAR); and (iv) Students Validation Questionnaire (SVQ). All the instruments were face and content validated. SVQ was pilot tested and reliability coefficient of 0.85 was obtained using Cronbach Alpha. CVAR, CEAR, ETEVAR were administered on content specialists, computer experts, and educational technology experts, while SVQ was administered on 83 JSS students from two selected secondary schools in Minna. The findings revealed that the process of developing web-based courseware using Dick and Carey Instructional System Design was successful. In addition, the report from the validating team revealed that the web-based courseware is valuable for learning basic technology. It is therefore recommended that web-based courseware should be produced to teach basic technology concepts on large scale.

Keywords: Development, Validation, Web-based Courseware, Basic Technology, Sustainable Development

Introduction

The role of science and technology for educational sustainable development in developing nations cannot be overemphasized. It is very important to note that without the knowledge of basic technology, Nigeria as a nation might be left behind in the scientific and technological race (Okonjo, 2012). Nigerian government realized the paucity of technology for national development and this made her to integrate basic technology into Junior Secondary School curriculum (FRN, 2013). One of the major objectives of basic technology is to enable the individual student to acquire appropriate skills, abilities and competence to live and contribute effectively to the development of his society (NERDC, 2006). To achieve this objective, there is the need for adequate commitment in the teaching and learning of basic technology in Nigeria junior secondary schools in such a way that, students' poor performance in the subject will be eliminated.

Over the years, students' performance in basic technology has not been encouraging. Basic technology, like other science subjects, recorded poor students' performance both in internal and national examinations. Many factors contributed to the poor performance of students in basic technology examination (Akale, 1986; Olorundare, 2011). These factors include; inability of the teachers to put across the concepts to the students, lack of skills and competence required for teaching, shortage of

qualified basic technology teachers, lack of teaching materials and necessary equipment. The causes of poor performance have been attributed to lack of interest in the subject or lack of understanding of the subject due to its abstractness as a result of poor school infrastructure, poorly equipped workshops, non-availability and utilization of instructional materials, lack of qualified personnel (teachers and workshop assistants), and poor instructional strategies (Oyelekan, & Olorundare, 2009; Gambari, 2010).

Globally, solutions to existing problems have been a trend in instructional activities. Efforts are therefore necessary to find solutions to the numerous problems encountered in teaching and learning processes. In the quest of seeking for systemic solutions to students learning problems, Educational Technology which is all about imparting knowledge using ICT tools could be of help, hence, new educational technologies such as game-based learning, mobile learning, web-based instruction, among others could shift the teacher-centered and learning environment to a student-centered environment that is more beneficial (Association for Educational Communications and Technology, AECT, 2007). Web-based instruction (WBI) is becoming a favored training option in industry, government, and education.

For the purposes of this review, online instruction is referred to as Web-based instruction. The web-based learning is relatively new in Nigerian public secondary schools. WBI is a hypermedia-based instructional program which utilizes the attributes and resources of the World Wide Web to create a meaningful learning environment where learning is fostered and supported. WBI is delivered via the computer using the Internet, making it capable of instant updating, distribution, and sharing of information (Khan, 2011).

Web-based instruction encompasses the integrated design and delivery of instructional resources via the World Wide Web and promotes students' engagement with text-based, hypermedia, multimedia, and collaborative resources for the purposes of teaching and learning (Bhagat., Wu, & Chang (2016). Nigeria has joined the global race in the growth and usage of ICT (FRN, 2004; Salami, Lagbe & Usman, 2008). This is evident by the growth in the use of the internet and the adoption of computer in schools. For instance, there is a proposed MTN Education bundle (a laptop) pre-loaded with rich educational content specially designed for children from pre-Primary to senior Secondary. Similarly, the 'Opon-Imo' is an e-learning computer tablet which comprises the entire educational needs of students in the Senior Secondary School classes. It is said to have 63,000 e-books, covering 17 subjects, a whole English dictionary, video tutorials, past questions for the last 10 years and lots more. It is an ICT innovation by the Osun State government.

World Wide Web is a small part of the internet. It is made up of the web pages that can be seen when connected to the internet. All web pages on the internet will have an address prefixed by www. The World Wide Web (the web) is not separate from the internet; instead it makes it to be more efficiently easy to use (Bhagat., Wu, & Chang, 2016). Web-Based Instruction is teaching and learning supported by the attributes and resources of the Internet. Web-Based Instruction offer one of the robust learning environments for complex text, graphical, and voice-based social interactions and experiences. The World Wide Web can be used to provide instruction and instructional support. Web-based instruction offers learners unparalleled access to instructional resources than the traditional classroom. It also makes possible learning experiences that are open, flexible, and distributed, providing opportunities for engaging, interactive, and efficient instruction (Khan, 2011). Effective online learning is dependent upon the principles of instructional design and development.

The design of web-based instruction must take into account cognitive processing of information, learning tasks, the learner, and an instructional tool (Cassarino, 2003). To support learning, the design of the online learning environment requires a shift in focus from content-delivery to a task-based instructional approach with opportunities for reflection and collaboration (Singh, 2009).

In this study, Dick and Carey instructional design model was used in developing the web-based courseware. Several instructional models were developed to achieve the same goal. For instance, Singh (2009) study suggested that using a systematic approach such as ADDIE to develop a valid and effective interactive web-based module was still viable. Similarly, Laleye (2016) adopted the design model provided by Ina, Fourie in (1994) and the social constructivist learning theory. The adopted model allowed development of the package to take less time and effort as it starts with specific set of prescribed objectives. In addition, Nugent, Soh & Samal (2006) conducted a study on Design, Development, and

Validation of Learning Objects. Results confirmed that the use of modular Web-based learning are a viable object can be successfully designed and used for independent learning.

Studies of the web-based learning environments have shown that development and validation Laleye (2016) carried out a study on development and validation of a computer- assisted instructional package for learning basic science in Nigeria. The overall reaction from the validating team revealed that the developed package (CAIP) is valuable for learning physics concept in Basic science. Similarly, Özkök (2013) conducted a study designed to test the validity and reliability of the Web-based Learning Environment Instrument (WEBLEI). The findings evidence that the WEBLEI is valid and reliable measure of Turkish students' perceived web-based learning environments traits. In a similar study, Fakomogbon, Shittu, Omiola, and Morakinyo (2012) conducted a study on design, development and validation of a web-based instructional package for teaching ceramics concepts in basic technology for junior secondary school students in Nigeria. The results revealed that comments received from experts and student representatives confirmed that the content, navigation mode, interactivity, structure, colour used and authoring tools used were relevant and it was of good quality for the intended users. Thongmee, Ruangsuwan, and Terdtoon (2015). Development of web-based learning environment model to enhance cognitive skills for undergraduate students in the field of electrical engineering. The results of model implementation efficiency revealed that students who studied by using the developed web-based learning environment model received pre-and post-points of – achievement (52.37 and 92.40%). It was assumed that the web-based learning environment model had its quality at the highest level and could be used as a pedagogical tool for undergraduate students. In a similar study conducted by Salve-Opina (2014) on the development and validation of online learning modules for college English. *The results show that the students exposed to the online modules in online portals performed better than those receiving traditional instruction in a classroom. In an overall perspective, the students were to a large extent satisfied with online instruction.*

However, Obdein, Alewiinse, Mathoulin, Liverneaux, Tuiithof, & Schiiven (2014) developed and validated a computer-based learning module for wrist arthroscopy. The study revealed that the computer based module did not enhance learning, the participants did find the module more pleasant to use. Developing learning tools such as this computer-based module can improve the teaching of wrist arthroscopy skills.

In spite of the increased popularity and adoption presence of web-based learning opportunities, there is a limited study on students' development and validation of web-based learning environments in Nigeria. However, in order to promote active engagement of the learners and delivery of meaningful learning in the web-based learning settings, it is necessary to develop and validate a web-based courseware for teaching basic technology at junior secondary school level in Nigeria.

Statement of the Problem

Presently, Nigeria is like many other developing nations across the globe facing rapid increase in adoption of computers, networks and web technology. Due to the more feasible application of the web-based learning for supporting teaching and learning, most Nigeria private secondary schools and some few public schools have adopted the web-based technologies to support their traditional learning environments. For a shift from teacher-centered learning environment practiced by teachers which is one of the factors attributed to poor performance among secondary school students, there is need for improvement in teaching and learning. Hence, the quest for more effective instructional strategies like web-based instruction, virtual learning, and mobile learning among others. Web-based instruction as one of the student-centered strategy is yet to be imbedded in teaching and learning in Nigerian classrooms.

Web-based instruction can be used to transform classroom instruction into a series of rich memorable experiences and thus, reduce boredom and forgetfulness in teaching subjects such as Basic Technology. There is therefore need to develop and validate web-based instructional courseware for basic technology in Nigerian secondary schools.

Aim and Objectives

The aim of this study is to develop and validate web-based courseware for junior secondary school basic technology students in Nigeria. Specifically, the study sought to:

- (i) determine the steps involved in developing web-based courseware for junior secondary school basic technology students in Nigeria.
- (ii) find out how the developed web-based courseware for junior secondary school basic technology students in Nigeria was validated.

Research Questions

The following research questions were raised to guide the study:

- (i) What are the steps involved in the development of web-based courseware for junior secondary school basic technology students in Nigeria?
- (ii) How was the developed web-based courseware for junior secondary school basic technology in Nigeria validated?

Research Methodology

Research Design

This study adopted instrumentation design (ID) which involves design, development and the validation of the instruments needed for certain implementation in science, technology, industry and medicine (Lyons & Seow, 2000). Instrumentation in this study is on the realization of a teaching tool which can be tested and assessed to check if the design really solved problem that brought its development. The design of this study fits into the definition of instrumentation given by the International Centre for Educational Evaluation (1982) which states that a study belongs to instrumentation research if it is aimed at developing new, modifying content, procedure, technology or instrument of educational practice. In addition, a mixed method quantitative pilot study design with qualitative components was used to test and ascertain the ease of development and validation of the web-based courseware.

Sample and Sampling Technique

The population for this research consists of basic technology teachers, industrial and technology education lecturers, computer experts, educational technology experts and JSSIII students in secondary schools in Minna, Niger State. Convenient sampling technique was used to select three senior lecturers from Industrial and Technology Education Department, Federal University of Technology, Minna and three senior basic technology teachers from three secondary schools in Minna to validate the content of the basic technology for junior secondary school Class three (JSSIII). Purposive sampling technique was adopted to select three experienced computer programmers from Computer Science and Cyber Security Departments and three Educational Technology lecturers from Educational Technology Department, Federal University of Technology, Minna. Furthermore, simple random sampling technique was used to select 83 junior secondary school students from Peace Secondary School, Minna ($n = 41$) and St. Clement Secondary School, Minna ($n = 41$) for field trial validation of the web-based courseware (WBC).

Research Instruments

Four research instruments were employed in conducting this study: (i) Content Validation Assessment Report (CVAR); (ii) Computer Expert Validation Assessment Report (CEAR); (iii) Educational Technology Experts Validation Assessment Report (ETEVAR); and (iv) Students Validation Questionnaire (SVQ).

(i) **Content Validation Assessment Report (CVAR):** This instrument contains eight statements which respondents were required to write their comments after using the web-based courseware. These include: appropriateness of the WBC for teaching the chosen topics; clarity and simplicity of the WBC; suitability for the level of the students; the extent to which the contents cover the topics; possible errors in the suggested answers; the structuring of the WBC; and other comments on the grammatical errors, misrepresentation of the symbols in the WBC, among others. Furthermore, a space for free comments was also provided. This instrument was given to three senior lecturers from Industrial and Technology Education Department, Federal University of Technology, Minna for face and content validation of the web-based courseware for basic technology with regards to the officially prescribed content of National Education Research and Development Council's (NERDC) curriculum.

(ii) **Computer Expert Validation Assessment Report (CEAR):** This instrument contains nine statements which respondents were required to write their comments after using the web-based courseware. These include: Appropriateness of the programming language used; typography errors in the

WBC; legibility of the WBC; the navigation; the interface; the animations in the WBC; functionality of the WBC; the storage, speed and durability of the WBC; and the appropriateness of the applications in the WBC. CEAR was given to three (3) lecturers from Computer Science and Cyber Security (programmers) Departments, Federal University of Technology, Minna for experts' validation after they had gone through the web-based courseware.

(iii) **Educational Technology Expert Validation Assessment Report (ETEVAR):** This instrument consists of seven statements which respondents were required to write their comments after using the web-based courseware. These include: suitability of the WBC for instruction; clarity and simplicity of the WBC; unity among illustrations; emphasis on key concepts; the use of colours (background and font colours); the legibility of the text (font type and size); and others such as audibility of the audio, animation, etc. ETEVAR was given to three (3) educational technology experts from Educational Technology Department, Federal University of Technology, Minna for the purpose of finding out whether the web-based courseware conforms with acceptable standards in educational technology.

(iv) **Students Validation Questionnaire (SVQ):** The instrument contains six section (A-F) and each section contains five statement items which respondents were required to state whether they are strongly agreed, agreed, disagreed, strongly disagreed respectively. Section A contains five-item on content in the WBC; section B has five-item on interactivity of the WBC; Section C consists of five-statement navigation of the WBC; Section D contains five-item on feedback from the respondents after using the web-based courseware; Section E has five-item that deals with screen design of the web-based courseware; while Section F contains five-statements on students' preferences toward the use of the web-based courseware to traditional method of teaching. SVQ was administered on 83 students who were randomly selected for field trial validation of web-based courseware for basic technology.

Method of Data Collection

Data were collected in two ways using qualitative and quantitative methods. Qualitative data on web-based courseware were collected from Industrial and Technology Education lecturers, Basic Technology Teachers, Computer programmers, Educational Technology experts. The experts responded to statements in: (i) Content Validation Assessment Report (CVAR); (ii) Computer Expert Validation Assessment Report (CEAR); (iii) Educational Technology Experts Validation Assessment Report (ETEVAR) respectively. The quantitative data were also obtained from 83 selected students using Students Validation Questionnaire (SVQ).

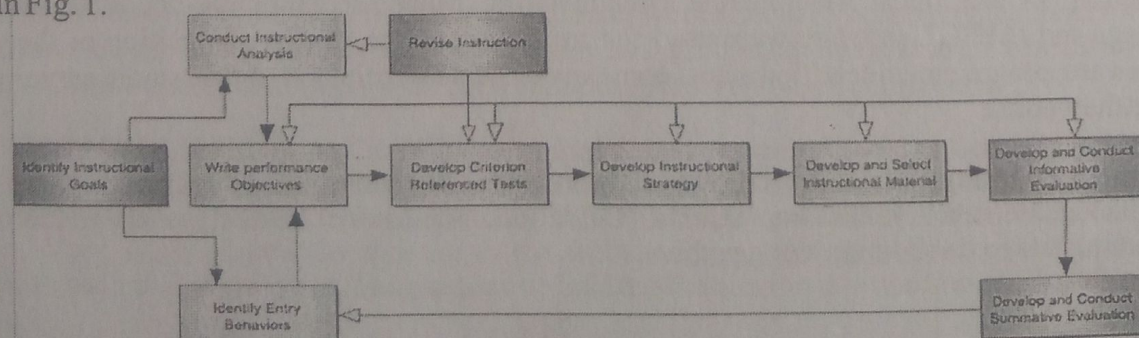
Data Analysis Technique

Research question one was answered by explaining the steps involves in developing web-based courseware. Research question two was answered using qualitative data and quantitative data. The summary of comments and recommendations from experts on validation were reported, while responses from students from field trail validation were analyzed using descriptive statistics of mean and standard deviation. In taking decision from the analyzed data, an average mean of 2.50 and above were considered as agreed, while an average mean of 2.49 and below was considered disagreed with respect to the research questions. A mean of 2.5, according to David (2005), was used as a criterion to judge mean scores for a modified four- point item format. The mean of 2.5 was calculated from the sum of 4+3+2+1 divided by 4.

Results

Research Question One: What are the steps involved in the development of web-based courseware for junior secondary school basic technology students in Nigeria?

This study adopted the ten steps of instructional design as provided by the Dick and Carey model (2005) as shown in Fig. 1.



Dick and Carey Instructional Design Model

This model is based on a systems approach for designing instruction. It views instruction as an entire system, centering more on the interrelationship between context, content, learning and instruction. The model has nine major process components i.e. nine basic steps in an iterative cycle and a concluding evaluation of the effectiveness of the instruction. The nine components in an iterative cycle include:

- (i) Assess needs to identify instructional goal(s);
- (ii) Conduct instructional analysis;
- (iii) Identify entry behaviour;
- (iv) Write performance objectives
- (v) Develop assessment instrument;
- (vi) Develop instructional strategy;
- (vii) Develop and select instruction;
- (viii) Design and conduct formative evaluation;
- (ix) Revise instruction; and
- (x) Design and conduct summative evaluation (Dick & Carey, 2005).

Stage 1: In assessing the needs to identify instructional goal(s), three basic technology teachers and researchers identified the difficult topics in Junior Secondary School class three (JSSIII) Basic Technology. Over dependent on teacher-centered approach of teaching and lack of using Internet for teaching and learning were identified as one of the problems for poor performance at JSS level. Hence, the need for developing web-based learning.

Stage 2: In conducting the instructional analysis, methods of instructional delivery for teaching basic technology at junior secondary school level were identified. This include the facilities, equipment, manpower and infrastructure available for instructional purposes.

Stage 3: In identifying entry behavior, the previous knowledge of the JSS III students must be identified. Concepts of basic technology taught at junior secondary class two (JSSII) were identified. Students were examined on their previous knowledge on some related concepts in basic technology.

Stage 4: In writing the performance objectives, the topics identified were structured from simple to complex, known to unknown, abstract to concrete. In this study, the objectives for each topic were formulated.

Stage 5: In developing assessment instrument, various instruments were used to determine the functionality of web-based courseware. In this study, (i) Content Validation Assessment Report (CVAR); (ii) Computer Expert Validation Assessment Report (CEAR); (iii) Educational Technology Experts Validation Assessment Report (ETEVAR); and (iv) Students Validation Questionnaire (SVQ) were developed.

Stage 6: In developing instructional strategy, justification for using web-based instructional courseware were identified. The necessity for developing web-based instructional courseware was based on the fact that the available web-based courseware on the Internet were not directly relevant to the concepts of this study as they are not culturally relevant to basic technology instruction in Nigeria. Hence, there is need to develop web-based courseware.

Stage 7: In developing and selecting instruction for web-based courseware, the researchers identified the content of a web-based instruction, typed the JSS III basic technology course material, develop the storyboard and forwarded it to the programmer. The computer programmer determined the types of web pages to be used, identified the equipment and software for design and development of a web-based instruction. In this study, Macromedia Dreamweaver, Macromedia Fireworks, PHP programming language and MYSQL software were used for creating database. At the completion of the web-based courseware, programmer identified a host company to help store the file at the remote server and finally hosted the website.

Stage 8: In designing and conducting formative evaluation, various validation stages were employed. This include: content validation, experts' validation, one-to-one student validation, small group validation, field trial validation among others.

Stage 9: This stage involved revising the instruction, each steps were revised and all the necessary amendment were made based on validation assessment reports from experts and students. The researcher checked the entry behavior again and follow the loop again until the web-based courseware met the standard.

Stage 10: The final stage of Dick and Carey Model is designing and conducting summative evaluation (Dick & Carey, 2005). This involve the testing of the final product with the end users.

Research Question Two: How was the developed web-based courseware (WBC) for junior secondary school basic technology in Nigeria validated?

The validation of WBC was done in three stages: (i) content validation (basic technology specialists),(ii) experts validation (computer programmers & educational technology experts), and (iii) field trial validation (students' representative).

(i) **Content Validation: this was divided into two stages:** (a) content validation of the course material, (b) content validation of web-based courseware.

(a) **Content Validation of the Course Material:** After developing the contents of selected difficult concepts in basic technology, three senior basic technology teachers were given the content to validate using Content Validation Assessment Report (CVAR). They assessed the appropriateness of the web-based content for teaching the topics, clarity and simplicity of the contents, suitability for the level of the students, the extent to which the contents cover the topics they are meant to cover, possible errors in the suggested answers, the structuring of the WBC among others before the WBC was developed. They ascertained that the contents complied with NERDC curriculum. They also ensured that all question items were derived from the contents.

(b) **Contents Validation of Web-based Courseware:** The contents of the courseware were validated by three senior lecturers from Industrial and Technology Education, Federal University of Technology Minna using Content Validation Assessment Report (CVAR). They examined the contents of the WBC whether it adequately and sufficiently cover the Nigerian secondary school Basic Technology curriculum. After the validation, some sentence errors, spelling mistakes, and misrepresentation of some symbols in the web-based courseware were corrected. Some paragraphs and formatting errors were discovered and corrected. The test items and contents of the web-based courseware were also corrected based on the suggestions and recommendations of the experts.

(ii) **Experts Validation: this was done in two stages:** (a) Computer Experts Validation, (b) Educational Technology Experts Validation.

(a) **Computer Experts Validation:** The developed web-based courseware was validated by three computer experts (from Computer Science and cyber Security Departments) to validate using Computer Expert Validation Assessment Report (CEAR). They examined the appropriateness of the WBC in terms of language, typography, legibility, navigation, interface, animations/video, functionality, packaging, and durability. Their suggestions and recommendations were used for modifying the web-based courseware.

(b) **Educational Technology Experts Validation:** Three Educational Technology experts from Educational Technology Department validated the web-based courseware by looking at: its suitability for instruction, simplicity, unity among illustrations, and emphasis on key concepts, colour use, and text. In addition, three basic technology experts and two basic technology teachers also validated the WBC in terms of its appropriateness for teaching the topics, clarity and simplicity of the WBC, suitability for the level of the students, the extent to which the contents cover the topics they were meant to cover, possible errors on the suggested answers, the structuring of the web-based courseware and others. Furthermore, comments and recommendations on font types and sizes were effected by changing the font type to legible one and increase the font size moderately. Also, some background colours that seem to be distractive were changed. All the experts' comments were used to improve the web-based courseware.

(iii) **Field Trial Validation:** The WBC was trial-tested on some 83 Junior Secondary School Basic Technology students from Peace Secondary School, Tunga and St. Clement Secondary school, Minna. The students were taught basic technology using WBC for three weeks using double period of 80 minutes' duration. They were allowed to connect to the website (www.basictchedu.com) using the password assigned to each student to log in. The purpose of field trial validation is to confirm the functionality of the

web-based courseware. After three weeks of exposure to web-based courseware, 30-item Students' Validation Questionnaire (SVQ) was administered to the students exposed to web-based instructional courseware and retrieved immediately and analyzed as shown in Table 1-6.

Table 1: Content in the Web-based Courseware

S/No	Statement	Mean	SD	Decision
1	The messages in the web-based courseware are easy to understand.	3.62	0.53	Agree
2	The content of the web-based courseware has been well organized (arranged in order).	3.67	0.64	Agree
3	The diagrams/illustrations in the web-based courseware are very clear to me.	3.42	0.69	Agree
4	The examples used in the various sections of the lessons in the web-based courseware are relevant.	3.42	0.66	Agree
5	It was easy to understand the lesson because information was presented from simple to more difficult one.	3.38	0.81	Agree
Cumulative Mean		3.50		

Decision Mean = 3.50

Table 1 shows the cumulative mean of 3.50 for students' opinions of the content in the web-based courseware. This implies that students agree that content in the web-based courseware are adequate. This is because the cumulative mean 3.50 is greater than the decision mean of 2.50.

Table 2: Interactivity of the Web-based Courseware

S/No	Statement	Mean	SD	Decision
6	It is easy to operate the web-based courseware with computer keys and icons.	3.67	0.56	Agree
7	This package permits me to repeat the section, enlarge animation, and exit the lesson at any time.	3.87	0.34	Agree
8	The frequent display of questions to the learners does not interrupt the learning process.	3.42	0.92	Agree
9	This package enables me to apply what I have learnt rather than memorize it.	3.67	0.56	Agree
10	This package allows me to discover information through active learning.	3.71	0.46	Agree
Cumulative Mean		3.67		

Decision Mean = 3.67

Table 2 shows the cumulative mean of 3.67 for students' opinions of the interactivity of web-based courseware. This implies that students agree that the interactivity of the web-based courseware are adequate. This is because the cumulative mean 3.67 is greater than the decision mean of 2.50.

Table 3: Navigation of the Web-based Courseware

S/No	Statement	Mean	SD	Decision
11	From the main menu, learners are allowed to register his/her name.	3.91	0.29	Agree
12	The EXIT key enables me to exit from the lesson.	3.82	0.39	Agree
13	The PREVIOUS key enables me to revisit the previous section(s) of the lesson.	3.96	0.21	Agree
14	The NEXT key directs me to go to the next section of the lesson.	3.87	0.34	Agree
15	The OPTION keys allow me to select the correct option.	3.84	0.42	Agree
Cumulative Mean		3.88		

Decision Mean = 3.88

Table 3 shows the cumulative mean of 3.88 for students' opinions on the navigation of the web-based courseware. This implies that students agree that the navigation of the web-based courseware are adequate. This is because the cumulative mean 3.88 is greater than the decision mean of 2.50.

Table 4: Feedback from the Web-Based Courseware

S/No	Statement	Mean	SD	Decision
16	This web-based courseware provides immediate feedback after selecting the option.	3.20	0.76	Agree
17	This web-based courseware displays the correct or wrong answer chosen with some sound.	2.62	0.91	Agree
18	This web-based courseware allows me to proceed to the next lesson only if the chosen answer is correct.	3.62	0.78	Agree
19	This web-based courseware terminates my activities if after three attempts I got the answer wrong.	1.80	1.08	Agree
20	This web-based courseware appreciates my efforts by congratulating me after completing the lesson correctly.	3.71	0.73	Agree
Cumulative Mean		2.99		

Decision Mean = 2.99

Table 4 shows the cumulative mean of 2.99 for students' opinions on the feedback from web-based courseware. This implies that students agree that the feedback from web-based courseware are adequate. This is because the cumulative mean of 2.99 is greater than the decision mean of 2.50.

Table 5: Screen Design of the Web-Based Courseware

S/No	Statement	Mean	SD	Decision
21	The presentations of the information in the web-based courseware attract my attention.	3.80	0.40	Agree
22	The use of proper lettering (fonts) in terms of style and size make the information legible.	3.82	0.39	Agree
23	The colours used for the various presentations are quite appealing.	3.80	0.40	Agree
24	The quality of the text, images, graphics and video are interesting.	3.84	0.37	Agree
25	The animations (moving picture) in the web-based courseware assist in understanding the lessons better.	3.71	0.51	Agree
Grand Mean		3.79		

Decision Mean = 3.79

Table 5 shows the cumulative mean of 3.79 for students' opinions on the screen design of the web-based courseware. This implies that students agree that the screen design of the web-based courseware are adequate. This is because the cumulative mean of 3.79 is greater than the decision mean of 2.50.

Conclusion

Literature revealed that there is few web-based learning courseware developed and validated to facilitate teaching and learning of practical-based science subjects particularly basic technology in Nigeria. This study demonstrated the steps in developing and various stages of validating a web-based courseware for basic technology in Nigeria. Adopting Dick and Carey Instructional System Design Model in developing web-based courseware was successful. In addition, contents specialist reported that the contents covered the required basic technology concepts. Computer programmers also affirmed that the programming language used, navigation, interface, animation, and others are in line with the standard of software development. Educational technology experts reported that simplicity, clarity, unity among illustrations, and emphasis on key concepts, colour use, and font type and sizes were adequate.

Recommendations

Based on the major findings of this study, the following recommendations were made:

1. Developers of web-based courseware such as online course module, learning courseware and computer package should ensure that Dick and Carey ISD Model or similar ISD Model is fully implemented. This will serve as a guide towards developing a quality web-based courseware;
2. Content specialists and experts' validation reports should be properly followed towards developing a standard web-based courseware.
3. Basic technology teachers should imbibe the spirit of using web-based courseware for teaching their students in order to enhance learning of technological concepts at junior secondary school level;
4. Web-based courseware is a team work, therefore web developers should involve subject specialists, computer programmers, educational technology experts, and students in the process of developing and validating web-based courseware to ensure high interactivity and users-friendliness of such courseware;
5. Secondary schools in Nigeria should embrace and support the use of web-based courseware in their schools as this will enhance students' performance in basic technology and science related subjects. Therefore, government and non-governmental organizations should provide ICT infrastructure for effective development and utilization of web-based courseware.

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Lecturers Perceptions of the Use of Anti-Plagiarism Check Software in Federal University of Technology Minna. Implications for Sustainable National Development in the 21st Century.

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Abstract

The study investigated the perceptions of the use of anti-plagiarism Check Software (APCS) amongst lecturers in Federal University of Technology, Minna. Survey research design was used by the researchers for the study which was convenient for the purpose of determining their perceptions of the use anti-plagiarism check software (APCS) in the University. The population of the study was all lecturers in FUTMINNA. Multistage sampling technique (stratified & simple sampling techniques) were utilized in arriving at 79 lecturers picked from across the eight schools (faculties) in the University. Likert-type questionnaire entitled 'Questionnaire for Perception of anti-plagiarism Check Software (QLPAPCS) was designed for the study and was validated by experts with a reliability index of 0.82 using Cronbach alpha. The method of data collection was distribution of QLPAPCS directly by the research assistants identified in each of the schools (faculties) in the University. Data collected was analyzed using simple frequency counts percentages while descriptive charts were used to illustrate the data analyzed. The study revealed that lecturers have very high perception of the use of anti-plagiarism (89.79%) in FUTMINNA which has implications on lecturers insisting on originality in students' projects and thesis works while laziness was perceived to be the major factor responsible for plagiarism. It is recommended that the usage of Turnitinas anti-plagiarism check software (APCS) should be encouraged to sustain the success recorded in the University. It was concluded that academic staff have positive perceptions APCS it should not be adopted to avoid been tagged for punitive measures for administrative convenience.

Keywords: Perception, Anti-plagiarism check software (APCS), Turnitin, Lecturers'

Introduction

The 21st century tools of Internet (using World Wide Web) and Information Communication Technologies (ICT) has brought the prevalence of easy access to library and open online resources. This advancement which broken the barriers to information resources has been abused, thus has become inimical to academic integrity and breach of intellectual property rights. Jerome, Christopher and Ifeakachukwu (2016) reported Gow (2013) whose assertion was that, the prevalence of plagiarism is traceable to the introduction of ICT's in education and the plethora of online resources. Similarly, Patrick and David (2002) also argued that, the universal access to the Internet has been cited as a reason for the perceived decline in academic integrity. This is because conducting research and the process of writing a report is a complex and difficult exercise requiring knowledge, truthfulness, honesty, clarity, accuracy, conciseness and most importantly ethical concerns (Roig, 2013). What is aptly describes that act is plagiarism? And plagiarism is the 'wrongful appropriation' and 'purloining' publications of another author's language, thoughts, ideas, or expressions and the representation of them as person's original work. It is also an act of using some one's else work or ideas without proper acknowledgement or permission from the author (Younmans, 2011). Furthermore, Howard (1995) in Jenny (2009) described plagiarism to include outright cheating and fabrication of laboratory data to non-attribution and "patch-writing," where several pieces of purloined materials is patched together. There is a growing concern among academics, policy makers and

administrators of dimensions and the forms plagiarism has taken and its consequences on national development. Intellectual theft of ideas erodes integrity which is gradually eroding originality, authorship and confidence in academics in the University system. Therefore plagiarism could be considered as academic dishonesty or unethical conduct and copyright infringements which perpetrators are liable to expulsion or suspension in a University anywhere in the world.

Today the issue of plagiarism in our higher institutions in Nigeria was discussed in the Committee of Vice Chancellors meeting organized in 2012 which culminated in the commissioning of a United Kingdom (UK) integrity software company (TURNITIN) for technical collaboration towards checking academic submissions in Nigerian Universities (The International School of Management, 2015). Academic dishonesty (plagiarism) is perceived differently by researchers; while some scholars are aware of it as academic dishonesty others do not necessarily perceive that acts or quantum is too insignificant to be adjudged to be plagiarism. Some plagiarism behavior such as collusion is intentional and unethical whereas others are either accidental or unintentional which is referred to poor practice (Jerome, Christopher & Ifeakachukwu, 2016). Plagiarism is gradually assuming a phenomenal dimension in the 21st century academic community particularly in the developing world. Plagiarism is now refined or modeled to include among others; cloning (act of submitting another researchers' work, word-for-word, as one's original work); remix (act of paraphrasing from other sources and making the content fit together seamlessly); recycling (act of borrowing generously from one's own previous work without citation); 404 error (written piece that includes citations to non-existent or inaccurate information about sources); re-tweet (includes proper citation, but relies too closely on the text's original wording and/or structure); mashup (paper that represents a mix of copied material from several different sources without proper citation); and ctrl-C (written piece that contains significant portions of text from a single source without alterations (Turnitin, 2012).

There will be no excuse for breach of ethical conduct by lecturers even though various reasons have advanced for their engagement which include amongst others; poor time management skills; the consequences of cheating as unimportant; institutional failure to enact policy against plagiarism or report cheating (administrators, 2003). While Khan and Subramanian (2012) have identified anti-plagiarism strategies to include:

- a. Raising awareness on academic dishonesty and plagiarism.
- b. Highlighting the various types of plagiarism.
- c. Introducing policies that encourage adherence to ethical codes of conduct.
- d. Open communication between students and lecturers on the expectations in reporting essays and projects.

Michael Huemers' theory on perception lays credence that, 'perception is directed awareness of external reality which accounts for non-inferential acknowledgement of such reality. The theory explains that, "for one to be aware of something and there is no object present then there cannot be actual awareness as in the case of hallucination". Huemer (2015) identified three major components of perception:

1. Internal mental state which refers to perceptual experience
2. Object of perception which is external and roughly satisfies the content of experience
3. Absence of relationship between the two disqualifies the event from been perceived.

Perception becomes relevant when it establishes the relationship between realism and object which actually constitute plagiarism. Therefore, the theory explains the function of attitudinal disposition of culprit to plagiarize could be due to environmental influence. Universities should promote policies that enhances scholars respect intellectual property and honesty in recognition of the contribution of knowledge to sustainable national development.

Frey (2001) reported that there are several anti-plagiarism detection soft are used for maintaining ethical standards in research reporting or authorship. They include: Ferret, Copy Catch Gold, and Turnitin. The University has adopted Turnitin programme for checking undergraduate Students Projects and also postgraduate thesis. Youmans, (2011) stated that, Turnitin.com search engine has created a database of peer-reviewed articles, text-books, online pages that compares and highlights copied texts to see whether they are plagiarized. The fear of being detected in institutions where plagiarism software programs are

used for assessment of published articles and students final projects has help promote ethical standards in such environments. Anti-plagiaristic measures are now been appraised and adopted in the processes of appointments and promotion of academics in Nigerian institutions of higher learning. The anti-plagiarism checks software (APCS) called Turnitin was introduced in Federal University of Technology, Minna (FUTMINNA) Nigeria in 2012/2013 academic session. The Turnitin anti-plagiarism check software package has screened over 10,000 undergraduate and postgraduate students' projects and theses. 15% and 10% was set as acceptable level of plagiarism for Masters and PhD postgraduate theses respectively while 20% was set for undergraduate students' projects. It is expected that screening will obviously keep lecturers and students in check towards guiding against plagiarism. Nevertheless, perception is all about the way individuals and people see and understand or rather interpret something. The desire to determine how lecturers and students have perceived the adoption of anti-plagiarism measures and specifically APCS (Turnitin) in FUTMINNA prompted this research study.

Empirical literature reviewed have shown varying respondents views on plagiarism. In a study conducted by Jenny (2009) in Charles Sturt University Australia shows that, there was no statistical significant difference between the proportion of staff and students who thought that cheating on assessment tasks was correlated with the number of years as an academic ($p = 0.048$, $r = 0.169$) and the that the most common reasons for plagiarism was thought to be lack of understanding about the rules of referencing and laziness or bad time management. A look at result of analysis of Jenny's study showed the percentages factors responsible for plagiarism: 73% of the students wanting a better grade, 65% too many assignments, unconscious that students are not aware they were doing anything wrong and 63% thought they were unlikely to be caught. Patrick and David (2002) reported that most students in the study agreed that plagiarism of any kind like cutting and pasting text from the Internet is wrong whether done conventionally or online. A t-test comparing of the groups who neither agreed nor disagreed or strongly disagreed revealed that those who believed plagiarism is wrong were significantly less likely to plagiarize ($t = -3.64$, $p < 0.01$).

Statement of the Problem

Academic dishonesty has become so rife that it is a source of discountenance between lecturers and managements of ivory towers in Nigeria. The issue of plagiarism is germane but the motive is viewed with a lot of cynicism amongst lecturers in Universities. There are lecturers with the notion that, plagiarism check is targeted at stalling lecturers' progression (promotion) which is usually accompanied with financial benefits. In FUTMINNA, Turnitin anti-plagiarism check software is currently used in checking undergraduate and postgraduate projects and thesis for similarities. And whether it would be used for comparing lecturers' articles before promotions is a contentious matter that may threaten industrial peace in Nigerian Universities. This study is therefore aimed at determining what type of perception lecturers have on the use of anti-plagiarism check software (Turnitin) in Federal University of Technology, Minna Nigeria.

Objectives of the study

The underlying aim of undertaking this study was to determine lecturers' perception of the use of anti-plagiarism (APCS) in Federal University of Technology Minna and its implication for sustainable national development in the 21st century. Specifically, the objectives of the study was to determine lecturers' perception of the use of Turnitin anti-plagiarism check software in FUTMINNA:

- 1) To determine whether lecturers are aware of the use of Anti-plagiarism Check Software (APCS) programme in FUTMINNA.
- 2) To determine whether lecturers insist on originality of sources of materials used in writing papers, assignments and projects.
- 3) To find out the point at which the lecturers begin to suspect plagiarism in a students' term paper, assignment and project.
- 4) To determine how rampant is plagiarism amongst lecturers and students in FUTMINNA.
- 5) To determine whether publishers return manuscripts with missing references?
- 6) To determine the factors influencing plagiarism amongst lecturers and in FUTMINNA.

Research Questions

The following research questions guided the study:

1. Are lecturers aware of the use of Anti-plagiarism Check Software (APCS) programme in FUTMINNA?
2. Do lecturers in FUTMINNA insist on originality when assessing student's term papers, assignments and projects?
3. When do lecturers begin to suspect plagiarism in a student's term papers, assignments project?
4. What is the proportion of students that engaged in plagiarism in FUTMINNA?
5. How rampant is plagiarism amongst lecturers and students in FUTMINNA?
6. How often do publishers return manuscripts with missing references?
7. What are the factors responsible for plagiarism amongst lecturers' and student's in FUTMINNA?

Research Methodology

Descriptive research design particularly the survey method was used for the study. Questionnaires was developed and given to sampled size of lecturer that filled the items and returned to research assistant. The population of the study were about 800 lecturers in University in the 2014/2015 academic session. The lecturers are spread across the various schools (Faculties) in the University. FUTMIN operates two campuses and presently has eight schools which constitutes the population of the study. Bosso campus with three schools; School of Science and Technology Education (SSTE), School of Life Science (SLS) and School of Physical Science (SPS) while the Gidan Kwano (GK) campus has five schools; School of Engineering and Engineering Technology (SEET), School of Environmental Technology (SET), School of Agriculture and Agricultural Technology (SAAT), School of Information and Communication Technology (SICT) and School of Entrepreneurship and Management Technology (SEMT). Stratified and random sampling techniques were used in selecting 75 lecturers from the eight schools in the University. The instrument for data collection was a researcher developed questionnaire entitled 'Questionnaire on Lecturers Perception of the Use of Anti-Plagiarism Check Software Package (QLPAPCS) in FUTMINNA'. The questionnaire was segmented into two sections. Section (A) contained demographic information while section B had items on lecturers' perceptions of the use of anti-plagiarism (APCS) check software (Turnitin). The QLPAPCS was distributed to lecturers, while only 75 lecturers completed and return the questionnaires. The QLPAPCS was validated by two experts and a reliability coefficient of 0.82 using Cronbach's alpha was obtained. Research assistants were used for data collection in the eight schools in the University. Lecturers were visited in the respective departments and given the QLPAPCS to fill and the assistant return at a later date to collect them. The data collected was analyzed using descriptive statistics (frequency counts & simple percentages).

RESULTS

ANALYSIS OF DEMOGRAPHIC DATA

Table 1: Analysis of demographic data of Lecturers in FUTMINNA

Variable	Category	Frequency
Academic Status	Junior Academic Staff	55 (69.6%)
	Senior Academic Staff	24 (30.4%)
Highest Certificate	Degree.	2 (2.5%)
	Postgraduate	20 (25.3%)
	Doctorate	3 (3.8%)
	Masters in-view	31 (39.2%)
	PhD in-view	23 (29.1%)
Age	<30 years	5 (6.3%)
	31 – 40 years	30 (38.0%)
	41 – 50 years	35 (44.3%)
	>50 years	9 (11.4%)
Length of Years in Service	<1 year.	2 (2.5%)
	1 – 5 years	26 (32.9%)
	6 – 10 years	35 (44.3%)
	11 – 15 years	8 (10.1%)
	16 – 20 years	2 (2.5%)
	>20 years	6 (7.6%)

Table 1 shows the distribution of academic staff sampled for the study. Junior academic staff represents about 55.70% and senior academic staff are 24.30%. Therefore, Junior academic staff number was higher may be because they are more in population compared to the senior academic staff who are mostly senior lecturers and Professors. The age bracket of lecturers between 41 – 50 years involved in the study were 44.3% which is the highest with only 11.4% of lecturers over 50 years of age. While those whose length of service ranges between 6 -10 years (44.3%) were more in the study. Furthermore, only about 7.6% of lecturers who have worked in the University over 20 years were sampled in the study. This is believed to be the segment of the population who are professors and associate professors in the University.

ANALYSIS OF RESEARCH QUESTIONS

Research Question 1: Are lecturers aware of the use Anti-plagiarism Check Software (APCS) programme in FUTMINNA?

Table 2: Responses on Lecturers awareness of the use of Anti-Plagiarism Check software (APCS) programme in FUTMINNA

S/NO	Items	YES	NO	TOTAL
1.	Aware Plagiarism is criminal	76 (12.52%)	1(0.16%)	77
2.	Aware of anti-plagiarism software	70(11.53%)	8(1.32%)	78
3.	Aware plagiarism is an offence during Thesis writing	71(11.70%)	8(1.32%)	78
4.	Instruct Students' about Plagiarism when given essay assignment	70(11.53%)	7(1.15%)	78
5.	Caution Students' about Plagiarism when given essay	67(11.04%)	8(1.32%)	75
6.	Care about Plagiarism when grading	64 (10.54%)	15(2.47%)	79
7.	Staff engage in Plagiarism	56 (9.23%)	11(1.81%)	67
8.	Is the University ripe for using anti -plagiarism software	71(11.70%)	4(0.66%)	75
TOTAL		545 (89.79%)	62 (10.21%)	607

Table 2 shows 89.79% lecturers' affirmation on awareness and 10.21% of them been unaware of plagiarism and PCS. This result showed that lecturers are generally much aware of plagiarism and PCS for detection of copy and paste works. This represents 545 responses which is high as against 62 respondents who have awareness and those who are also unaware of plagiarism and PCS in the University.

Research Question 2: Do lecturers insist on originality when assessing students' term papers, assignments and projects?

Table 3: Lecturers' Responses on Originality Check

Items	Frequency	Percentages (%)
Term Papers Only	3	3.9%
Assignments	30	39.5%
Project/Thesis	43	56.6%
TOTAL	76	100%

Table 3 shows the result of whether lecturers insist on originality when marking students' term papers, assignments and project/thesis work. It showed that lecturers check on originality recorded high percentage of 56.6% for projects/thesis work, 39.5% for assignments and 3.9% for term papers respectively.

Research Question 3: When do Lecturers begin to suspect plagiarism in a student's term papers, assignments and project?

Table 4: Responses of Lecturers' suspicion of Plagiarism in a students' work

S/N	Items	Frequency	Percentages (%)
1.	When facts not in public domain are not referenced	26	40%
2.	No reference in more than a quarter of a page	8	12.3%
3.	When Students' writing change to professionals writing	14	21.5%
4.	When a statement in a previous paragraph do not rhyme with the preceding paragraph	17	26.2%
TOTAL		65	100 %

Table 4 shows that 40% of lecturers suspect plagiarism in students' work when facts not in public domain are presented. 12.3% of lecturers suspect plagiarism when a student does not reference more than a quarter of a page. 21.5% of lecturers suspect plagiarism when students' writing change to professionals writing. And 26.2% are able to suspect plagiarism when a statement in previous paragraph does not rhyme with the preceding argument or opinion subsequently raised which may indicate a copy and paste text which is plagiarism.

Research Question 4: What are the proportion of students engaged in plagiarism in FUTMINNA?

Table 5: Responses of Lecturers' on Proportion of Students' Engaged in Plagiarism

SN	Items	Frequency	Percentages (%)
1.	Very Few	12	15.4%
2.	Few	26	33.3%
3.	Fairly Large	32	41.1%
4.	Very Large	8	10.3%
TOTAL		78	100 %

Table 5 shows that very few proportion of students engage in plagiarism which is 15.4% while the few that engage in plagiarism represents 33.3%. Furthermore, fairly large proportion of students which represents 41.1% engages in plagiarism while 10.3% responses indicated that very large proportion of students in FUTMINNA are engaged in plagiarism.

Research Question 5: How rampant is plagiarism amongst lecturers in FUTMINNA?

Table 6: Responses of Lecturers' on Rampant Level of Plagiarism in FUTMINNA

S/N	Items	Frequency	Percentages (%)
1.	Very Rampant	1	1.4%
2.	Rampant	19	26.4%
3.	Not Rampant	52	72.2%
TOTAL		72	100 %

Table 6 shows that 1.4% and 26.4% respondents indicated that plagiarism is very rampant and rampant respectively while 72.2% of respondents indicated that plagiarism is not rampant amongst lecturers in FUTMINNA.

Research Question 6: How often do publishers return manuscripts with missing references?

Table 7: Responses of Lecturers' on return of Article Papers with missing References

S/N	Items	Frequency	Percentages (%)
1.	Once	12	15.8%
2.	Occasionally	11	14.4%
3.	Never	53	69.7%
TOTAL		76	100 %

Table 7 shows that 69% of respondents never had their article papers returned for missing references. And those who had their papers returned occasionally represented only 14.5% while 15.8% had theirs return once.

Research Question 7: What are the factors responsible for plagiarism amongst lecturers in FUTMINNA?

Table 8: Responses of Lecturers' on Factors Responsible for Plagiarism amongst Lecturers in FUTMINNA

S/N	Items	Frequency	Percentages (%)
1.	Laziness	32	42.1%
2.	Mass information on the Internet	12	15.8%
3.	No enforcement of Plagiarism law	10	13.2%
4.	Too many assignments and time Management	14	18.4%
5.	Publish or Perish Syndrome	8	10.5%
	TOTAL	76	100 %

Table 8 shows that six (6) factors are responsible for plagiarism amongst lecturers and students in FUTMINNA. Laziness had the highest percentage of 42.1%. 15.8% of respondents are saying that mass information on the Internet is responsible. 13.2% indicated that is lack of enforcement of anti-plagiarism law. 18.4% indicated too many assignments and inadequate time management while 10.5% respondents attested that it is publish or perish syndrome that is responsible for plagiarism especially amongst lecturers in FUTMINNA.

Discussion

The results of data analyzed on the perception of plagiarism and use of PCS in the FUTMINNA showed that lecturers have the awareness that plagiarism degrades and is an offence in the University. This is believed would improve the quality of research outputs from the University and entrench hard work and academic integrity which lecturers should strive for. On whether lecturers check on originality, the findings showed that, projects/thesis works of students have very high percentages of examination for plagiarism. Similarly, a lot of attention is dedicated to checking the sources and acknowledgement of other authors work in students' assignments and term papers to ensure proper representation of facts. And how do lecturers suspects plagiarism in students' work, is when facts that are not public domain are not acknowledged. Furthermore, when there is no coherence or there appears a contradiction between a paragraph and the preceding one, when language of reporting suddenly turns to a professionals writing and no reference in more than quarter of a page. This findings correlates with earlier work of Jenny (2002) on how to detect plagiarism in student work that, new students were less confident more likely to be confused and avoid plagiarism than older student ($p = 0.011$). Thus, the older or rather level of study of a student could likely trigger the tendency to plagiarize. On the analysis on the proportion of students that engaged in plagiarism in FUTMIN showed that fairly large percentage of students either copy or refuse to acknowledge sources of facts or deliberately distort facts with motive of taking credit. This finding also collaborates Khan and Subramanian (2012) that showed over 70% of students mostly use online databases, e-books, e-journals, and e-libraries to complete their essays and reports. This meant that lecturers would have to pay proper attention to works presented to them to avoid been deceived into accepting distorted facts by lazy and crafty students, because very large proportion of them are engaged in plagiarism.

The findings on how rampant is plagiarism amongst lecturers in FUTMINNA revealed that, 72.2% of respondents in the study indicated that plagiarism is not rampant. This finding agrees with the earlier position of 89.79% of lecturers' awareness on plagiarism and use of PCS. University's adoption of anti-plagiarism check software (Turnitin) has raised awareness level which helped to reduce rampant cases of plagiarism (TURNITIN, 2012). Therefore, plagiarism is not rampant amongst lecturers in FUTMINNA. Furthermore, on whether publishers reject or return article papers written by lecturers for missing references, the result showed that 69.7% of respondents said never was their articles returned. While those whose article papers were return occasionally and once were 14.5% and 15.8% respectively. The result

showed that lecturers reference other peoples efforts in article papers they submit to publishers by correctly acknowledge the sources of materials. And so their articles' are often not returned for missing references.

The findings of the study also revealed that several factors are responsible for plagiarism amongst lecturers in FUTMINNA. Laziness was found to be the leading contributor with 42.1%, while mass information on the Internet; lack of enforcement of plagiarism law; too many assignments and time management; publish or perish syndrome amongst academic staff recorded 15.8%, 13.2%, 18.4%, and 10.5% respectively. So, the major factor responsible for plagiarism in FUTMINNA is laziness and then followed by too many assignments and time management. Harko, Robert and Pargman (2016) posited that, the reason for plagiarizing is no single reason but rather the combination of several variables such as lack of training due to not having received enough training in scientific writing, and lack of time due to poorly designed assessment procedures and finally lack of motivation. Others factors highlighted do not pose serious problem as to influence or responsible for plagiarism in FUTMINNA was the 'you publish or perish syndrome' that is given prominence as a condition for elevation of rank in the University which has endeared lecturers to plagiarism.

Implications Of Findings To Sustainable National Development

The following are the implications of findings of the study to sustainable national development in the 21st century:

1. That lecturers have awareness of anti-plagiarism Check Software (APCS) in the University which those implies they will be amenable for coping without proper acknowledgment or plagiarism because it will be detected and therefore academic dishonesty is not likely to thrive. As such, lecturers would uphold ethical conducts of honesty and hard work in the University.
2. That lecturers insist on originality when assessing particularly students' time papers, assignments and projects. When students are conscious that lecturers insist on originality, they will avoid the tendency of plagiarizing and imbibe the attitude of due diligence, originality, honesty and hard work in their conduct of assignments and other academic activities.
3. That when do lecturers suspect plagiarism in a students' work? Is when facts not in public domain are not referenced, when a statement in a previous paragraph do not rhyme with the preceding paragraph, were confirmed as possible indicators that a students has plagiarized. It does implies that, lecturers have to be vigilant and conversant with facts in public domain not to be deceived by clever and crafty students.
4. That the population of students engaged in plagiarism in FUTMINNA are fairly large. It therefore meant that, the factors influencing plagiarism (laziness, mass information on the Internet and too much assignments etc.) are having massive effects on students in the University
5. That plagiarism is not rampant among lecturers in FUTMINNA is plus on the University's academic which is commendable. It has shown that, lecturers are conversant with ethical rules and standard of academic literary acceptable for publishing.
6. That publishers do not normally return manuscripts with missing references also goes strengthen the earlier position of lecturers' awareness of universal standards of academic publishing which will soon see products of the University imbibing such threats and attitudes.
7. That the factors responsible for plagiarism among lecturers and students in FUTMINNA are in order; laziness, mass information on the internet, no enforcement of plagiarism law, too many assignments and time management, publish or perish syndrome.

Conclusion

From the empirical findings of this study, it was concluded that there is very high awareness of plagiarism and use of PCS amongst lecturers in FUTMINNA. Lecturers' carefully examine students' projects/thesis for plagiarism. Similarly, plagiarism is not rampant among lecturers and that is why articles submitted for publication are often returned for missing references. That the factors responsible for plagiarism amongst lecturers are laziness, mass availability of information on the Internet and lack of enforcement anti-plagiarism laws. In addition, there is publish or perish syndrome as the major factor responsible for plagiarism.

Recommendations

The following recommendations were made from the findings of the study:

1. More enlightenment campaigns should be carried out through workshops, sponsoring radio jungles using the University's 92.3 FM station to sustain current gains in awareness amongst lecturers.
2. Lecturers of research methodology must emphasize the need for proper referencing in text and bibliography of other authors work in students projects and thesis works. Group assignments that would help students demonstrate practical application of knowledge of referencing should be emphasized.
3. The University should subscribe to quality journals and commercial sites for download of reference materials to reduce the practice of plagiarism or cheating.
4. Lecturers should be encouraged to use APCS for every assignment and time papers.

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