INTEGRATION OF ICT TOOLS IN AGRICULTURAL EDUCATION CURRICULUM FOR QUALITY INSTRUCTIONAL DELIVERY.

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Abstract

Information and Communication Technologies (ICTs) have become part of individual lives in the 21st century. ICT is often employed to improve the quality of instructional delivery to help in equipping the students with relevant skills and knowledge. This paper stressed on the integration of ICT tools in Agricultural Education Curriculum for Quality Instructional Delivery. The paper dealt with the ICT tools that can be integrated in agricultural education curriculum; ways ICT tools can enhance quality instructional delivery; benefits of integrating ICT in Agricultural education curriculum; challenges of integrating ICT in agricultural education curriculum and strategies for enhancing ICT integration in agricultural education curriculum. Therefore, for effective integration of ICT in agricultural education curriculum, it was recommended that teachers of Agricultural education should be trained periodically; sufficient ICT facilities should be provided; there should be constant power supply; internet services should be enhanced, among others.

Key Words: *ICT, Integration, Agricultural Education, Curriculum, Quality and Instructional delivery*

Introduction

The world we live today is very different from what it was during the past centuries, especially in the way things are carried out. Although the 19th century was characterized by industrial revolution that increased human production capacity, the 20th century witness tremendous development in computer technology that helped humans invent new ways to live and work (Alhawiti, 2013), and in the improvement of quality education. Education is perhaps most affected by technological development given to the huge changes that resulted from the use of computer technologies in instruction delivery. This is because instructional delivery is now easier due to the integration of Information and communication technologies (ICT).

Information and communication according to Alhawiti (2013), exposes learners to different types of digitalized activities and machines like computers, digital mobile devices (iPods, smartphones, etc.), and online games. Thus, many learners can access the internet, participate in social networks (Facebook, Twitter, etc.), send e-mails, and exchange images and videos. ICTs are tools or resources that could be used to process, store, preserve, access, retrieve and disseminate information with ease (Onoh, Onu, & Oluka, 2012). The authors also noted that ICT has become part of life, thereby making the entire world a global village where people readily communicate to function effectively. According to Mishra, Vinay and Tripathi (2015) ICT is a diverse set of technological tools and resources used to communicate, create, disseminate, store and manage information. Ibezim (2017) defined ICT as all equipment that support activities involving the creation, storage, manipulation and communication of information, including related methods of application and management. ICT simply means any electronic gadget or tool that can aid easy creation, storage, retrieval and transfer of information. The ICT tools that can be employed in Agricultural education instructional delivery include social media, use of Computer Assisted Instruction (CAI), elearning, computer software, internet among others. Gulbahar & Guven (2008) buttressed that most countries throughout the world have begun integration of technology innovations in schools using different methods to increase the quality of teaching and learning. Mastering information technology and understanding basic skills and concepts of ICT are now highly appreciated by many countries

(Rampersad, 2011).

ICT has really improved teaching and learning processes. Through the help of ICT, teachers can easily access information from internet even in their bedrooms, teach with ease, assess and grade students' performance without much stress. ICT is beneficial to students in areas of independent learning, easy access to information, carryout assignments, projects with little stress among others.

According to Shymal (2006), ICT opens up opportunities for learning because it enables learners to access, extend, transform and share ideas and information in multi-modal communication styles, and format. Knowing the important roles of ICT in teaching and learning, there is need for proper integration of ICT tools in agricultural education curriculum for quality instructional delivery in Nigeria tertiary institutions (Colleges of Education and

Universities).

Agricultural Education is a programme designed for training learners in the improved crop and animal production processes and marketing as well as in teaching (Egbule, 2004). Agricultural Education provides learners with sound academic knowledge and skill as well as ample opportunity to apply the knowledge through classroom activities, laboratory experiments, project participation and supervised agricultural experiences as contained in the curriculum (Osinem, 2008). According to Tyler in Ughamadu (2006), curriculum refers to all the learning experiences which is planned by and directed by the school to attain its educational goals. To achieve agricultural education objectives both in colleges of education and universities, quality instructional delivery of the planned curriculum is very vital.

Instructional delivery is carried out at the implementation stage of the curriculum. It is the stage of interaction between the student and the environment as directed by the teacher. It is also a deliberately planned interaction between the teacher and students towards the achievement of stated objectives and goals. For quality instruction delivery to be achieved, it must be interactive in nature and students-centered. Students have to be actively involved in the teaching learning process with their interest aroused and maintained through the integration of ICT tools.

The integration of ICT in agricultural education teaching and learning is a medium in which a variety of methods, approaches and pedagogical philosophies may be implemented (Hadi & Zeinab, 2012). According to Munienge, Telisa, and Kikunga (2013), the integration of ICTs in the curriculum of agricultural education brings many opportunities such as increasing learners learning capability, enhancing problem solving capabilities, facilitating learners‘ critical thinking among others. The authors further stated that before integrating the use of ICT tools in agricultural education instructional delivery, one needs to make sure that suitable levels of investment is in place such as adequate training, good policy, careful planning, restructuring the teaching process, and a systematic approach in order to achieve maximum educational benefits. Integration of ICT tools in agricultural education curriculum instructional delivery enhances students‘ skill acquisition thereby solving the problem of skill mismatch. This is achievable because ICT enable learners learn beyond the classroom, give them the opportunity to put what they learnt in classroom into practice, and enable them to interact with their counterparts outside the school settings among others.

However, this paper aims to examine the ICT tools that can be integrated in agricultural education curriculum; benefits of integrating ICT tools in agricultural education curriculum; challenges of integrating ICT tools in agricultural education curriculum; and strategies for enhancing ICT integration in agricultural education curriculum.

Integration of ICT Tools in Agricultural Education Curriculum

There are many ICT tools that can be integrated in agricultural education curriculum for quality instructional delivery. Hadi and Zeinab (2012) noted that different ICT tools and applications may be integrated in teaching and learning process. Some of these tools and applications according to the authors may be designed specifically for educational purposes and some others for general use. Some of the ICT tools that can be integrated in agricultural education curriculum to aid instructional delivery include:

- **E-learning:** E-learning otherwise known as electronic learning can be effectively used for instructional delivery both for distance and close learning. According to Shyamal (2006), the link between distance learning and telecommunications is becoming even stronger, yielding new solutions to old problems, innovative educational resources and new teaching/learning practices. E-learning as learning via electronic media enable the students to learn beyond the walls of the traditional classroom. The benefits of e-learning are that it enables the students to learn any time, any place, independent learning, group collaboration among others.
- **Social Media:** Social Media are tools that allow for communal (social) interaction and easy creation of content by users (Ibezim, 2017).
  Social media are digital technologies that are based on user participation and sharing. Social media can be used for instructional delivery. Some examples of social media that can be used in agricultural education instructional delivery are facebook, blog, google plus among others. The ways social media can be used by teacher for instructional delivery according to Ibezim are:
  i. Post course notices and course related news items in blogs.
  ii. Organize seminars and in class discussion through their blogs.
  iii. Provide records of their own research activity as reference material for students.
  iv. Give opinions on published research in a field of study as a continually updated reading list for the students.
  v. Provide discussions of some related topics linking to topical stories that illustrate realworld implications.
- **Computer Assisted Instruction (CAI)**: CAI makes use of computer directly as a medium of instruction and information delivery system. Egbuna and Opone (2005) maintained that CAI is an instructional design whereby computer system delivers instruction directly to learners by allowing them to interact or relate with designed lessons that have been programmed into the system. Ornstein and Hevine in Egbuna and Opone (2005) highlighted three levels of CAI as:
  i. **Practice and Drill Level:** This is the simplest and lowest level. It assumes that a concept or skill in agricultural education has previously been taught to the learners. This level is then used to perfect and reinforce previously learned concepts, skills or procedures thereby enhancing mastery. This can be an effective tool for teaching practical related courses in Agricultural education. ii. **Tutorial Level:** At this level, computer essentially acts as the teacher or instructor

thereby taking the place of agricultural education teacher or instructor. The tutorial level takes over the responsibility for real teaching. Every interaction is between the computer and the learner. The computer present new concepts and principles and once the learner exhibits clear understanding, he immediately goes over to the next activity.

iii. **Dialogue Level:** This is the highest level and it involves a sophisticated interaction between the learners and the computer. The agricultural learners actually talk to the computer and engage in real dialogue with the computer. The learner can interact or communicate with the machine by giving response and asking new questions.

- **Use of Computer Software/Applications**: Certain computer software have been developed which can be integrated in agricultural education curriculum for quality instructional delivery. The functions of the software depend on the type. Some examples of such computer software include: Microsoft Power-point, spreadsheet package (Excel), assessment tools (e.g. flubaroo, Kahoot etc.) Analysis software (e.g. SPSS) among others. For instance, power point can be used for easy presentation of lesson; spreadsheet package- to assist learners in calculations; flubaroo can be used for online assessment of students while SPSS is used for easy analysis of research data.
- **Internet:** Internet is a network that connects millions of computers all over the world through the use of international telecommunications system (Egbuna and Opone 2005). Internet provides most of information or data requested. Ikekeonwu (2003) opines that internet provides world-wide access to resources and information. Internet can serve as a useful tool for teaching and learning. Teachers can update their knowledge and lessons via internet services. Also, students can carry out their assignments, read ahead of the teachers, up-date their knowledge through the use of internet.

Ways ICT Tools Can Enhance Instructional

Delivery in Agricultural Education

ICT tools can enhance instructional delivery in different ways. According to Shyamal (2006), ICT tools help instructional delivery in the following four ways:

- **Access-** ideas and information from diverse sources through searching, locating, selecting, and authenticating material in a wide range of multimedia forms;
- **Extend-** ideas and information through processing, manipulating, analyzing & publishing material in different multimedia forms;
- **Transform-** ideas and information into new or different forms through synthesizing, modeling, simulating and creating material in many multimedia styles and formats; and
- **Share-** ideas and information across local, national and international networks by interacting electronically with others in actual and/or delayed time.

Quality Instructional Delivery in Agricultural Education

Quality is a very important phenomenon in Technical and Vocational Education because the effectiveness of any curriculum depends on its quality. Smith in Goetsch and Davis (2010) describes quality as the performance to the expected standard. They further opined that quality depicts superior value and is dynamic in nature. Since this 21st century has its focus on ICT, quality agricultural education will therefore involve the integration of ICT tools into its curriculum for relevance to our modern world.

For quality agricultural education instructional delivery to be achieved, it must be in line with the sixteen principles of vocational education developed by Charlse Prosser 1949. The principle as outlined by Onoh, Onu and Oluka (2012) are:

> *the training environment should be replica with the working environment; the training jobs should be carried out on the same way as in the occupation itself; there should be adequate repetition of training in any skill or concept taught for proper mastering; training should be given on actual jobs and not on exercise or pseudo jobs; students should be trained on the same tools, equipment, and machines which they will use after schooling; the instructors must be masters of the skills and concepts they teach among others.*

Benefits of Integrating ICT Tools in Agricultural Education Curriculum

- ✓ ICT tools enable the sharing of ideas and information about agriculture across local, national and international networks by interacting electronically with others (Shyamal 2006).
- ✓ ICT tools such as social media, power point, skype, internet, and CAI can enhance the quality of instructional delivery by increasing learners' motivation and engagement, facilitating the acquisition of basic skills amongst others (Adu & Olatundun, 2013).
- ✓ ICT can be used to improve skill acquisition in agricultural education with the help of e-learning process (Onoh, Onu and Oluka, 2012). Other benefits of integrating ICT tools in agricultural education curriculum are:
- ✓ ICT gives access to information. Ideas and information from different sources about agriculture can be obtained with the help of ICT tools like internet.
- ✓ It enhances independence learning. With the help of ICT, agricultural education students can engage in active and meaningful learning without the teachers. This can be achieved through CAI, social media and e-learning among others.
- ✓ ICT facilitates research works by Agricultural teachers and students. Through ICT, information and ideas useful for conducting of research can be obtained.
- ✓ With ICT, agricultural teachers can employ the use of online assessment tools in assessing students' performance. With the help of online assessment tool, teachers can administer test for thousands of students and grade their performance without stress.

Key Challenges in Integrating ICT Tools in Agricultural Education Curriculum

Despite the numerous benefits of integrating ICT in instructional delivery, there are also challenges militating against its integration for effective instructional delivery. Some of the barriers include problem of power supply, poor network, poor funding, high cost of some ICT facilities, inadequate ICT skills by some teachers among others. However,

Munienge, Telisa and Kikunga (2013) gave a detail classification of the challenges into three groups, which are:

- **Environmental Challenges**: People are expected to be able to work, learn, and study whenever and wherever they want to; but this is still not possible in developing country like Nigeria. There is limited infrastructure for the full ICTs integration in education in a country like Nigeria. There are inadequate computer sets, computer laboratories, poor network, power failure among others.

- **Cultural Challenges:** Diversities of culture in different part of the world are also challenges in introducing ICT in education. English is the dominant language of the internet. Research has shown that an estimation of 80% of online content is in English. A large proportion of educational software produced in the world market is in English also. In most countries where English is not the first language this represents a serious barrier in integrating ICTs use in instructional delivery. This situation limits the information access for some people who has lack or no ability in English language.
- **Educational Challenges**: One of the greatest challenges in ICT integration in education is balancing educational goals with economic realities. ICTs in education require large capital investments. Due to financial difficulties, government in some part of the world specially developing countries priority is the rehabilitation of school buildings and teacher welfare. ICT for education on the other hand has not yet been considered a priority. In term of human resources, the constraints are due to the lack of trained teaching manpower and lack of motivation among educators to adopt and integrate ICT as a tool into their teaching.

Strategies for Enhancing Integration of ICT Tools in Agricultural Education Curriculum

One of the most vital contributions of ICT in the field of education is easy access to learning (Adu & Olatundun, 2013). Gone are those days where teachers and students need to go to library only before they can gather the information they need. With ICT libraries are made mobile. Information can now be sourced anywhere and at any given time. Students and teachers can have easy access to information through the help of e-book and other online resources. However, for effective integration of ICT in instructional delivery, certain strategies need to be put in place. The strategies as outlined by Adu & Olatundun, (2013) are as follow:

i. **Develop a school ICT Policy:** For quality integration of ICT tools in agricultural education curriculum, the school management must have a proper ICT school policy. The policy is a blue print for the school to design and manage ICT programme for agricultural education teachers and students in a systematic and progressive manner.

ii. **Learn the Technology:** Learning the basic of word processing, spreadsheets, presentation software, using web page and the Internet are prerequisite to boost their computer skills. In order to stay ahead and becoming a competitive person, one must keep abreast with the recent technology.

iii. **Involved Others in The Process:** Literarily, participation gives one sense of belonging and responsibility. In implementing technology successfully, all staff should be encouraged to participate in the implementation process.

iv. **Enhancing Partnership and Collaboration:** Partnership and collaboration can enhance technological development and promote decision making of the school leaders. In gaining ICT expertise and fund raising, leaders can foster good partnership and collaboration with the community, public and corporate sector.

v. **Plan a Training Programme for Teachers:** Teachers are the nation builders; they need to be versatile and conversant with the latest technology. They are the custodians of knowledge dissemination. Therefore, constant training programme for teachers will promote the sense of professionalism in them. In planning for an ICT training programme for teachers, the first step is motivating them to learn new knowledge and gaining new skills and competencies.

Conclusion

As the world is gradually changing into a global village through the help of ICT, teaching and learning will not remain same as it was before. There is every need for curriculum planners and developers to integrate ICT tools in agricultural education curriculum (colleges of education and universities) for quality instructional delivery. Schools should also to make use of the rich and exciting opportunities offered by the new technologies in education in order to equip the students with sustainable skills. Teachers should embrace and integrate the use of ICT tools in instructional delivery. Learning is effective when the students are actively involved and participate in the process. ICT tools make students to be active learners.

Recommendations

To effectively integrate ICT tools in agricultural education curriculum for quality instructional delivery, the study recommends the following among others:

1. Curriculum planners and developers should integrate ICT tools into agricultural education curriculum. They can be included as part of instructional materials for quality teaching.
2. The school administration through the help of the government should provide sufficient computers and other ICT tools necessary for teaching and learning.
3. The school management should provide strong and constant internet services in the school. This will enable easy access to internet at any given time.
4. Agricultural education lecturers and instructors should be constantly trained on the usage of new ICT tools which they can employ in instructional delivery.
5. There should be an establishment of an effective ICT unit and support structure which will act as a catalyst for the integration of ICT tools in the teaching learning process.
6. Schools should adopt online assessment tools in assessing students' performance. This will enable the students embrace ICT usage knowing that they will write online test.
7. Constant power supply is highly necessary for the integration of ICT in instructional delivery in schools.

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