

TRANSFORMING AGRICULTURAL EDUCATION THROUGH THE USE OF INFORMATION AND COMMUNICATION TECHNOLOGY.

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Abstract

The opportunity offered by information and communication Technology in the 21st Century have not been fully utilized in enhancing the teaching and learning of agriculture. The advents of computers and internet have given rise to e-learning, e-conferencing, e-marketing etc which can be of immense benefits to both teachers and learners of agriculture: Through internet services, a wide range of information that will be essential in studies, researches and practical management of farm enterprises can be accessed thereby transforming agricultural education. The paper examines the relevance of ICT in agricultural education, challenges to effective use of ICT in agricultural education, suggest ways to address the challenges and makes recommendations on how to transform agricultural education through ICT.

Many nations and institutions have turned to ICT and are exploring ways by which it may help them in pursuing their educational goals. Also, recent years have witnessed increase in the use of Information and Communication Technology (ICT) in almost all spheres of human life. Adesope, Asiabaka and Agumau (2007) observed that the advent of computers have given a new direction to the Information and Communication Technology Industry. A large volume of information can be handled using a very small micro chip and transmitted with great speed globally. The revolutions in ICT have great potentials to enhance the methods of teaching and learning in agriculture. Internet services like e-learning, e-library, e-marketing etc are quite essential to both teachers and students of agricultural education for research and studies. Through these internet services, both teachers and students will have access to reliable information about better practices of production, storage, processing techniques and profitable marketing channels. Yekinni and Olaniyi (2007) reported that enormous quantities of agricultural knowledge and decision support tools exist on the internet and other digital media. The agricultural information highway is now capable of sharing research and development knowledge among research institutions and anyone who have access to the internet.

Food and Agriculture Organization (1998) observed that modern ICT have transformed the process of communicating agricultural information in advanced countries in recent decades, that is, advanced countries are already harvesting the benefits of modern ICT to strengthen and improve agricultural production. It further adds that ICT may have the same impact in transforming agriculture in developing countries as it did in advanced countries. Maru (2007) posited that with the advent of ICT especially computers, internet and android phones, there is an ongoing transformation to agriculture through innovation that is largely enabled through information sharing and exchange between agricultural communities.

The present methods of teaching and learning in schools of most developing countries are paper based and usually require both the teacher and students to be physically present, usually in lecture halls, before teaching and learning can take place. The methods used usually face several challenges. For example, the teacher or student may be unable to attend the lesson due to some constraints and enough lecture halls are needed to accommodate the students. The adoption of modern ICT in schools will overcome these challenges. The teacher can load lesson materials on the internet and students can access them anytime on their computers. In addition, both teachers and students can have access to unlimited agricultural information via the internet. They can also watch live demonstration of innovations and interact with agricultural experts.

The Relevance of ICT in Agricultural Education

Agricultural education is that form of education that provides the practical skills, aptitude and knowledge in the art and science of crops and animal productions for man's use. It also involves the processing, marketing and distributions of all farm products.

Agriculture is the bedrock for economic source for most rural farmers and natural development as well as sustainable food security. The main thrust of agricultural education is to prepare students who should take into farming as a vocation upon graduation. Agricultural Education should stimulate the right attitudes in the students in addition to the acquisition of knowledge and skills in agriculture. There is therefore, the need to adopt appropriate teaching and learning approaches that would correct the wrong impression by the students that agriculture is a vocation for the poor and uneducated people. These approaches should expose the students of agriculture to the opportunities that abound in agriculture as profitable enterprises. The principle of "catch them young" should be applied in agricultural education where students are exposed to the right information and skills on the best production methods, right from primary school to university. Technical Centre for Agricultural and Rural Cooperation (2000) reported that efficient information dissemination remains the key to bridge the gap between developed and underdeveloped countries, when students of agriculture are properly guided and acquire adequate knowledge and skills in best production technologies, there is high tendency for them to venture into agriculture as a vocation. Munyua (2000) observed that the information revolution through ICT is an intervention with the potential to ensure that knowledge and information on important technologies, methods and practices are put in the right hands. He further noted that knowledge and information are basic ingredients of food security and are essential for facilitating rural development and bringing about social and economic transformation. Information and Communication Technologies provide efficient and convenient teaching and learning opportunities in agricultural education. These include:

1. **Electronic Learning:** Lecture notes and other relevant course materials are loaded on the internet by the prospective lecturers. The students can have access to these materials in the convenience of their hostels or homes with their computers at any time. Areas of ambiguity are sent back to the lecturers for further explanation. This will serve as a remedy to the protracted problem of shortage of lecture halls in schools. Examinations are also conducted via the internet. Examination questions are sent to the students through internet to answer under regulated time. This can help to check examination malpractice which is common in most schools today.
2. **Electronic Library:** This provides ample opportunity for students to have access to unlimited information, far more than what the lecturers or text books could

offer them. Information on the internet is retrievable such that the students can have access to them anytime they need them.

3. **Electronic Conferencing/ Workshop:** This provides live interactive session where teachers, students, researchers and other relevant stakeholders in agriculture are brought together for discussions. The students have the rare privilege of interacting live with agricultural experts in different disciplines. They have the opportunity to watch live the demonstration of agricultural innovations and questions for further clarifications.
4. **Internet Browsing:** Specialized information such as weather forecasts, pest and disease management techniques, marketing channels, input supplies etc are usually posted to the internet by the relevant organizations. Both the teachers and students of agriculture will find this information very useful as it will provide them with relevant technical knowledge that enables them to set up and manage their farm enterprises.

According to Itodo (2012), other relevance of ICT includes:

1. It facilitates distance learning.
2. It provides reliability to the information.
3. It provides a high level or records security.
4. It proves enough storage facility at the least cost and
5. It provides the needed speed for information transmission.

Challenges to Effective Use of ICT in Agricultural Education

The following challenges are working against the adoption of modern ICT in agricultural education.

1. **Policy Bottlenecks:** In most developing countries, especially in Africa, the formulation and implementation of policies in the ICT sub-sector is still very rudimentary (Ozor, 2007). Thus, most developing countries lack policies and strategies that would facilitate the harnessing of modern ICT for rural development programmes, or where such policies have been formulated, proper implementation plans are needed. FAO (2002) reported that most developing countries do not have clear, transparent and sustainable policies to support ICT use. Munyua (2000) observed that most ICT projects in developing countries are government controlled and the bureaucracies that accompany such government services make it difficult for the rural poor to benefit from it.
2. **High Cost of ICT Equipment and Services:** The cost of modern ICT equipment and services such as computers and internet are still high and therefore remain strong deterrents in the adoption of ICT in many developing countries like Nigeria, Angola, Kenya, Cuba and India (Ozor, 2007). The costs of purchasing

and maintaining ICT equipment and services are often high beyond the scope of educational and training institutions as a result of poor funding.

3. **Poor Infrastructural Facilities:** The basic infrastructural facilities like electricity supply and telecommunication network are either lacking or poorly developed in developing countries especially in rural communities. This makes it extremely difficult or impossible for schools in rural communities to have access to internet services. In situations where schools provide infrastructural facilities, because of huge maintenance cost, sustaining operations is not possible.
4. **Shortage of ICT experts:** Most of the staff managing ICT based projects in developing countries often lack adequate knowledge and skills that would enable them take full advantage of the new technologies (Munyua, 2000). FAO (2002) reported that the few ICT experts in developing countries prefer to work in juicy establishments where the wages and conditions of service are higher or more attractive. This explains the dearth of ICT expert in educational institutions.
5. **Inability to sustain ICT project:** Agbamu (2006) noted that most projects established in developing countries with external aids usually face the major challenge of discontinuity or neglect after the expiration of the external assistance. ICT projects are not exception as they suffer the same fate. The inability to sustain ICT projects in terms of continued funding and maintenance has often adversely affected the efficiency and effectiveness of ICT services. Quite often, ICT projects are either abandoned or left un-utilized in various institutions due to absence of electricity supply to provide power to the computers especially in rural communities.

Ways to Address the Challenges to Effective Use of ICT in Agricultural Education

The following ways can be used to address the challenges to effective adoption of ICT in agricultural education:

1. **Policy Considerations:** Weak and illegal framework and policies have slowed down the development and the use of ICT in many African countries (Ozor, 2007). The national government of each country should strengthen collaboration with development agencies to formulate appropriate policies to attract private investors. FAO (2002) reported that FAO is currently partnering with similar development agencies like the United States Agency for International Development (USAID). World Bank and non-governmental agencies should re-define national policies that can promote and accommodate electronic agriculture especially in Africa, Latin America and Asia. The report also added that already, national policies of some African countries like Ghana, South Africa, Nigeria etc are being revolutionized to attract private investment in the provision of ICT

services. USAID (2008) reported that some developing countries now have policies that accommodated ICT use in agriculture.

2. **Cost of ICT Equipment and Services:** The following measures can be taken to reduce the cost of ICT equipment and services.
 - (i) Government should encourage the manufacture of computers and other ICT accessories locally to bring down the high cost associated with importation of goods.
 - (ii) Government should grant import waivers or low import tariffs for ICT equipment or services that must be necessarily imported.
 - (iii) Multi-national companies operating in the country should be encouraged to supply computers and ICT services to educational institutions as part of their social service.
3. **Provision of infrastructural facilities:** Because ICT devices depend on infrastructure like electricity to function, the government at all levels should prioritize the provision of rural infrastructures. This will ensure that educational institutions have adequate infrastructure to support ICT services. Government at all levels should also create enabling environment for the private investors to invest in the provision of infrastructure.
4. **Shortage of ICT experts:** There is need to invest in the training and re-training of more ICT personnel to have a sustained and improved ICT services. Such trainings can be conducted through conferences/ workshops or train the trainers courses. Emphasis of such training should be to equip ICT teachers with vast knowledge in internet applications.
5. **Sustainability of ICT projects:** In order to ensure that ICT projects do not suffer neglect after expiration of external assistance, right from inception the issue of sustainability should be considered. Thus, reliable sources of funding the project should be identified and the ICT expert who will operate and maintain the project be put in place.

Conclusion

The modern Information and Communication Technologies have great potentials in transforming the teaching and learning of agricultural education just like any other aspect of human endeavours. However, their use in agricultural education has been quite slow due to inappropriate and/ or rigid ICT policies that do not encourage participation by private investors especially in developing countries. The over reliance on importation of ICT equipment and services make their prices very high beyond the scope of many educational and other training institutions. Shortage of ICT experts in addition to poor infrastructural facilities make ICT services

unavailable to rural communities especially. If these challenges are properly addressed, both teachers and students will key into the revolution in ICT industry to enhance teaching and learning in agricultural education.

Recommendations

1. Computer education should be made a compulsory subject in secondary and tertiary institutions. This is to ensure that graduates from these institutions are ICT compliant.
2. Government should collaborate with multi-national companies operating in the country in the provision of computers and internet services to schools and training institutions, also the government should collaborate with them in the training and re-training of ICT personnel.

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