IMPACT OF INFORMATION AND COMMUNICATION TECHNOLOGY (ICT) ON TEACHING AND LEARNING AGRICULTURAL EDUCATION

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Abstract

Teaching and learning activities have to be planned and organized to ensure continuity between ICT and non- ICT lessons, the employment of ICT and non-ICT tools to provide support for one and another, and the interactions between the tools and the course participants. It is only then that students in the introductory agricultural course are likely to think "in an agricultural way". Drawing upon international studies on ICT in Education, this paper also identified and discussed the cognitive opportunities and limitations of ICT in addressing the challenges in learning and teaching agriculture and finally made some recommendations on the way forward.

Education is the acquisition and dissemination of knowledge , skills and attitudes through institutional process, which may be general, or specialized, formal or non- formal in school or out of school to effect change in any society. Thus, education is the most veritable instrument for saving the large scale and complex ignorance of the agricultural principles and its application in the society.

In education, effective teaching and learning can only be said to have taken place when behavioural changes are noticed in the learner as a result of his joint interaction with the teacher under a conducive environment (Yalams, 2002). Moreover, for teaching and learning of agriculture in schools to be effective and sustainable, the provision and use of ideal, conducive Information and Communication Technology (ICT) in schools becomes imperative.

Research studies in Information and Communication Technology in agricultural education have shown that ICT facilitates the acquisition of important cognitive skills required for effective analysis and evaluation. It provides the cognitive scaffolding for students to acquire complex concepts and understand the connection between them (Smith and Smith, 1989). ICT equally allows teachers and students to communicate both their thoughts and interests in the subject matter (Manning,2002 and Greelaw, 1999) and offer a better match to students' learning style according to Robbins, (2000). More so, ICT in agricultural education is a medium through which students can observe the real-life implications of agricultural theories (Simkins,1999).

Conceptual Framework: Information and Communication Technology (ICT)

To define Information and Communication Technology (ICT), a term used in the title of this paper and extensively throughout, two other terms need to be defined.

UNESCO (2000), defined information as the science dealing with the design, realization, evaluation, use, and maintenance of information processing systems, including hardware, software, organizational and human aspects, and the industrial, commercial, governmental and political implications of these. Informatics Technology is defined as the technological applications (artifacts) of informatics in society.

Information and Communication Technology (ICT) is defined as the combination of informatics technology with other related

technologies, specifically communication technology. These definitions imply that ICT will be used, applied, and integrated in activities of working and learning on the basis of conceptual understanding and method of informatics. The use of ICT cuts across all aspects of agriculture and social life.

Aims of Agricultural Education

Agricultural courses are run in educational institutions over the world. Although their structure may vary, the aims of the courses are consistent. The general aim is to provide students with an adequate knowledge and understanding of the tools of agricultural analysis and of the situations and problems too when these tools are applied. The study of agriculture gives students a factual background needed for rational decision- making. The Joint committee for agricultural education (1977) captures the types of thinking inherent in the discipline, as well as the interconnectivity of agricultural concepts and ideas, thus:

(i) A capacity to understand the mutual interrelations and interdependencies of the various elements in an element in an agricultural system and to take account of them in handling agricultural problems;
(ii) A capacity to apply to an agricultural problem the models of agricultural analysis that are most appropriate to it;
(iii) A capacity to follow and sustain an agricultural argument and to make logical inferences from given information.

The above aims suggest that to facilitate students to think " in an agricultural way", the introductory aspect of agricultural courses must promote learner autonomy, and provide access to the world of agricultural concepts and ideas. It is a common place to note that learning depends on access- to adequate facilities, informed teachers, illuminating materials and so on. However, students also need to gain access to the academic environment of agriculture. Every academic subject faces this same kind of challenge, to help students to go beyond their experience, to use it and reflect on it, and therefore change their perspective of it, and therefore change the way they experience the world.

Challenges of learning and teaching Agriculture: An Overview

The cognitive capabilities that are appropriate to learning in the natural environment of the real world do not work as well in the academic environment of the agricultural disciplines. Agricultural teachers who want their students to think "in an agricultural way", cannot assume that "agriculture as a substantive activity" will suffice; that is, the experiences of the agricultural system do not necessarily incorporate the form of comprehension that provides an access to the discipline.

Without autonomy, students are likely to be plagued by the problem of inert knowledge and to approach the discipline as bundles of facts and descriptions. As a result, they may lack an appreciation of and ability to participate in the agricultural ways of thinking. Many problems in agricultural courses are brought about by heterogeneity among students. In most educational contexts, students are heterogeneous in terms of aptitudes, prerequisite knowledge, motivation, experience and learning styles. To support this, Robbins (2000: 12) noted that:

> *Teachers are faced with the fundamental dilemma of where to pitch their lessons. If the lessons are pitched too high, the weaker students become hopelessly lost in the course. If the lessons are pitched too low, the brighter students are turned off as the course fails to stimulate them intellectually.*

Yet the nature of agriculture requires students to work through and understand the

concepts or principles themselves. There is a lack of access into the world of agricultural concepts and ideas. To this effect most students use their everyday experience to interpret the meaning of agricultural concepts. Although such experiences can help the development of agricultural thinking, many misconceptions are found as a result. The idea that students tend to equate knowledge to facts is another problem of its own.

However, agriculture is the way of thinking about problems, not as a set of answers ready to be taken off the shelf. Most students have problems in understanding agricultural concepts and principles, let alone in applying and evaluating them. The most common problem is that student's expectations of the course are not sometimes met. Parks (1999) stated that:

> Many students expect the course to provide them with clear –cut and simple answers to current socio-economic problems. They often encounter a sense of disappointment when they cannot apply the theories and principles that they have learnt to real-world agricultural situations.

This problem of recognizing the agricultural dimension to a problem is likely to become more acute as techniques become more complex.

Opportunities and Limitations of ICT in Teaching and Learning Agriculture

Research studies on the use of ICT in learning and teaching agriculture have shown that ICT empowers students and allows them access to the discipline. Various types of ICT tools are used in agricultural courses: tutorial, testing, agricultural simulations, database containing agricultural data, graphic packages to display agricultural models, spread sheet and tools of local area network and the internet. Each provides opportunities for students to think " in an agricultural way".

This section is not dismissing traditional classrooms for failing to support learner autonomy and provide access to the discipline instead, it's taking stance that ICT in an agricultural course will offer teachers more options to create learning environment that will enable students to think "in an agricultural way". Whether these opportunities are perceived and taken up depends on the course participants, tools and the learning environment.

Advocates of ICT in agricultural education argued that ICT packages provide students with learner autonomy that is crucial to the learning process (Brooksbank , 1998). In contrast to traditional methods of instructions, ICT gives students the opportunity to determine when instruction will occur and at what pace. It does so by providing facilities that give students control over the presentation of content and the sequence of the learning activities, and hence promoting learner autonomy. Students can set the pace of instruction and work through the course content at a rate commensurate with their ability and motivation. ICT offers means for learner control, where students have greater flexibility and self- determination to acquire agricultural knowledge and construct their own meaning of the knowledge.

However, some advocates of ICT use in agricultural education, are of the view that most ICT packages do not have a significant effect on learning and teaching activities in schools because only a small proportion of their potential is used. The extent to which learning opportunities are actually taken up depends on where and how ICT is situated in the agricultural course. If ICT is treated as an add- on, isolated from all other aspects of the course, few if any of the opportunities will be taken up.

In this paper, I am taking the stance that the above views seldom hold in the real- world because:

1. Students may lack the learning strategies needed to work through the ICT

package. The multitude of options and choices available to students in the ICT package may impose a cognitive load on them.

2. Students may lack knowledge about learning from ICT package. Some initial teaching may be necessary, as ICT packages do not support the use of large blocks of text on the screen. Moreover, the embedded help in most packages is not enough when students have no ideas of what the packages offer in terms of allowing them to structure the knowledge in their own way.
3. Students may lack the motivation to learn if the ICT package is not integrated into the curriculum or used with orienting activities, it is probable that many students will just browse through the screen, or read through once and expect learning just to happen.

Conclusion

The discussion in this paper has explored the opportunities and limitations of ICT in learning and teaching agriculture. Moreover, within the same learning environment, the learning needs of students may differ and the opportunities of the ICT tool may not be taken up.

Teaching and learning activities have to be organized to take up the opportunities and address the limitations of ICT. With a better knowledge of how these activities may be organized, agricultural educators are more likely to take up the opportunities provided by ICT to ensure that their students think " in an agricultural way".

Recommendations

To address the above- mentioned limitations, the following recommendations are made:

a. Teachers should organize orienting activities to help students manage learning from ICT packages. As they provide students with structure that guides them on a given task or learning activity as they work through the ICT packages.
b. Teachers need to be adequately prepared to implement a state-of- the-art ICT curriculum.
c. There should be both government and community involvement in the provision of basic infrastructure such as (electric wiring, internet access, lightening and airconditioning our spaces) and resources such as (various types of technological devices from computers with peripherals, software, etc).

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