LEARNING SCIENCE THROUGH DISTANCE EDUCATION- A CHALLENGE AT KARNATAKA STATE OPEN UNIVERSITY

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ABSTRACT

Distance education is the education of students who may not always be physically present at a class room. The modern use of electronic educational technology (also called e-learning) facilitates in distance learning and independent learning by the extensive use of Information and Communications Technology (ICT), replacing traditional content delivery by postal correspondence in general and for science discipline in particular. Science is an art related to field of study which draws upon many disciplines such as chemistry, physics, physiology, biology, hygiene, economics, rural development, child development, sociology and family relations, community living, art, food, nutrition, clothing, textiles and home management. The science, technology, society and environment education movement has a long history in science education reform, and embraces a wide range of theories about the intersection between science, technology and society. In delivering science courses by distance, a key challenge is to offer the learner an authentic and meaningful laboratory experience that still provides the rigour required to continue on in science. On developing strategies for successful Science and technology programme in Distance Education is to identify relevant mode to approach and to define and prioritize short and long-term objectives and the need to align the agenda with requirements.

The present paper attempted to understand the challenges in Open and Distance mode with special reference to science subjects at KSOU and analyze the reasons in teaching science stream, and throw some light on the possible ways of solving the problems of ODL and encourage learner's scientific mind.

Keywords: ICT, Science Education, KSOU

INTRODUCTION:

The term open and distance learning reflects both the fact that all or most of the teaching is conducted by someone who is away from the learner, and that the mission aims to include greater dimensions of openness and flexibility, whether in terms of access, curriculum or other elements of structure. Open and distance learning systems can usually be described as made up of a range of components such as: the mission or goal of a particular system, programs and curricula, teaching/learning strategies and techniques, learning material and resources, communication and interaction, support and delivery systems, students, tutors, staff and other experts, management, housing and equipment, and evaluation. The ODL system is used for school-age children and youth those who are unable to attend ordinary schools, or to support teaching in schools, both at primary and secondary level. However, most courses and programs are aimed at the adult population.

Science education has been recognized worldwide as a pre-requisite in technological development. It is almost impossible today to live a full and satisfactory life with little or no knowledge of science. This is because science education has introduced a lot of changes in our world and it will continue to do so in the future (Orukotan, 2007). Science education remains a very potent factor that promotes national development.

Considering the nature of science, students studying science courses are expected to engage in first-hand experiences such as observation, measurement, testing hypothesis, or experiment, particularly in higher education (Kirschner, 1991). This can be a serious challenge, for distance education institutions when offering science courses because of the fewer occasions for students to be on campus where laboratory facilities, relevant equipment, and teaching staff are provided (Kennepohl and Last, 2000; Jason and Namin, 2006).

Much debate has been going on, however, as to the role, value or effectiveness of practical work not only in distance teaching settings but also in education in general (Watson, 2002). According to Jason and Namin (2006), the advantages of providing distance students with practical work include; reinforcing student's motivation towards subject matter, generating within students positive attitude towards overall learning and intensifying interpersonal relationships with tutors and peer students.

Practical work means any teaching and learning activity which involves at some point the students in observing or manipulating real objects and materials. The term "practical work" is used in preference to 'laboratory work' because observation or manipulation of objects could take place in a school laboratory or in and out of school setting, such as the student's home or in the field e.g. when studying aspects of Biology or Earth science (Irwin, 1995).

Moreover, because of the nature of the discipline, science often involves students in first-hand experiences such as observation, measurement or experiment, particularly in tertiary level education. It can present a challenge, however, for distance education institutions when offering science courses because of the fewer occasions for students to be on campus where laboratory facilities, relevant equipment and teaching staff

are provided. Apart from basic academic reasons, ensuring that student engage in practical work becomes critical when it comes to the issue of credit transfer between educational institutions as it can fairly represent the credibility to science courses (Osborne, 1993). For example, while you can study a history lesson completely online, you cannot perform nursing clinical online. Thus, physical classroom attendance is mandatory for the completion of some degree programs and this is why practical exercise is necessary due to what they contribute to the learning process.

However, not much research studies have been carried out to investigate the kind of effect brought about by a specific method of practical work on distance student learning. Instead, relevant literature on science courses involving distance education method is rather illustrative.

WHAT IS SCIENCE AND SCIENCE EDUCATION

Science is a systematic study of nature and natural phenomenon in order to discover their principles and laws. (Urevbu 2001). There are several definitions of science. Science can be defined in terms of its processes or its products. When defined as a process, science involves observing, classifying, measuring, experimenting, questioning, hypothesizing, recording, controlling variables, interpreting data and communicating. As a product, science is an ordered body of knowledge in form of concepts, laws, theories and generalisations. Over the years these have become formalized into systematic bodies of knowledge in the fields of biology, chemistry, physics, and geology and so on. These bodies of knowledge have to be transmitted from one person to another and from one generation to another. The process of transmitting scientific knowledge can only be done through education - in this case science education. Science education deals with sharing of science content and process with individuals who are not considered traditionally to be members of the scientific community, the individuals could be students, farmers, market women or a whole community (Kola, 2013). According to Okeke (2007), science education is an integrated field of study which considers both the subject matter of science discipline such as biology, chemistry, physics, agriculture etc as well as the processes involved in the learning and teaching of science. It can be said to embody all education processes aimed at providing unlimited opportunities for learners to understand and utilize necessary knowledge, skills and attitudes required to operate effectively in a scientific and technological society. In other words, science education implies exposing learners' usually prospective teachers of science to scientific and technological knowledge, to the nature of science and scientific processes, to scientific attitude as well as equipping them with professional skills of a science teacher. There is a thin line separating science education and education in science. Education in science refers primarily to understanding and application of scientific concepts and principles, while science education includes the development and acquisition of processes required to assist others acquire scientific and technological knowledge.

CHALLENGES OF TEACHING AND LEARNING SCIENCE IN KSOU

Several distance educators have found that print media dominates in the delivery of content materials to open and distance learners and also in communicating with instructors. (Butcher 2003, Tooth 2000). Research studies (Yusuf and Falade 2005, Nnaka 2012) have also shown that open and distance learners enrolled in most of the open universities including KSOU programmes use mainly print media for instructional delivery. The science courses are no exceptions, despite the critical role that hands-on experiments play in the teaching and learning of science. Owoyemi and Akinsete (2012) in their study on "learning science at a distance – students' perception of practical work in learning science" found that the students were of the opinion that it is more challenging to learn science without any practical work.

Their study also revealed that distance learners were of the view that it is essential for a science course to include practical sessions even though the course materials have been delivered to them. Practical work is an essential component of science teaching and learning, both for the purpose of developing students' scientific knowledge and that of developing students' knowledge about science (Millar 2004).

Some of the challenges of teaching and learning science education in KSOU include:-

LACK OF INFRASTRUCTURE

This has constituted a major challenge to the use of more sophisticated multimedia for instructional delivery in science education in KSOU. The following examples will illustrate the magnitude of this challenge-

- The television can be used to communicate information live to a large number of people or in recorded audiovisual form. It has been successfully used in open and distance learning programmes in some Universities of South Africa, India and China. Television programmes can be used to emphasize the experimental sides of science by demonstrating the use of complex equipment and by leading students

through experimental and pedagogical procedures. However there is no functional dedicated television station for open and distance learning in KSOU.

- Teleconferencing is a good open and distance learning instructional strategy that enables learners to get connected simultaneously so that interaction takes place even though participants are physically apart. It aids in minimizing learner instruction by creating a learning environment that is similar to face-to-face instruction. This facility is not in use in KSOU.
- Available evidence and visits to some KSOU study centres reveal that they lack the physical infrastructure to accommodate science laboratories.

INTERNET CONNECTIVITY

This has also posed a challenge to the teaching and learning of science through open and distance learning in KSOU. This is because access to the internet is generally very poor in the country and students in the rural areas never get access to the internet. Moreover the cost of accessing the internet is very high in developing countries. Most students make use of the cybercafés who charge between Rs. 10 and Rs. 20 per hour despite their poor services and slow rate of their server. Study has shown that most of KSOU study centres do not have internet connectivity. This implies that any instructional media that requires the use of the internet cannot be utilized at such study centres.

High cost of Software –The high cost of software and its licence is another serious challenge to instructional delivery of science courses in KSOU. The appropriate software for the teaching and learning of science through open and distance learning is usually very expensive because they are not developed locally. They are developed in Europe and other developed countries, and are usually made to suit their environment. In short, the software that is appropriate and culturally suitable to the Indian education system is in short supply.

Poverty –Inequality of access to the available technology by all the students is another challenge to science education through open and distance learning .The cost of personal computer (PC) and laptops have remained high in developing countries. Their prizes are beyond what the average worker or student can afford. Moreover the few students who are able to afford PC/Laptops are not connected to the internet, since this means additional cost which many cannot cope with.

RECOMMENDATIONS

1. KSOU should adopt a “media mix”-namely interactive and non-interactive media, electronic media, and print material. The use of television instruction, videoconferencing, teleconferencing and Worldwide web applications need to be introduced into the instructional delivery mode for science education. These communication and technology devices will ensure that the delivery of science education through open and distance learning is effective and efficient.
2. All KSOU study centres should be equipped with functional internet facilities, so that students and tutorial facilitators can make use of any multimedia facility that is available.
3. It is necessary for KSOU to partner with information and communication technology companies in the country to assist students to acquire their own personal computers/laptops.
4. KSOU study centres that have adequate physical infrastructure should have fully equipped science laboratories. Frequent review and strengthening of existing Memorandum of Understanding (MOU) for students practical work with conventional universities is critical, to ensure that it is working.
5. Training and re-training of science tutorial facilitators on the use of various electronic media for instructional delivery, whether online or face-to-face interaction.

CONCLUSIONS

The establishment of the Karnataka State Open University during 1996, open and distance learning system has come to be accepted as an alternative mode of acquiring higher educational qualifications. Through this system one can effectively pursue any programme of study at KSOU including sciences. However, pusuing a programme in science in KSOU is faced with a lot of challenges. In order to meet these challenges there is need to integrate the use of technologies such as, computer conferencing, television broadcasts, and so on into the instructional delivery method so as to produce knowledgeable and skilled scientists and science educators. With the advancement of technologies, learning and collaborative work in the future can become radically different from what it is today. Although no one can expect that educational networks will totally replace the traditional lecture. The traditional lecture has some drawbacks: students have to attend at a fixed time, the needs of students with different backgrounds cannot be met and students have no control of their learning pace or environment. Many web-based training and learning platforms have been developed. However, none of these platforms offer an integrated and open platform for learning according to our requirements. Some of them do not

support all the necessary ODL services (synchronous, asynchronous and collaborative learning). The ODL system is now a fast growing subject. The time is not far from now when the entire education and training system will be fully controlled by ODL system. In India especially IGNOU is doing key role in this area.

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