

# A Programme Delivery Model Based on Use of Interactive Communication Technologies and Associated Quality Assurance Mechanisms

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**Abstract:** *In this paper, the teaching-learning strategies adopted by Open Universities and Correspondence Course Institutes in our country have been reviewed. The various technologies being used by them are identified and relevant parameters developed and models relevant for delivery of programmes by Open Universities and CCIs are reviewed. Keeping in view the requirements of the models discussed, and types of technology used, relevant performance indicators have been developed for script and production, curriculum and instructional design, feed back, interactivity, learning effectiveness, access etc. The quality assurance mechanism relevant for the above parameters are also indicated.*

## Introduction

Open and distance learning has emerged as a powerful instrument for augmenting opportunities for higher education. Information and communication technologies have created significant impact on delivery of distance mode programmes (Bates 1995). Interactive technologies facilitate more learner-centered personalised education and help to improve the process of distance education by expanding the scope and content of the curriculum (Horgan 1998). These technologies have initiated systemic change and the entire system is in a process of transition from campus-based face to face learning to an emerging distributed learning environment. The institutions adopting these new model need to make significant changes in several areas. The effectiveness with which these issues are managed will set the pace of change and determine the degree to which online learning and teaching become the foundation for a new instructional paradigm (Bates 2000, Daniel 1999). The distance education system has grown significantly in our country during the last one decade. Some Open Universities are using state of the art communication, information technologies and online systems for delivery of programmes whereas some others rely on print. For such a new and evolving system the maintenance of quality becomes the central issue. Identification of parameters and proper indicators which may be used as input to decide type of technology in delivery of programmes are important as these provide important input into the system. In this paper, the various technologies used by Open Universities (OUs) and Correspondence Course Institutions (CCIs) in our county are reviewed. Based on it a model of delivery

system has been developed and relevant indicators for various technologies used by OUs and CCIs identified.

### **Important Technologies used in Open and Distance Education**

Green (1996) and Frand (1996) have carried out surveys on information technologies in higher education. Bates (1995) and Daniel (1999) have given detailed reasons for incorporation of these technologies in distance education programmes. The same are summarized to help arrive at a model.

**Important Technologies used in Open Education:** The important communication technologies used by Open Education System for creation of knowledge and dissemination of the same are:

- A/V aids
- Computing and multimedia (Computer Network)
- Communication and Networking
- Broadcasting and streaming technologies (TV broadcast, teleconferencing)

Based on the above technologies various teaching/learning strategies are used in Open Education

- Computer- based learning
- Web- based Learning (Virtual Classroom)
- Broadcast- based learning
- Video-conferencing (satellite, ISDN, DSL based virtual classroom)

Over a period of time most of these are converging into the Internet as far as their educational applications are concerned. Delivery of learning programmes through the integration of

- Satellite communication and Broadband Internet Services
- CD- based multimedia contents
- Web- based contents
- Radio and TV Broadcast

The huge and rich contents on the CD-ROM, combined with dynamic contents on the Web and live presentation through satellite communication, leads to an effective real-time interactive virtual learning environment.

### **Use of Technology by Open Universities and Correspondence Course Institutions in India**

The distance mode programmes are being offered by 10 Open Universities and 64 Correspondence Course Institutes of dual mode Universities in our country. These institutions adopt varying teaching-learning strategies for delivery of programmes.

The Open Universities though few in number, have created an impact on higher education system in India by extending access to higher education to a large number



**Table 2: Use of Information and Communication Technologies in OUs**

Sl. No	Open Universities/ CCI's	Audio Cass-ettes	Video Cass-ettes	Inter-active Radio Counselling	Inter-active Tele-conferencing	Computer Aided Learning	E-mails/ Internet/ Online Education	Teaching Learning Strategies
1.	IGNOU	√	√	√	√	X	√	Print, multimedia mix, on line system
2.	BRAOU	√	√	√	√	X	X	Print, multimedia mix
3.	YCMOU	√	√	√	√	X	√	Print, multimedia mix
4.	MPBOU	√	√	X	X	X	X	Print, multimedia mix
5.	KSOU	√	√	√	X	X	X	Print a/v and radio
6.	KOU	√	√	X	X	X	X	Print a/v
7.	BAOU	√	√	X	X	X	X	Print a/v
8.	NSOU	√	X	X	X	X	X	Print audio
9.	NOU	X	X	X	X	X	X	Print
10.	UPRTOU	√	√	X	X	X	X	Print and video

A look of the table shows that IGNOU is using the state of the art technologies, broadcast, telecast and online system for delivery of programmes. Besides this, three other Open Universities are using multimedia mix for delivery of programmes. The print materials used by OUs are in SIM format. The CCI's on the other hand rely mostly on print materials and a/v aids. A few CCI's are using radio counselling for delivery of programmes. Most of the CCI's are continuing the use of print materials in traditional form and requires transformation in SIM.

### **Delivery Models based on use of Technology**

The functioning of an Open University is usually based on a quasi-industrial model of working. Every University requires human, physical and financial resources for its establishment and smooth functioning. However, with the availability of electronic communication technology, the institutional-form and its structure is undergoing a rapid change. A new open university can launch programmes by outsourcing its activities.

The interactive communication technologies enable two-way communications and help in decentralization of the delivery system. Like in conventional education system the two way didactic interaction and feedback play vital role in distance education also. The interactive communication technologies enable two-way communication in a distributed class room setting and the delivery models may be developed depending on the strength of a particular media to provide interaction.

Therefore the different media and their ability to provide interaction is distributed below which would help to identify parameters for developing delivery models.

As evident from the tables given in the previous section, print is the most dominant media used both by the State Open Universities and Correspondence Course Institutions. It is one-way media with in built provision for feedback and allows personalized learning. On the other hand combination of media which uses study texts and a/v materials - multiple media like Radio, TV, audio and video also provide one way interaction but in a distributed class room surrounding. Computers, satellite broadcast – using study text, a/v materials, CAI and broadcasting are examples of two way interaction – one way video and two way audio in distributed classroom synchronous interaction. Internet, network, digital technologies allowing greater interactivity in distributed class room using multi media SIM and web based resources enable two way interaction both synchronous and a synchronous which allows personalized autonomous home and work place learning.

The discussions given above help us to group the SOUs and CCIs in two groups – one relying mostly on one-way technologies and other using two way interactive communication technologies which allow greater interaction. The first one corresponds to conventional distance mode model and the second one represents virtual and networked model.

**The model of delivery systems:** Use of only one media may not be adequate for delivery of programmes. A variety of media-mix is usually employed by the institutions for the delivery of programmes. The basic requirement for any programme delivery is creation of content-incorporating proper learning components which in turn would take into account learner profile, objectives of the course, feedback, support mechanisms, assessment and enrichment/quality control mechanisms to be used. The main requirement for effective delivery in both the models is availability of good quality of learning material and timely delivery of the same to the learners. The delivery mechanisms in traditional distance mode programmes are fairly well established. However, the delivery mechanism assumes different forms and may change significantly in the networked and virtual model with development in the technology. Therefore, a model of delivery and support system is presented below using interactive technology.

**Grid – a distributed set of services delivery model:** Grid computing is the latest advancement in high performance computing. Grid computing can be defined as applying resources from many computers in a network at the same time to a single problem. A computational grid is a collective of geographically distributed resources namely: networks, computers, data stores and virtualization/virtual reality displays. At its core, Grid computing is based on an open set of standards and protocols that enable communication across heterogeneous, geographically dispersed IT environments. Grid differs from the web in that it empowers multiple resources to collaborate toward a common goal, while the web primarily enables communication. Grid computing enables devices – regardless of their operating characteristics – to be virtually shared, managed and accessed across an enterprise. Grid computing enables the virtualization of distributed computing resources such as processing, network bandwidth and storage to create a single system image, granting users and

applications seamless access to vast IT capabilities. Unlike the Internet, which primarily is a network for communications, grids are network for computation and data storage. The web enables unparalleled access to information via web HTML. Grids enable access to diverse Internet resources, such as computers and data storage for utilization by organizations. Like a decentralized nervous system, the grid consists of high-end computers, servers, work stations, storage system and databases that work in tandem across private and public networks. Thus the grid system is a distributed server network connected to every computer and provides increased connectivity. The infrastructure for such a system would consist of computer hardware, computer software, Internet services and a/v equipments. An institution connected to its study centres through LAN and WAN forms a cluster which can further be connected through another cluster by WAN. Clusters are homogenous and in close physical proximity to one another, while Grids can be heterogeneous and geographically distributed. As an application to Distance Education, a cluster can be formed by connecting head quarters of an institution with its study centres. Suppose an open university specializes in a particular programme and delivers it in areas of its expertise and offers to its students. The Grid allows access of the same programme to other open universities faculty and students. This is possible as clusters of open universities can be joined together to form a grid.

The emergence of broadband and mobile internet service in our country makes it feasible to create such a cluster for an institution with study centre located in far flung areas which can further be connected in the another cluster to form a grid. In addition WLL (Wireless in Local Loop), Direct to Home satellite communication technologies are also becoming available. In near future, networks offering 2 Mbps connectivity, based on Right of Way, by hooking on existing networks of ISPs and teleconference providers are going to come up to provide voice-data-telephony multi services. A combination of satellite based communication technologies and grid internet connectivity can thus be used by the institution for effective delivery system. This would enable providers to:

- Access specialized programmes of one OU by the other open universities or CCIs
- Supply printed material on demand
- Provide synchronous interactions such as chat, whiteboards etc
- Provide programme delivery on CD Rom
- Provide feedback to learners – the learner can put queries which can be answered both in synchronous and a synchronous manner which may further be supplemented by the use of satellite communication technologies.

### **Assurance of Quality in above mentioned model**

The assurance of quality for networked and virtual models is a serious issue as it require integration of ideas and content, organization, presentation styles and other technical requirements. Therefore in the following section, we present details about the performance indicators to assure quality in such a system. The delivery of programs in this model incorporate various facets such as course development in electronic form, student support services in virtual learning, infrastructure and outcome assessment.

Delivery of programmes in such a model should be based on careful instructional design which in turn should take into considerations characteristics of the distance learners, requirements of the particular subject and the capacity of the instructional media to achieve the learning goals of the course. In the following the representative practices and relevant performance indicators are given for such a model.

### **Representative Practices**

- Arrangements made to make course materials in electronic forms
- All staff involved in developing and teaching via electronic media have adequate, reliable access to a computer, peripherals, email account and the Internet in their workplace.
- Formal and informal support networks are established to encourage academic involvement and growing expertise in technology innovations, and a culture of collaborative learning.
- Preparation of planning document that succinctly outlines key strategies, needed resources and future directions for successful integration of technology into the curriculum.
- Adequate bandwidth on demand at an affordable price
- System-wide administration protocols and policies for stand alone and partnered delivery
- Timely learner and instructor access to equipment and software.
- Technical support systems are designed to provide services to staff and students.
- Help documentation is provided to all users, staff and learners

### **Quality Assurance Parameters**

Powar, Panda and Bhalla (2000) have described and identified performance indicators for various processes in the higher distance education. In this paper we have taken aspects which are not covered by them and is based on the models for delivery of programmes mentioned above. Some relevant indicators are:

*The choice of technology for delivery system should be based on its reliability robustness and availability of operational facilities. A document technology plan ensuring integrity and validity of information should be in place as electronic security measures. A centralized system for maintaining distance education infrastructure and support need to be established. The course development is based on guidelines ensuring minimum standards for design and delivery. The learning outcomes expected using technology is defined. Periodical review of instructional materials to ensure standards undertaken. Course design enable learners to develop skills to analyze and provides opportunity for self evaluation. Mechanisms for learner interactivity facilitation are identified and arrangements for timely feedback to learner assignments are ensured. Adequate information about the online programme is given to help learner to have access to the minimal technology required. Course objectives, concepts and learning outcomes clearly summarized and adequate access to library resources are ensured. Feedback time for assignments clearly defined and followed. Provision for hands-on-training and information to learners to help to access material through electronic databases*

established. Structured system should be in place to answer learners questions and arrangements for hand on practical training is arranged.

### Summary and Conclusions

In this paper we have examined in detail the teaching-learning strategies followed by the Open Universities and a few selected Correspondence Course Institutes. The analysis shows that IGNOU is using state of the art technologies, broadcasting, telecasting and on-line system for delivery of programmes, the benefits of which are reaped by a large number of the students community. Three State Open Universities are using multimedia mix for delivery of programmes and the remaining rely on print and a/v aids. The Correspondence Course Institutes rely mostly on print material, contact classes, a/v aids and a few use interactive radio counselling. However, most of the CCIs are continuing the use of print materials in traditional format. Thus there is a mixed trend in so far the efforts for quality assurance in distance education is concerned. While some institutions, mainly OUs have adopted interactive methods of imparting education, most CCIs are yet to convert the instructional material in SIM format and use of a/v aids is also very less.

Based on the above use of teaching-learning a delivery model using grid computing artitecture has been proposed. The relevant indicators to ensure quality in the proposed model is also given. This may help OUs and CCIs to prepare effective delivery of programmes.

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