
Qualitative and Interactive Distance Learning through “VSAT”

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Abstract

“Nothing is permanent except change.”

In a world where change is the only constant there is a need for tools techniques to help institutions become more effective. **VSAT** is small, software driven equipment for the reliable transmission of data, video or audio via satellite. It covers the entire spectrum of interactive distance learning from Synchronous to Asynchronous, Classroom to Desktop PC based solutions and high quality video over IP networks.

Breaking through the barriers of time, space and facilities, **Sikkim Manipal University (SMU)** provides an interactive distance learning solutions, using **VSAT**.

DOEACC Society, a Govt. of India, Ministry of Communications and Information technology, has also started providing web based tutorials. This paper also explores the details about its Web based Tutorial, which is mixer of all (graphics, multimedia, animations, text etc.).

This paper deals with Technical aspects of E-learning viz. video conferencing through VSAT and Web / CD based tutorials, Benefits of VSAT, effectiveness of VSAT, process of providing E-learning through VSAT and the other methods of providing qualitative E-learning.

Keywords

Qualitative, Interactive, Distance Education, VSAT Technology, E-learning.

1. Introduction

“Nothing is permanent except change”.

In a world where change is the only constant there is a need for tools techniques to help institutions become more effective. In a competitive world there is a need for ways to stay ahead or to up before it is too late. In the twenty first century, people are fading up

with old styles, they need change very fast. To stay in the competing world, Institutions have to take initiatives to compete with all the challenges of changing world. **"Change your self before they change you"**.

Let's take communication system as an example, in the early phase of communication, people are sending their messages through birds. Then the process got a spark of change and it burnt out with the new ways like mail, telephone, pager, email, mobile, internet etc. In the same way, in the early phase of education system, education was provided by black board and chalk. Than books and materials come into picture. And now computer and internet plays a vital role in providing effective education.

With the reference of World Wide Web in 1969, the world of teaching and learning has adopted it as one of its main innovations. However, in spite of extensive use of the web in education, varieties of terminologies are used to depict this new field of knowledge.

Some of the terms mostly used interchangeably are as follows:

1.1 Web-Based Instructions

It is a "hypermedia based instructional program which utilizes the attributes and resources of the World Wide Web to create a meaningful learning environment where learning is fostered and supported".¹

1.2 Virtual Learning

"The educational process of learning over the Internet without having F2F (Face to Face) contact is known as virtual learning".² However, for some virtual learning may also include tale learning.

1.3 Online Learning

It is synonymous to web-based learning where learning is fostered via the WWW only, in an Internet or Intranet. Mishra (2001) calls it as the new generation in the

evolutionary growth of open, flexible and distance learning.

1.4 E-Learning

"The term e-learning covers a wide set of applications and processes including computer-based learning, Web based learning, Virtual Classroom and digital collaboration".³ However, the term e-learning is becoming widely accepted as a substitute for online learning and web-based learning.

1.4.1 e-Learning Developments

The real impetus for e-Learning came from the National Task Force on Information Technology and Software Development constituted by the prime Mister of India in 1983. The Task Force report presents the master plan that India has in place as a long term policy for capacity building of institutions, human resource development in IT related areas, and use of ICTs in Education

In the 21st Century, VSAT Satellite Technology is one of the best technologies through which you can provide qualitative and interactive distance education.

2. Strengths and Advantages of e-Learning

e-Learning has become popular amongst educationists because of its inherent strengths and advantages it provides to the institutions' instructional process. Some of these are:

- ◆ Access to educational resources from outside the institution on a global and instant basis;
- ◆ Quick and easy way to create, update and revise course materials.
- ◆ Increased and flexible interaction with student through e-mail and discussion forums;
- ◆ Location and time independent delivery of course materials such as course notes, diagrams, reading list, etc.;
- ◆ Ability combine text, graphics and a limited amount of multimedia, enabling

¹ Khan, B.H. (1997)

² French, Hale, Johnson and Farr (1999)

³ WR Hambrecht +Co, 2000, p.8

instructional designers to prepare quality learning materials.

- ◆ Increased learner control through hypertext based presentation of information;
- ◆ Opportunities for international, cross-culture and collaborative learning; and
- ◆ Ability to serve a large number of students at a potentially reduced cost.

3. What is VSAT ?

VSAT is small, software driven equipment for the reliable transmission of data, video or audio via satellite. It covers the entire spectrum of interactive distance learning from Synchronous to Asynchronous, Classroom to Desktop PC based solutions and high quality video over IP networks.

VSAT (Very Small Aperture Terminal) is a satellite communications system that serves educational institutions and business users. A VSAT end user needs a box that interfaces between the user's computer and an outside antenna with a transceiver. The transceiver receives or sends a signal to a satellite transponder in the sky. The satellite sends and receives signals from an earth station computer that acts as a hub for the system. Each end user is interconnected with the hub station via the satellite in a star topology. For one end user to communicate with another, each transmission has to first go to the hub station which retransmits it via the satellite to the other end user's VSAT. VSAT handles data, voice, and video signals.

VSAT is used both by Educational Institutions' users who sign up with a large service such as Manipal U and by private companies that operate or lease their own VSAT systems. VSAT offers a number of advantages over terrestrial alternatives. For private applications, companies can have total control of their own communication system without dependence on other companies. Business and Educational Institution users also get higher speed reception than if using ordinary telephone service or ISDN.



VSAT stands for "Very Small Aperture Terminal" and refers to receive/transmit terminals installed at dispersed sites connecting to a central hub via satellite using small diameter antenna dishes (0.6 to 3.8 meter).

VSAT technology represents a cost effective solution for users seeking an independent communications network connecting a large number of geographically dispersed sites. VSAT networks offer value-added satellite-based services capable of supporting the Internet, data, LAN, voice/fax communications, and can provide powerful, dependable private and public network communications solutions.

Generally, these systems operate in the Ku-band and C-band frequencies.

- ◆ Ku-band based networks, is used primarily in Europe and North America and utilizes the smaller sizes of VSAT antennas.
- ◆ C-band, used extensively in Asia, Africa and Latin America, require larger antenna.

3.1 What does a network look like?

VSAT networks come in various shapes and sizes ranging from point-to-point, point-to-multipoint, and on demand for thousands of sites based on a dedicated facility located at their own site. Mesh systems have traditionally been somewhat smaller in size than star systems - 5 to 30 sites used to be a good rule of thumb - but since prices have come down, some networks now comprise as many as several hundred or even thousands of sites.

3.2 Is there an advantage of VSAT over cable?

When it comes down to cost, making general comparisons between VSAT services and their terrestrial equivalents is almost impossible. Charges for terrestrial services are nearly always distance-dependent, while VSAT connections cost the same whether sites are 1 or 1,000 miles apart. And with most VSAT services, the cost per connection comes down considerably when a customer adds users.

Quick Installation	A satellite network can be installed in a matter of weeks, since there are not countless miles of wire to be installed
Geography	Versatile satellite networks provide the capability to span rain forest, deserts and mountainous terrain, or connecting remote island locations.
Bandwidth Advantage	Satellite networks offer bandwidth advantages that provide a bigger "Pipe" for transmitting Video, Voice and Data.

4. Satellite

In general, a satellite is anything that orbits something else, as, for example, the moon orbits the earth. In a communications context, a satellite is a specialized wireless receiver/transmitter that is launched by a rocket and placed in orbit around the earth. There are hundreds of satellites currently in operation. They are used for such diverse purposes as weather forecasting, television broadcast, amateur radio communications, Internet communications, and the Global Positioning System, (GPS).

The first artificial satellite, launched by Russia (then known as the Soviet Union) in the late 1950s, was about the size of a basketball. It did nothing but transmit a simple Morse code signal over and over. In contrast, modern satellites can receive and re-transmit thousands of signals simultaneously, from simple digital data to the most complex television programming.

There are three types of communications satellite systems. They are categorized according to the type of orbit they follow.

A geostationary satellite orbits the earth directly over the equator, approximately 22,000 miles up. At this altitude, one complete trip around the earth (relative to the sun) takes 24 hours. Thus, the satellite remains over the same spot on the earth's surface at all times, and stays fixed in the sky from any point on the surface from which it can be "seen." So-called weather satellites are usually of this type. You can view images from some of these satellites on the Internet via the Purdue Weather Processor. A single geostationary satellite can "see" approximately 40 percent of the earth's surface. Three such satellites spaced at equal intervals (120 angular degrees apart); can provide coverage of the entire civilized world. A geostationary satellite can be accessed using a dish antenna aimed at the spot in the sky where the satellite hovers.

A low-earth-orbit (LEO) satellite system employs a large fleet of "birds," each in a circular orbit at a constant altitude of a few hundred miles. The orbits take the satellites over, or nearly over, the geographic poles. Each revolution takes approximately 90 minutes to a few hours. The fleet is arranged in such a way that, from any point on the surface at any time, at least one satellite is on a line of sight. The entire system operates in a manner similar to the way a cellular telephone functions. The main difference is that the transponders, or wireless receiver/transmitters, are moving rather than fixed, and are in space rather than on the earth. A well-designed LEO system makes it possible for anyone to access the Internet via wireless from any point on the planet, using an antenna no more sophisticated than old-fashioned television "rabbit ears."

Some satellites revolve around the earth in elliptical orbits. These satellites move rapidly when they are near perigee, or their lowest altitude; they move slowly when they are near apogee, or their highest altitude. Such "birds" are used by amateur radio operators, and by some commercial and government

services. They require directional antennas whose orientation must be constantly adjusted to follow the satellite's path across the sky.

5. Why Satellite?

As Internet traffic continues to grow at exponential rates worldwide, Internet services providers (ISP's) everywhere are faced with the challenge of keeping up with demand for network bandwidth and developing creative solutions for squeezing more use out of existing bandwidth. Satellite-based Internet connections are one of those solutions. VSAT has offered ISP's and telecommunications service providers easily scalable, cost-effective Internet access.

6. Key Benefits of Satellite

6.1 Faster installation

Satellite services are usually activated much more quickly than terrestrial fiber. An antenna, modem and satellite circuit can be provisioned in a few weeks rather than the months it might take for a traditional fiber installation. As a network grows, additional capacity can be obtained in just as short a time.

6.2 Better network performance

Satellite connections enhance network performance by linking directly to an Internet backbone, bypassing congested terrestrial lines and numerous router hops. In addition, dedicated space segment, local loop circuits and ports into a major Internet backbone mean ISP's do not share infrastructure, another reason for slow or degraded connections over the traditional fiber line.

6.3 Lower network costs

The broadcast nature of satellites allows for the simultaneous delivery of information to wide geographic areas without regard to terrestrial infrastructure or geographic barriers. This translates into a pricing structure that is distance insensitive, keeping costs down for international ISP's. In addition, satellite capacity is easily

matched to actual traffic patterns, meaning ISP's pay only for what they need.

7. Sikkim Manipal University



Sikkim Manipal University of Health, Medical and Technological Sciences, Gangtok is incorporated under the State Legislative Act (Act IX of 1995) of Government of Sikkim and is recognised by Ministry of Human Resource Development and University Grants Commission under Section 2(f).

The university is offering distance education programs in association with Manipal Academy of Higher Education (MAHE) and Manipal Universal Learning, as a part of its efforts to bring education to masses and fulfil the growing demand for software professionals.

The courses include Master degree programs, Bachelor degree programs, Diploma and Post Graduate diploma programs, both in Information Technology and Management category. Twinning programs are also launched in collaboration with IT majors in the field of Wireless Technology.

A nationwide network of study centres for various programs has been established. To enable every student to choose study centre that is readily accessible and nearest to him/her, a large number of study centres have been authorised by the Learning Resources Development Centre. MANIPAL UNIVERSAL LEARNING is our Learning Resources Development Centre to provide Student Support Services at various Study Centres. Sikkim Manipal University has taken steps to categorise centres for students into:

- **University Centres**
- **Study Centres**

University Centres of SMU will be permitted to offer all courses leading to Bachelor's and Master's degree. To improve the quality of lecture and faculty presentations, all University Centres have been provided with an effective interactive

distance learning system making use of VSAT technology. These presentations delivered in the studio at Manipal can be seen and heard live by the students in their centres connected through VSAT terminals. These virtual classrooms using qualified teachers will make the learning process more effective and consistent.

Study Centres of SMU will be permitted to offer Diploma and PG Diploma courses, i.e. up to Second Semester. If a student wants to pursue his study beyond Second Semester; he may get himself transferred to any University Centre nearby.

7.1 How SMU utilize the VSAT Facility

Sikkim Manipal University with the help of Manipal Universal Learning (Manipal U) has established a studio in manipal. From the studio all the materials, Video and Audio files are to be transmitted to Bangalore earth station and from the Bangalore earth station it is transmitted to all the study centres with the help of a transponder. On the other side, every study centres are connected to the earth station with the help of a dish antenna. Computers are connected with that dish via modem. To operate and support all the files Manipal U has also develop software called "Student". On learners computer screen you will find on left-top side video is available, on the top-bottom side index and on the right side all the materials including text, diagrams, charts, tables, graphics, pictures, multimedia animations etc are available.



Studio

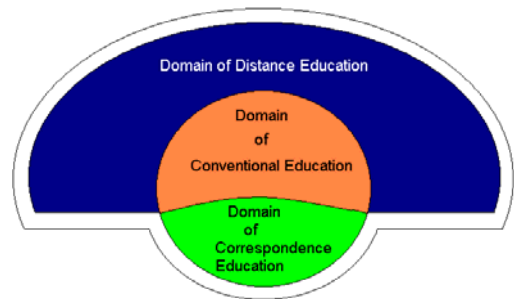


Learner at Centre asking the question to the Faculty

7.2 What are the benefits of VSAT specific to Sikkim Manipal University?

- Learners will get the **standardised education** because one expert faculty deliver the session and it will attend by all the learners across the nation at a time.
- Learners will get the **benefits of other learners' questions** sometimes that question may not generate in his mind but when some body else ask the question he automatically get his answer.
- Ultimately it also **improves the ICT skills** of learners.
- Here from studio only experts will deliver their sessions, so, learners will get **quality education**. From professionals also.
- Learners can also get **sample MCQs** at the time of session. It will **provide the practical experience** about the system of examination and format of it.
- Learners can also **contact the faculties** after the session over **through e-mail**.
- And university will **save the amount of lots of faculties' pay**. Because here there is only one faculty for one subject across the nation. So you can count how much you can save for one subject and for all subjects.
- In sort it is very **cost effective** with **qualitative** and **interactive distance learning** through **VSAT**.

7.3 Futuristic view of Distance Education





8. DOEACC Society

DOEACC Society is an autonomous body of Department of Information Technology, Ministry of Communication & Information Technology, and Govt. of India. DOEACC Society is the only professional examination body in India, which accredits institutes / organizations for conducting particular courses, specializing in the non-formal sector of IT education & training.

8.1 Vision

To be the leader in the development of industry oriented quality education and training in state-of-the-art-areas, establish standards and be the country's premier institution for examination and certification in the field of IECT.

8.2 Aims and Objectives

- ◆ To generate quality manpower and develop skilled professionals in the area of IECT by providing world class education & training and accreditation services.
- ◆ To provide continuing support to learners and trainers through design & development of innovative curricula and acquisition of content aligned with the dynamically changing IECT scenario.
- ◆ To establish a quality system of examination and certification that is globally recognized and provides a fair assessment of the competency of students.
- ◆ Value addition courses for non-science and non-engineering stream for increasing their employability.
- ◆ Bridging the gap in Human Resource Requirements in emerging fields by sharing expert resources and established infrastructure through e-Learning video/web conferencing at national level.
- ◆ To establish standards in the area of IECT and to develop market in the emerging areas.
- ◆ To impart continuing education for up gradation of knowledge and skill, necessitating from high obsolescence in IECT.

- ◆ To develop entrepreneurs and provide IECT based services to users.

8.3 Details about E-learning of DOEACC Society

E-learning refers to the systematic use of networked Information and Communications Technology (ICT) in teaching and learning. It can be said that emergence of e-learning is directly linked to the development of and access to information and communications technology (ICT) infrastructure.

The e-learning makes use of various technologies (ICT) to enhance or transform a learning process, educational value and reaching a larger and more diverse learner population with minimal expenditure. To make use of most of the opportunities that these technologies offer, foremost attention need to be paid to the pedagogy of the learning and teaching transactions. This includes the changing nature of student learning from one of being "Teacher-directed" to being "Student-directed" or "Student-centred". It is therefore, obvious that the e-learning environment offer more flexibility, as the electronic access provides variety of multimedia based material at doorstep of the learner at a time and a place suitable and convenient to the learner or of learner's choice.

Need

- ◆ Quality education at affordable cost for Indian people because education is social commitment of the government.
- ◆ Extending quality education to the remote parts of India to improve the literacy rate.
- ◆ Making learning independent of location & seasonal hazards.
- ◆ Effective utilization of recent technologies i.e. ICT.

8.4 Benefits / Advantages of E-learning of DOEACC Society for both Trainer and Learner

- ◆ Extendibility , Quicker (cost effective), world wide distribution

- ◆ Easy and efficient delivery, Interactivity, Resource sharing
- ◆ Reduced technical support – Ease of content update
- ◆ Collaborative and exploratory learning environment
- ◆ Reduced burden of text books ,Consistency / uniformity, Wider reach
- ◆ Travel cost and Time saving
- ◆ On demand availability – Any time, Any where, Any place
- ◆ Self-pacing (as per the capability of learner) – Just in time knowledge
- ◆ Training to Masses in affordable cost



Front Page of E-Learning materials of DOEACC Society' O' Level Course

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9. Conclusion

In the 21st century as per my view Students / Learners are the internal Customers and Corporate World is the External Customer of any Educational Institution. So Institutions if take proper care of both the customers that institution is the winner. Now Educational Leaders has to think "**Beyond Chalk and Talk**". So start thinking about new ways of providing qualitative and interactive education. "**Change your self before they Change You**"

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