

Full Length Research Paper

An overview of online education in India

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For over the past years, online education has been quite an option for several learners who have a hard time in going to school campuses due to several reasons such as financial resources or having a hectic schedule. There are several individuals who prefer to continue their higher educational learning through online system. Since, online education offers flexibility of time which allows the learners to be flexible with their schedules and can still manage to perform several obligations in life such as having a full time work. Having an online degree will also add weight to resume of job seekers. Online educational system is a great support for individuals who have some disabilities in their body which hinders them upon going to a school or college campus. Since, online system is very much accessible to use upon, it only requires the presence of internet connection and computer in order to access the career education courses that are being offered by the different virtual schools in the net.

Key words: Online education, career, online system, internet.

INTRODUCTION

Online education is a new generation tool. It is basically a computer based program. In this education the career courses are delivered partly or completely via the Internet, an intranet or an extranet. Online education section is just a ticket to a successful career. Whether students have just graduated from high school, are returning to college after a few years in the workplace, or simply want to continue their education while working a full-time job, India academic is a great resource to begin researching their educational options. They can earn an online degree at various levels: associate degrees online, bachelor's degrees online, master's degrees online, even a PhD degree online.

Some reputed national institutes like IIT Mumbai, IIM Kozikode, IGNOU, Tamil file University and so many are providing some career courses through online education. Although, online learning system is quite beneficial but there are some people who have criticized or question the quality of educational services that it provides. The most eared comments are the aspects of interaction system between the professors and learners or learners

to learners. Most online schools have responded that they make sure that online learners will be using different interaction programs that are being set such as class chat or forums in order to participate in the class discussions and make friends to their online classmates and professors. A live class also is another factor to prove the credibility to develop the interpersonal skills of online learners. Most online schools have responded that they make sure that online learners will be using different interaction programs that are being set such as class chat or forums in order to participate in class discussions and make friends to their online classmates and professors. As well, live classes also are other factors to prove the credibility to develop the interpersonal skills of online learners.

Obviously the biggest difference between online education in India and attending an actual university is that it is not necessary to be in any particular location to study. This means that much of the social aspect of going to college is removed from the online education experience. But depending on your point of

view, this could actually be a very good thing. It makes it possible to bypass a lot of the peer pressure and "popularity contests" that many college cultures have become inundated with.

Online education and courses have the additional benefit of immediate availability. No more waiting time until the next visit of your mail carrier, just sit down and turn on your PC to enter into your virtual classroom or have your list of today's assignments displayed on your monitor.

Online learning in India is gaining prominence slowly, but indeed steadily. This is due to the fact that more than half the population of India today is below 25 years of age and the numbers of Internet users are growing continuously. The tremendous growth of the economy in the recent past has also helped in the growth of online education in India. E-learning in India is specially popular with the young professionals who have joined the work force quite early but still would like to continue their education that may help them move up their career ladder quickly and safely. They find online education in India very convenient, as the nature of the course work does not require them to attend regular classes. Moreover reputed institutes like Indian Institute of Management, Indian Institute of Technology, Indian Institute of Foreign Trade are today offering e-learning courses. Thus e-learning in India makes it possible for the learners to pursue their education from reputed institutes without much hassle.

Online degree programs are now known all over the world. In fact, many colleges and universities are already adopting online education programs and offer certificate and degree programs for both domestic and international students. For students who have no enough knowledge about the many benefits they can get about online degree programs the following are good information to digest. This is important so that, as students, you can also decide for yourself whether you would be shifting to online education or continue enrolling in traditional schools. The virtual education is now the schooling type of the new millennium.

E-learning tools

E-learning is a concept of learning electronically using the internet. This type of learning is particularly successful for higher studies or corporations. There are many tools used in the e-learning procedure. They are:

Web blog

A blog short for web log is a user-generated website where entries are made in journal style and displayed in a reverse chronological order. The term "blog" is a mingling of the words web and log.

Blogs provide comments or news on a particular subject, some function as more personal online diaries. The modern blog evolved from the online diary, where people would keep a running account of their personal lives. Most such writers called themselves diarists, journalists. Blogs can be hosted by dedicated blog hosting services, or they can be run using blog software, such as Word Press ,Movable Type, blogger or Live Journal, or on regular web hosting services, such as Dream Host.

Social bookmarking

Social bookmarking is a web-based service to share Internet bookmarks. In a social bookmarking system, users store lists of internet resources that they find useful. These lists are accessible to the public or a specific network, and other people with similar interests can view the links by category, tags, or even randomly. Some allow for privacy on a per-bookmark basis.

Wiki

A wiki is a website that allows visitors to add, remove, edit and change content, without the need for registration. It also allows for linking among any number of pages. This ease of interaction and operation makes a wiki an effective tool for mass collaborative authoring. A wiki enables documents to be written very collaboratively, in a simple markup language using a web browser. A single page in a wiki is referred to as a "wiki page", while the entire body of pages, which are usually highly interconnected via hyperlinks, and is "the wiki". Wiki is an uncomplicated, easy-to-use user-maintained database for creating, browsing and searching information. Wiki pages can be created and updated easily.

Really simple syndication (RSS)

RSS is a web feed formats used to publish frequently updated digital content, such as blogs, news feeds or podcasts, vodcasts etc. Users of RSS content use software programs called "feed readers" or "feed aggregators". The user subscribes to a feed by entering a link to the feed into the reader program. The reader can then check the user's subscribed feeds to see if any of those feeds have new content since the last time it checked and if so, retrieve that content and present it to the user.

Podcasting

Podcasting is a fusion of two words: *iPod*, Apple's

popular digital music player, and broadcasting.

Podcasts are basically digital audio programs that can be subscribed to and downloaded by listeners by RSS (really simple syndication). It can be accessed on an array of digital audio devices, like Mp3 players, desktop computer, laptops, mobiles etc. They can be easily produced with any computer having a soundcard; microphone, recording software and an Internet connection. Though podcasters' web sites may also offer direct download or streaming of their content, a podcast is distinguished from other digital media formats by its ability to be downloaded automatically.

Instant messaging

An instant messaging application allows one to communicate with another person over a network in relative privacy. There are many options like Gtalk, Skype, Meetro, ICQ, Yahoo! Messenger, MSN Messenger and AOL for instant messaging. You can add associates to a contact list or buddy list, by entering their email address or messenger ID.

Text chat

Internet relay chat (IRC) and other online chat technologies allow users to join chat rooms and communicate with many people at once, publicly. Users may join a pre-existing chat room or create a chat room about any topic. Whether you are in another person's chat room, or one you've created yourself, you are generally free to invite others online to join you. This facilitates both one-to-one communication and many-to-many interaction.

Internet forums

Originally modeled after the real-world paradigm of electronic bulletin boards of the world before internet was born, internet forums allow users to post a "topic" for others to review. Other users can view the topic and post their own comments in a linear fashion, one after the other. Most forums are public, allowing anybody to sign up at any time. A few are private, gated communities where new members must pay a small fee to join for example the something awful forums. These e-learning tools are a practical, inexpensive and uncomplicated method for learning online. They are available to one and all and are great for propagating E-Learning

METHODOLOGY

The technology backbone of e-learning comes from Information

Technology, with hardware devices like personal computers, projectors and printers being the physical interfacing platforms. The transfer of knowledge is enabled in the virtual world through various software applications that follow established compliance protocols like sharable content object reference model (SCORM) which is a collection of standards and specifications for web-based e-learning). E-Learning technologies can be classified into two delivery modes - synchronous and asynchronous.

As the name suggests, synchronous technologies aim at real-time dissemination of knowledge while asynchronous technologies are tuned to "delayed response". A few synchronous technologies are:

- 1) VoIP
- 2) WebEx
- 3) Videoconferencing
- 4) Chartrooms

The asynchronous technologies span

- 1) E-mail
- 2) Printed courseware
- 3) Compact discs

Online educational systems are to present courses and instructional programs through the web. These systems tend to use existing materials and present them as a static package via the Internet.

Online education system or distance learning includes processes like web-based learning, virtual classrooms, audio visual aids, and other digital alliance procedures. The content is delivered through internet in the form of emails or in some cases some online education system or distance learning includes processes like web-based learning, virtual classrooms, audio visual aids, and other digital alliance procedures. The content is delivered through internet in the form of emails or in some cases some relevant web links are also provided. Furthermore, audio and video tapes are also provided to students. Sometimes, some relevant books are also included in the reference sections of the entire study plan.

The course content in distance learning education plan is designed by various experienced teachers and facilitators. Moreover, the entire course content is planned properly and includes various activities and assignments so as to make sure that the student learns in a comprehensive and proper manner.

Online education system is extremely beneficial especially for such people and students who cannot go to the educational institutes due to various reasons which may include limited financial resources or job responsibilities. Moreover, some people also opt for online education system due to the ease of flexible timings and approach. Moreover, there are people who want to pursue further in their academics but cannot opt for regular institutes because they are stuck in their jobs.

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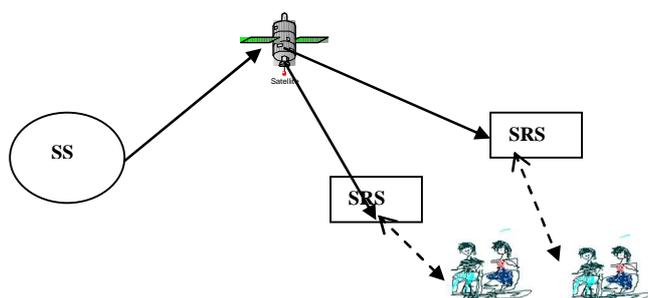
Online education technical requirements are as shown in Tables 1 and 2.

Table 1. Online education technical requirements.

Pc-based	Minimum	Suggested
Processor	Pentium III 500 MHz	Pentium III 500 MHz
OS	Windows 2000	Windows 2000
RAM	128 MB	512 MB
Disk space	1GB	10 GB
Connection	56k modem	Broadband
Communication	N/A	Webcam and microphone

Table 2. Satellite based models.

Mac-based	Minimum	Suggested
Processor	G4	G4
OS	9.1	OSX
RAM	128 MB	512 MB
Disk space	1 GB	10 GB
Connection	56k Modem	Broadband
Communication	N/A	Webcam and microphone

**Figure 1.** Generic architecture of a satellite-based model.

Satellite based models

Model 1: VSAT model

Satellite networks with dedicated bandwidth provide one solution for distributing multimedia information to remotely located participants. Generic architecture of a satellite-based model is given in Figure 1.

Working of a satellite-based model

The multimedia content originates at the SS. Using VSAT technology (<http://www.indiaacademic.com/online-education/e-learning.html>) this signal is broadcast/multicast using a channel to the SRSs. To ensure quality reception, typically the channel used is a demand assigned multiple access (DAMA) channel, which is contention-free. Considering the high latency in a satellite network (round trip time (RTT) in the range of 250 ms) Kearsley (2000), dedicated channel access is important to ensure quality of reception as retransmissions are of no value.

Model incorporating interaction with participants

The basic model is enhanced to provide interaction between the two parties (as in the case of a distance education application), by adding a polling channel, which uses a time division multiple access (TDMA) mechanism. A 16 kbps channel is sufficient to serve the purpose of polling the SRSs, which registers a request for interaction. Through the hub, the 512 Kbps channel is shifted to the requesting SRS, which becomes the broadcasting site. A complete description of features of such a working model implemented for the purpose of distance education at IIT Bombay can be found in (Kearsley, 2005; Johan and Moore, 2003; <http://elearning-india.com/content/view>).

Advantages

Reach: Given investments in the receiving infrastructure, this model can be extended to any part of the country. With the provision of international agreements, services can be extended to Srilanka and South East Asian countries (as far as the satellite coverage can be extended).

Scalability: As at any point in time, only one site is transmitting, the data channel requirement remains constant, irrespective of the number of SRSs. Also, since the received signal can be projected on a large screen for the benefit of many participants, this model is scalable to reach multiple participants within a same SRS.

Cost effectiveness: When the model is scaled to serve multiple participants at multiple SRSs, the initial high investments of the satellite infrastructure can be covered, making the model cost effective.

Interaction: In the case of a distance education application, the model provides interaction not only with the faculty, but also with peers as in the case of a traditional classroom, adding value to the participant.

Disadvantages

Traveling overhead: The model compromises on flexibility for a participant, as for the model to be cost effective, multiple participants have to be served by a single SRS. This requires the participant to travel to a SRS, causing overheads, in terms of time and energy.

High initial investments: The model is sustainable only if a minimum number of participants participate and benefit from the model.

Model 2: A hub and spoke model

Figure 2 illustrates a hub and spoke model which uses leased line infrastructure in conjunction with the satellite network.

Workflow in a hub and spoke model

This model is an extension of the satellite-based model, which allows the initial infrastructure cost to be spread across more centers. The basic idea of this model is to increase the number of RCs in a given area (within a metropolitan, for example) by taking advantage of the SRS's infrastructure, thereby spreading the cost across more centers.

Given a high density of potential participants in a given area, multiple centers provide easier access to participants, without taking away business from the existing SRS. By using a leased line modem to connect to the router at the SRS, additional centers, from

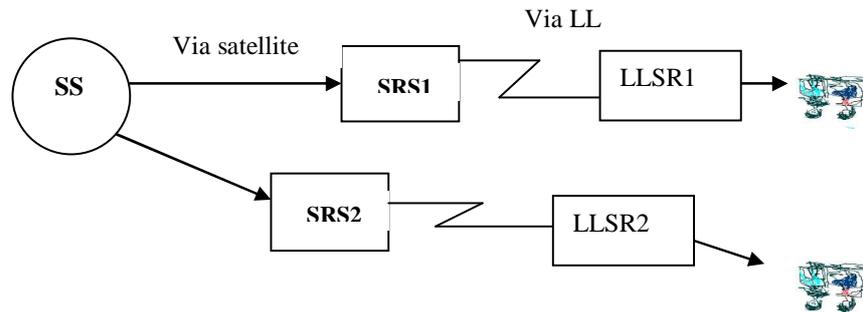


Figure 2. Generic architecture of a Hub and Spoke leased line model.

here on referred to as leased line receiving sites (LLRS) can share in the infrastructure to serve more participants in a given geographical area. (It is to be noted that this model is cost effective only when the distances between the SRS and LRS are within 10 km⁵, so that the recurring LL costs are justifiable by the LLRS). The cost of the satellite infrastructure can be shared amongst the participating LLRSs to make it viable for the SRS to invest in the satellite infrastructure. This hub and spoke model has already been implemented as part of the distance education program (DEP) (Rao, 2003).

Advantages

Considering that this model is an extension of the satellite-based model, advantages elaborated in the previous section hold good for this model also.

In addition, this model alleviates the burden of heavy initial investment by a single SRS by spreading the cost across more centers. The LRSs invest around one third of the amount in the LL infrastructure while paying a fee for using the SRS's satellite infrastructure.

Disadvantages

Cost of travel for the participant still remains in this model. In addition, the LRS is dependent on the SRS for providing the service. Thus, the SRS becomes the one point of failure, which brings down all the spoke centers with it, introducing reliability issues in the model.

MODELS FOR STREAMING OVER THE INTERNET

Model 3: Streaming model

The two options considered for streaming multimedia files from the Source Site (SS) over the internet are explained as follows:

Live streaming: When a lecture is being delivered at the SS as in a distance education application, it is encoded on the fly using hardware based encoding solution, which in turn is streamed to the clients.

In this case, the SS typically hosts the encoding hardware component. The encoded file is sent to the streaming server placed at the ISP's internet data center (IDC) for serving the clients in real time. During live encoding, the file is also stored for future use.

On-demand streaming: Recorded contents are encoded off-line at different rates and uploaded to the server. Valid users after

authentication can start the streaming session at any time convenient to them. As users will be accessing the lectures using a media player application, they will have the options to pause, rewind, fast forward, etc.

In the case of live streaming, as the content is played in real time from the SS, additional care needs to be taken to ensure acceptable quality of service (QoS) in terms of delay, loss and delay jitter parameters. On demand streaming provides flexibility to users to access the content from their desk tops at any time. In both these cases once the streaming session is started, users expect continuous and jitter-less transmission. Figure 3 describes the generic workflow of a streaming model.

Workflow in live streaming: In this model [6], the live feed of the lecture going on is given as the input to a real time encoder. This encoder (typically hardware based) compresses the audio/video source in real time and sends it to the streaming server. Here the live compression to various bit rates can also be done simultaneously depending on the encoder being used. In case the encoder is a part of the streaming server itself, it directly starts streaming the compressed file. The live streaming can also be stored on the server and can be used for streaming in the on-demand mode in the future. The URL is accessed by the participant after authentication.

Workflow in on-demand streaming: Assuming source material recorded on DV tapes, this content would be compressed and encoded in various bit rates (56, 150 and 256 kbps) and to a format (.mp4, .mov), which is suitable for streaming. This file is then uploaded on the streaming server. Registered participants are given the URL to view the lecture, after authentication. Participants log on to the streaming site and select the appropriate bit rate link based on their network connectivity and watch the lecture. The participant only needs a standard player (quick time, real, windows), which supports streaming. While the user can not download the file, he/she can navigate through the file using the pause, rewind, etc. buttons provided by the player application.

Advantages

Streaming allows participants to access the lectures on their desktops providing flexibility of space. While synchronous live streaming poses a time constraint, on demand streaming allows for flexibility of time. In the latter case participants are also provided with the mechanisms to access the contents according to their pace. From a working professional's point of view, streaming (especially access of contents on demand) is very attractive giving him/her flexibility across all three dimensions: space, time, and pace.

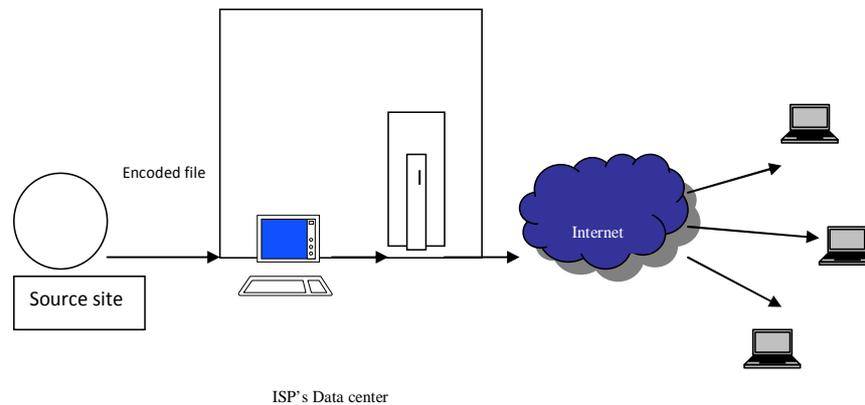


Figure 3. Streaming model.

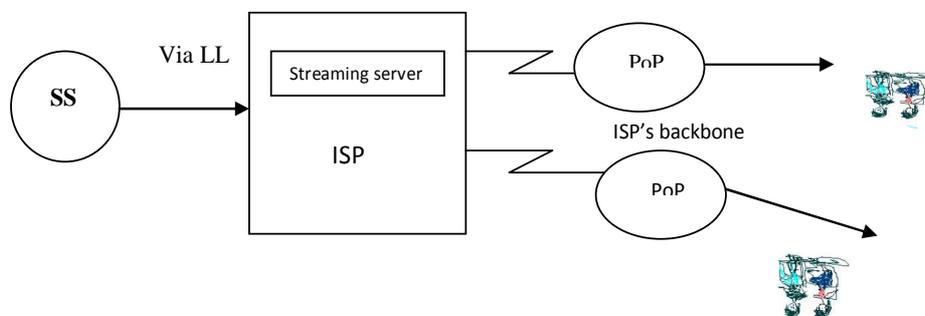


Figure 4. Generic architecture of an internet based caching model.

Disadvantages

Streaming requires stable and dedicated connectivity to guarantee a good quality of reception. While dedicated bandwidth is costly, sharing bandwidth on a public network with numerous other applications result in unpredictable quality. Simultaneous access by multiple users requires high bandwidth, jeopardizing cost-effectiveness and scalability of this model.

Model 4: Caching model

In order to provide QoS guarantees on the best effort Internet, one optimization could be in the form of placing cache servers at the PoP locations of the ISP. Participants in the neighboring area of a PoP will be served by that PoP, thereby reducing the uncertainty in delay. The idea is to provide QoS in the local area by serving the clients in the area through a local streaming server, which contains the replicated content to be streamed to the local participants (Figure 4).

Advantages

Considering that this model is an extension of the streaming model, advantages elaborated in the previous section hold good for this model also.

Disadvantages

In this model, the following are the challenges:

- 1) Keeping the caches at the PoP servers consistent. Mechanisms to load and delete the appropriate files and synchronous uploading of the files to all the PoP servers have to be implemented.
- 2) Efficient cache management and back up mechanisms through cooperative sharing of caches need to be implemented.

HYBRID MODELS

Model 5: A two-tier model

Figure 5 illustrates a combination of networks that can be used for efficient multimedia dissemination.

This model leverages the satellite network to bring the content closer to the participants accessing the content through the Internet. In this model, the VSAT based architecture is assumed to be operational, which is used to transmit the contents to various geographically dispersed locations. Considering that in the initial phase, most of the RCs are located in the cities where the ISP's PoPs are present, the VSAT infrastructure can be used to load the cache servers at the PoPs. For example, when a lecture is transmitted using the VSAT infrastructure, it can be captured through a point-to-point link, at the server placed in the PoP. Participants access the contents from the PoP streaming server, as in the previous case.

Advantages

Comparing this model with the previous one, instead of uploading

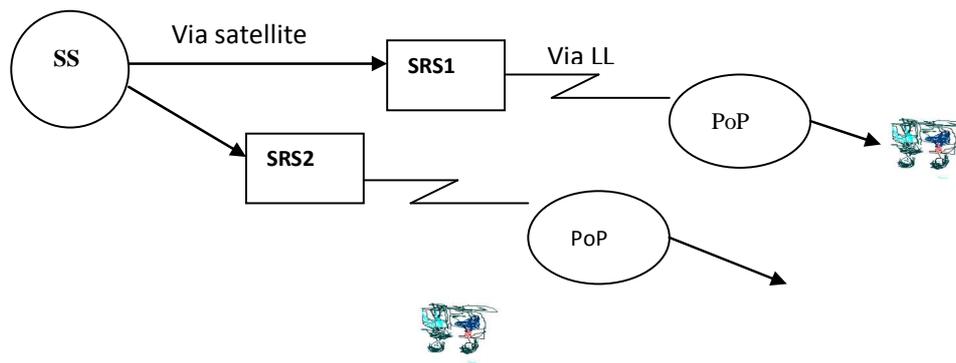


Figure 5. Generic architecture of a two-tier model.

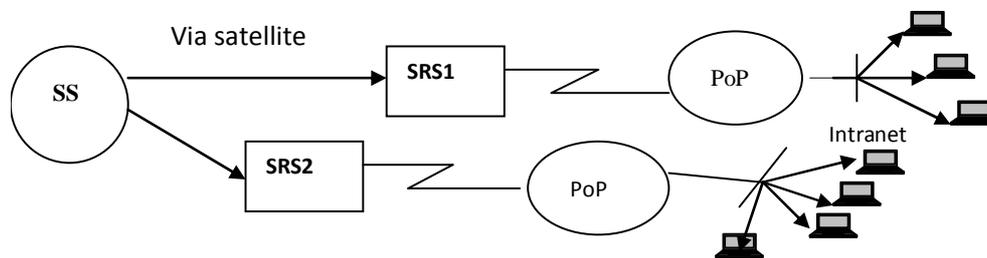


Figure 6. Generic architecture of a three-tier model.

the content from a central server at the ISP, the existing VSAT infrastructure is used to upload the contents to the local PoP servers. This model leverages the VSAT transmission for loading the cache servers to provide guaranteed service to the participants from a local area.

Disadvantages

This model relies on the SRS to load the cache servers. Also, an annual recurring cost is incurred based on the distance of the PoP from the SRS. Recovering this cost from the participants may make this model unviable.

Model 6: A three-tier model

Considering that the motivation for internet streaming arises out of providing flexibility to corporate participants who enjoy internet connectivity with adequate bandwidth to support multimedia streaming, a three-tier model with the following features are proposed:

- 1) A VSAT network is used for reaching RCs from where participants attend lectures.
- 2) As the live lectures are being transmitted, they are captured and transmitted to the servers placed at the PoPs of the ISP.
- 3) These servers serve the local area corporations connected through the Internet.
- 4) The corporation's gateway server connects to the ISP's PoP, which streams the contents on the Intranet of the corporation, allowing participants to access the contents on their desktops (Figure 6).

Advantages

Providing flexibility to participants is the main advantage of this model. By allowing access to their employees, corporations can train their employees and enhance their skills. This model also allows for a viable business model where the cost of LL can be spread across corporations.

Disadvantages

Implementation of such a model requires cooperation between several entities with clear understanding of the scope of each of the entity's responsibilities. In practice this may prove to be cumbersome.

RESULTS AND DISCUSSION

Online education system is known for efficient time management. On usual basis, students have to spend their precious 5 to 6 h in colleges or schools and then almost 2 to 3 h in coaching centers. But with online education system, a lot of time can be saved and thus, students would not only reduce on the burden but would also get the chance of developing their own knack for learning. This productive use of time, undoubtedly, improves both their quality and career.

However, sometimes the delivery or removable media or printed formats is necessary, resembling the correspondence courses, in which written materials must

be transmitted by mail. Depending on the online education center, you can sometimes skip this step, downloading additional material. Online education can be reasonably beneficial for many students as it allows them to prioritize their schedule and complete the assignments in accordance with their comfort levels and convenience. Moreover, the teachers in online form of education do not teach the students you all the time and on contrary, students are also given the liberty to select the mode of learning as per their suitability. Secondary, the online course outline, material and test systems are much simpler in online education rather than other educating manuals such as heavy books and light information.

The scope of online education in India is actually much wider. Apart from proper course works, some E-learning portals in India are also conducting mock tests for various competitive examinations like engineering, medical, management etc. For example, the India time's group has introduced the mindscape test center where one can appear for mock IIT-JEE exams online for making self-assessment.

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