



HIS3B03 INFORMATICS AND HISTORY

**MODULE-IV DIGITAL RESOURCES FOR LEARNING AND
RESEARCH**

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- **Information Communications Technologies (ICT) is a generic term used to refer technologies that enable society to create, collect, consolidate, communicate, manage and process information in multimedia and various digital formats for different purposes.**
- **The most popular types ICT gadgets include computers, TV, Radio, cellular phones, Projectors, CD-ROM and the Internet.**
- **ICTs are making dynamic changes in society. They are influencing all aspects of our life including education. ICT is revolutionizing the education sector as it provides both students and teachers with more opportunities in adapting learning and teaching to individual needs.**
- **ICTs greatly facilitate the acquisition and absorption of knowledge, offering unprecedented opportunities to enhance educational systems.**
- **The use of ICT in teaching-learning is very important for it provides opportunities for teachers and students to operate, store, manipulate, and retrieve information, encourage independent and active learning, and self-responsibility for learning such as distance learning, motivate teachers and students to continue using learning outside school hours, plan and prepare lessons and design materials such as course content delivery and facilitate sharing of resources, expertise and advice.**

- **ICT enabled education is a broader concept covering a wide variety of tools, techniques, strategies and methods aiming the speedy and effective acquisition and dissemination of knowledge, both in and outside classroom.**
- **It may vary from comparatively simple way of employing certain digital tools such as computers and projectors aimed to make the conventional class room teaching much more effective, to conducting highly complex scientific experiments in virtual laboratories.**
- **It could be used in both formal and non formal streams of education.**
- **ICT could invariably be applied in the conventional chalk and talk mode of teaching as well as in several kinds of web based self learning modules that are functioning without the presence of a teacher or facilitator**

➤ This variedness indispensably demands the labeling of ICT enabled learning into the following **three major categories**.

1. E-learning: E-learning or electronic learning encompasses **learning at all levels, both formal and non-formal, that uses an information network—the Internet, an intranet (LAN) or extranet (WAN)—whether wholly or in part, for course delivery, interaction and/or facilitation.** Some prefers to call it **online learning**. Web-based learning is a subset of e-learning. Generally speaking, e-learning is more suited for higher and advanced learning in a **teacher less environment**.

2.Blended Learning: Blended learning **refers to learning models that combine traditional classroom practice with ICT solutions.** For example, **a teacher can make use of certain digital tools like laptops and projectors to supplement his lecture.** In another, a little more advanced case **the students in a traditional class can be assigned both print and online materials, have online mentoring sessions with their teacher through chat and are subscribed to a class email list.** In yet another instances, **a Web-based training course can be enhanced by periodic face-to-face instruction.** “Blending” was prompted by the recognition that not all learning is best achieved in an electronically-mediated environment, particularly one that dispenses with a live instructor altogether.

3. Open and Distance Learning : Open and distance learning is defined by the Commonwealth of Learning as **“a way of providing learning opportunities that is characterized by the separation of teacher and learner in time or place, or both time and place; learning that is certified in some way by an institution or agency; the use of a variety of media, including print and electronic; two-way communications that allow learners and tutors to interact; the possibility of occasional face to-face meetings; and a specialized division of labour in the production and delivery of courses.”** Open and distance learning is an ideal way of learning designed to meet the educational needs of those underprivileged lots such as the dropouts and individuals from marginalized groups and is functioning with the motto learning while earning.

ADVANTAGES OF ICT SUPPORTED LEARNING

I. Expanding access: ICTs are a potentially powerful tool for extending educational opportunities, both formal and non-formal ,to previously underserved constituencies. Expanding access means integrating populations that had been traditionally excluded from education for cultural and social reasons. This may consists of scattered and rural populations, ethnic minorities, girls and women, persons with disabilities, and the elderly, as well as all others who for reasons of cost or because of time constraints are unable to enroll on campus. This **increased accessibility could be attained in two distinct ways;**

a).Anytime, any where access:-One defining feature of ICTs is their ability to transcend time and space. Online course materials maybe accessed **24 hours a day, 7 days a week**. ICT-based educational delivery (e.g., educational programming broadcast over radio or television) also dispenses with the need for all learners and the instructor to be in one physical location. Additionally, certain types of ICTs, such as teleconferencing technologies, enable instruction to be received simultaneously by multiple, geographically dispersed learners.

b).Access to remote learning resources:-Teachers and learners **no longer have to rely solely on printed books and other materials in physical media housed in libraries for their educational needs**. With the Internet and the World Wide Web, a wealth of learning materials in almost every subject and in a variety of media can now be accessed from anywhere at any time of the day and by an unlimited number of people. This is particularly significant for many schools in developing countries that have limited and outdated library resources. ICTs also facilitate access to resource persons—mentors, experts, researchers, professionals, and peers—all over the world.

II. Helps to create a Learner-centered learning environment : Learner centered learning environment is one that **pays attention to knowledge, skills, attitudes, and beliefs that learners bring with them to the learning process where its impetus is derived from a paradigm of learning called constructivism.** As ICT enabled learning always **demands learners' active personal involvement in learning task, the whole process of education becomes very much interesting and hence so effective in contrast to the monotonous one way process normally seen in traditional classrooms.**

III. Motivating to Learn : An effective teaching/learning process **must stimulate intellectual curiosity and offer a sense of enjoyment that will move the students from the passive role of recipients of information to the active role of builders of knowledge.** Yet, engaging the learner in this process can be the most challenging task for teachers. ICTs are effective instructional aides to motivate and engage students in the learning process. Videos, television, and computer multimedia software provide information that can be authentic and challenging in addition to stimulating students' sensorial apparatus through images, color, sound, and movement.

IV. Fostering Inquiry and a sense of Exploration: Although basic skills and information are essential components of the teaching/learning process, **learning is more than information transfer. Learning requires the ability to analyze and synthesize information, use it in diverse circumstances, and propose new lines of inquiry that foster knowledge. Inquiry and exploration are essential strategies to attain those abilities.** ICTs have the potential to **restore curiosity to education.** ICTs can **take students on exciting journeys through time and space.** Movies, videos, audio technology, and computer animations **bring sound and movement to static textbook lessons and make the classes lively and attractive and in turn will help to stimulate a sense of inquiry and exploration.**

V. ICT makes education easy and less expensive: ICT, with its **high storage capacity, significantly effortless reprographic techniques and a rich variety of software programmes and applications designed to meet various educational needs, makes the teaching learning process an easy affair.** Spreadsheets can store and analyze large amounts of data necessary for complex mathematics and science studies. Computer simulations transform risky and expensive experiments into safe and cost-effective virtual laboratories. There is several **software packages designed to simplify the otherwise tiresome task of data analysis used in social science research.** In our digital age, it is **very much easy to access the rich volumes of digital data preserved in digital format in archives and libraries without bothering the constraints of time and space.**

VI. ICT Promotes Collaborative Learning: ICT-supported learning encourages interaction and cooperation among students, teachers, and experts regardless of their physical location. Apart from modeling real world interactions ,ICT-supported learning provides opportunity to work with students from different cultures, thereby helping to enhance learners teaming and communication skills as well as their global awareness. This type of collaborative spirit would invariably leads to the creation of a sense of global citizenship and a broader outlook.

LIMITATIONS OF ICT USE IN EDUCATION

a). Teacher Related Limitations of ICT Use: Teachers' attitude plays an important role in the teaching-learning process that utilizes computers and internet connections. Although **teachers' attitude towards use of these technologies is vital, many observations reveal that teachers do not have clarity about how far technology can be beneficial for the facilitation and enhancement of learning.** Of course, some teachers may have positive attitudes to technology, but refrain from using it in teaching due to low level of self-confidence. Many senior teachers very often consider themselves as not qualified to teach with technology. Moreover, **attitude, motivation, computer anxiety, and computer self-efficacy are factors affecting teachers' use of computers in their lessons.** Furthermore, many teachers may not have the required IT skills and feel uncomfortable, nor do they have trainings needed to use the technology in their teaching. Unless teachers develop some basic skills and willingness to experiment with students, ICT use in education will not yield any desirable impact.

b).Student Related Limitations of ICT: Use On the other hand, there are also another set of limitations of ICT use in education that are directly related to student behaviour. It is true that appropriate use of computer and the internet by students have significant positive effects on students' attitude and their achievement. Nonetheless, it is very common to observe limitations related to student behaviour. **Students tend to misuse the technology for leisure-time activities and have less time to learn and study. Online gaming, use of facebook, chat rooms, and other communication channels are the perceived drawbacks of ICT use in education. Students easily switch to these sites at the expense of their study. Internet access at home, for instance, may be a distraction because of chat rooms and online games, reducing the time spent in doing assignments and learning. Therefore, the impact of availability of ICT on student learning strongly depends on its specific uses. If ICT is not properly used, the disadvantage will overweight the advantage.. Computers limit students' imaginations. Over-reliance on ICT limits students' critical thinking and analytical skills. Students often have only a superficial understanding of the information they download. Computer-based learning has negative physical side-effects such as vision problem, musculoskeletal problems and cyber addiction.**

c).Technology Related Limitations of ICT: Use The other limitation of ICT use in education is technology related. **The high cost of purchase, installation and maintenance of technological devices, high cost of accessories and probable vulnerabilities to virus and other forms of cyber attacks, interruptions of internet connections, and poor supply of electric power are among the technology related limitations of ICT use in education.** Further, there are also the **problem of digital divide referring to the unequal access to ICT devices and the language problem resulting out of the still continuing predominance of English in the cyber world.** Besides, there are certain highly relevant moral, ethical and philosophical issues which are also to be taken into account. These ethical concerns include the **problem of plagiarism, information overload, the problem related to authenticity and accuracy of information, privacy and security threats, software piracy and so on.**

USE OF ICT IN HISTORY CLASSROOMS

- Until recently, there is a misconception that the tools and techniques of ICT are of no use in history classes and many would suggest pure lecturing as the best suitable method for narrating historical incidents. These advocates of traditional chalk and talk method were perhaps driven by the overwhelming influence previously enjoyed by political history that depends more upon the oratory skill of the teacher to provide a detailed narration of events and happenings of the past. Moreover, many senior teachers might have thought that the modern tools of ICT are not only unnecessary but also unfit for explaining the events relating to a remote past.
- But all these things changed dramatically in accordance with the changing perception of history as a discipline and also because of the unprecedented advancements in the field of technology. Now, the **study of history is more analytical rather than rendering a detailed narration of events and happenings of the past.** Analytical history gives too much importance to the concept of causality in the study of history. This involves the **generation and testing of hypotheses, somewhat akin to what one does in science and in other fields of inquiry.** This changing approach towards the subject definitely provides more room for using the tools and techniques of ICT in teaching learning process.
- We all know that learning history includes learning some facts (names, dates, places, etc.) Students find it very difficult to remember all these names and dates. Traditionally, history teachers used to make extensive use of blackboards and paper charts to explain these names and dates effectively. Very often, time charts were also prepared manually to impart a sense of chronology. To create a sense of location and space in students' minds, history teachers used to depend on drawing maps. But, all this would require a high level of artistry, expertness and hard work from the part of teachers stealing considerable time and money.

- But, today a history teacher can make the **maximum use of ICT for displaying the names, events, chronological charts and maps.**
- **Attractive power point presentations** containing facts, dates, timeline, charts and maps could be prepared in a few simple steps either by scanning from a text books or downloading from the net, so as to facilitate its displaying by using a projector.
- Going by the paradigm 'seeing is believing', displaying the larger and clearer pictures of microliths and Mughal monuments by using LCD Projector is apt and more effective rather than spending two or three hours in explaining the peculiarities, features and dimensions of these objects.
- Moreover ,displaying pictures and graphs in appropriate places and in a judicious manner is the best possible tactic **to escape from the dullness of long lectures and to increase the effectiveness of teaching by stimulating the inquisitiveness among students.**
- A teacher having a through awareness about the possibilities of ICT in teaching history could make the **effective use of audio and video clippings so as to make his classes much more attractive, interesting and effective.**
- For instance, in classroom sessions dealing with India's heroic struggle for independence, the teacher can make **effective use of audio clippings of the speeches made by national leaders such as Mahatma Gandhi, Jawaharlal Nehru, Patel, and Subhash Chandra Bose. This would make the students really interested in the topic and also helps to stimulate their enthusiasm for learning.**

- Similarly, in learning sessions on our great national leaders, the teacher **can make maximum use of feature films and documentaries based on their lives and activities like Richard Attenborough's Gandhi and Shyam Benegal's The Making of Mahatma.**
- Using **films and documentaries** could offer an added impetus in classroom sessions dealing with almost all aspects of modern and contemporary history like the world wars, cold war, national movements occurred in different nations, social and environmental movements, etc. Even more important is the fact that ICT will always encourage self-learning.
- **Conventional method of teaching like lecturing, generally promotes passive learning characterized by the overemphasis given to memorising and retention capabilities.**
- On the other hand, ICT enabled learning especially online learning **motivates students to pose historical problems, develop hypotheses, find evidence and develop logical arguments to support these hypotheses, and so on.** Effective use of ICT would always help to **generate a sense of inquiry and enthusiasm for learning.** This in turn will **ensure self-learning by students through different methods such as project method, brain storming and problem solving.**

- The more advanced form of ICT supported history learning is the **adaptation of virtual reality environment.**
- Virtual reality is an **artificial environment that is created by using certain software and presented to the user in such a way that the user began to accept it as a real environment.**
- Virtual reality is primarily **experienced on a computer through two of the five senses; sight and sound. It is the computer-generated recreation of a three-dimensional image or environment. The user (learner) starts interacting with this simulated environment in a seemingly real or physical way with the help some specifically designed electronic equipment, such as a helmet with a screen inside or gloves fitted with sensors.** This virtual reality environment is particularly effective for teaching ancient history as it helps to create a feeling in the minds of the students that they are walking through the streets of Ancient Greece or sitting in front of a pyramid in Egypt.
- Another instance of using ICT in history classroom is the **employing of mapping and location services such as Google Maps and Google Earth.** This would definitely help a lot in providing a **more accurate and effective sense of space and location in classes related to history, geography and environmental studies.** In addition to this the teacher can **also make use of presentations and talks by renowned historians and scholars and documentaries such as BBC India and Travels of IbnBatuta, readily available in social networking sites like YouTube and Ted.com.**
- Further, teachers can **motivate their students to make the maximum use of worldwide class rooms, online discussion groups online course materials and information databases like Geographic Information Systems (GIS) so as to ensure the active involvement of learners in teaching learning process**

- Apart from the aforesaid tactics to be incorporated in class room teaching, ICT is also **offering a major advantage as it provides anytime anywhere access to rich volumes of knowledge repositories stored in digital format.**
- The traditional textbooks available to students studying history are severely limited in their usefulness in generating and disseminating knowledge.
- The **conventional libraries** in schools and colleges should face the constraints of **lack of storage space and restricted access.**
- It is **not possible for an educational institution, to maintain a library with all the books catering to the needs of each and every students studying in different classes or courses.**
- In contrast, the rapidly growing collection of digital resources- **CD ROMs and a host of online resources ranging from Wikipedia to online libraries and e-books is actually revolutionizing the teaching and learning of history.**
- Now, both **primary and secondary sources that could be utilized for reconstituting the past are readily available in the net in digital format.**
- The Web is now a global library that **contains a large number of primary source documents in the form of archives and e-books.** Thus, students can now obtain information from primary sources rather than relying upon information filtered through the minds of their textbook authors.

DIGITAL RESOURCES

- Digital information resource is a generic term used to **denote all the knowledge repositories which are available in digital format or as soft copies.**
- The digital world gives everyone an opportunity to find his or her own expert, not necessarily in the classroom.
- The Internet and other digital resources provide students and teachers the means to extract the most interesting and highly useful information.
- A digital resource is **a file stored in digital media.**
- The most **common example** of a digital resource is a **Word document saved in a personal computer or attached to a mail ID. It could be anything, like a video file or an audio file or even a text file such as a pdf file or a Power Point Presentation.**
- Generally, **digital resources can be classified into two; born digital and digitized materials.**
- The **born digital materials includes; e-books, e-journal, e-news paper, e-magazine, thesis, dissertations, reports, website, www-resources and other related materials which is created or uploaded in digital format.**
- On the other hand, **digitized materials means those converted from other format to digital format. The best known example is the scanning of printed books or archival records to form its e-versions.** A digital resource is available in the form of CD ROMs or can be accessed from libraries, database or from the world-wide-web.

MERITS AND DEMERITS OF DIGITAL RESOURCES

- The **benefits of digital resources for student learning** are many.
- Digital content can **easily be kept updated and relevant to students' lives without the cost of reprinting or redistributing as in the case of print materials.**
- It can be **made available anytime and anywhere, both online and offline, accessible when the student, researcher or teacher needs it, whether from home, school, or from any other location.**
- Digital content can be **far richer and attractive**, including not only text, but also high-definition graphics, video clips, animations, simulations, interactive lessons, virtual labs and online assessments.
- Digital resources could be **utilized to facilitate and supplement all the existing streams of education such as formal, informal and non-formal and also in its different levels like primary, secondary and higher.**
- Digital resources are **available in various forms such as e-books, e-journals, webpage, blogs, wikis, databases etc..**

DEMERITS

- **The major demerits of digital learning resources** as pointed out by its critics is centering on the **concept of dehumanization**. The critics argue that the increased exposure of humans to machines, more specifically the digital media devices would inevitably leads to a high degree of **dehumanization with the end result of treating humans just as a number or another machine**.
- If education is viewed as merely an exercise for imparting knowledge, we can unhesitatingly go ahead with digital resources. But, **when judging from the point of view of socialization, most of the e-learning systems seem virtually inadequate as these systems lacks sufficient room for inter-personal relationships among students and also between the student and teachers**.
- Another thing is the **problem of digital divide and comparatively higher expenses needed for providing infrastructure**.
- Other major demerits of digital resources are the **problem of information overload, chances for getting wrong and misleading information, the issue of plagiarism and network problems affecting the accessibility of digital content**

EDUCATIONAL WEBSITES

- These are basically individually **designed websites that are tailored to a particular audience, often on a particular subject.**
- They are much like an **interactive text book, including audio, video and 3D graphics.**
- Some also **contain activities and quizzes etc to aid learning.** They can make learning more interesting and have can help students to visualize situations and objects in a realistic way that they would not otherwise have the opportunity to see.
- They are often based on a **particular resource such as a digital library or collection.**
- These sites can also **contain the discussion board and can give students to ask questions to experts via email.**
- Some educational websites also **contain an area for teachers, giving advice on how to use the resources for particular age groups and curricula.**
- These sites **allow distance-learning students to maintain a better sense of community. These sites can also serve to promote the work of the organisation and are not so much aimed at a select group of students but are available to academics and members of the public alike.**
- Two popular educational websites are the site on **Ancient India [offered by British Museum]and BBC Learning.**

DATABASE

- A database is a **structured collection of data**.
- A database is **organized in such a way that it can easily be retrieved, managed, and updated**.
- Databases can be **classified according to types of content: bibliographic, full-text, numeric, and images**.
- In computing, databases are sometimes classified according to their organizational approach.
- A distributed database is one that can be dispersed or replicated among different points in a network.
- **Geographic Information System (GIS), the system designed to capture, store, manipulate, analyze, manage, and present all types of spatial or geographical data can be cited as an example of database.**

WIKI RESOURCES

- A wiki is a **web site that is generally editable by anyone with a computer, a web browser, and an internet connection. Wikis use a quick and easy syntax to allow users to apply formatting to text and create links between pages.**
- The term 'wiki' is derived from the Hawaiian phrase, **wiki-wiki, which means quick.**
- A wiki is a **collaborative web site whose content can be edited by visitors to the site, allowing users to easily create and edit web pages collaboratively.**
- The name Wiki was chosen by **Ward Cunningham**, the creator of world's first Wiki.
- The main strength of a wiki is that it **gives people the ability to work collaboratively on the same document.**
- The only software you need is an **Internet browser.**

WIKIPEDIA:

- The largest and most talked about Wiki on the Internet is Wikipedia.
- It is an **online encyclopedia providing and updating information virtually about anything and everything. Wikipedia is editable by anyone in the world with a computer and an internet connection.**
- Wikipedia has become astonishingly widely read and cited. **More than a million people a day visit the Wikipedia site.**
- Wikipedia contains **3 million articles of which 1 million is in English**
- The **goal of Wikipedia is to create an encyclopedia that can be shared and copied freely while encouraging people to easily change and improve the content.**
- Each and every article has an **“Edit this page” button**, allowing anyone, even anonymous passersby, to add or delete any content on any page.
- Wikipedia is **entirely free**. That freedom includes, not just the ability of anyone to read it, but also their freedom to use it.
- The following wikis represents a range of different applications of wiki technology:
- **WikiWikiWeb**-the first ever wiki appeared in 1995.
- **Wikitravel**- a project to create a free, complete, up- to- date, and reliable world wide travel guide.
- **Scholarpedia**-a wiki project based on a system of peer review.
- Other well-known Wiki resources are **Wikinews, Wikimedia Commons, Wikiversity, Wikiquote, Wiktionary and Wikibooks.**

E-LEARNING

- Internet has been long used for educational purpose and a number of prominent models of Internet-based education have been emerged over the past 20 years.
- Perhaps the most established of these are various forms of what has come to be known as **e-learning—ranging from online courses to virtual classrooms and even virtual schools.**
- Many early forms of e-learning involved the predominantly one-way delivery of learning content, there by replicating traditional correspondence forms of distance education. These programs which continue to the present day tend to rely on online content management systems, although supported by some form of interactivity in the form of e-mail, bulletin boards, and other communications systems.
- Alongside these forms of content delivery is the continued development of so-called **virtual classrooms—usually spatial representations of classrooms or lecture theaters that can be attended by learners and teachers. Often these virtual spaces are designed to support synchronous forms of live instruction and feedback, with learners able to listen to lectures and view videos and visual presentations while also interacting with other learners via text and voice.**
- Other asynchronous forms of virtual classroom exist in the form of digital spaces where **resources can be accessed and shared—such as audio recordings and text transcripts of lectures, supplementary readings, and discussion forums. These forms of e-learning have continued to be developed since the 1990s.** With the establishment of a large number of cyber schools and online universities, e-learning now became the rapidly growing and increasingly popular segment of educational systems around the world.

- While the examples of e-learning tend to replicate the basic structures and procedures of conventional schools and universities, a variety of other models of Internet-supported education have emerged over the past twenty years.
- One of the **most familiar forms of Internet-based education is the collective open creation of information and knowledge, as exemplified by the online encyclopedia named Wikipedia.** Despite ongoing debates over its accuracy and coverage, the educational significance of Wikipedia is considerable.
- These characteristics of **wiki tools correspond with the wider Open Educational Resource movement which is concerned with making professionally developed educational materials available online for no cost.**
- In this manner, it is reckoned that **content from almost 80 percent of courses at the Massachusetts Institute of Technology are available on this free to use basis.**
- Similar commitments can be found in institutions ranging from **world-class universities such as Yale and Oxford to ordinary colleges.**
- In all these cases, **course materials such as seminar notes, pod casts, and videos of lectures are shared online with a worldwide population of learners, most of who could otherwise not attend.**
- Crucially, the emphasis of Open Educational Resources is not merely permitting individuals to use provided materials, but encouraging the alteration and amendment of these resources as required.

- For example, the **UK Open University's extensive Open Learn project provides free online access to all of the institution's curriculum materials with an invitation for individual users to adapt these resources as they wish.**
- Other forms of online content sharing involve the open distribution of educational content that has been created by individuals as well as institutions
- For example, the **YouTube EDU service offers access to millions of educational videos produced by individual educators and learners.**
- Similarly, **Apple Computers' collection of educational media known as iTunesU is designed to allow learners to circumvent traditional educational lectures and classes in favor of on-demand free mobile learning.**
- Describing itself as “possibly the world's greatest collection of free educational media available to students, teachers, and lifelong learners,” iTunes U offers free access to hundreds of thousands of educational audio and video podcast files.
- **Another model of online learning is the so called flipped classroom in which learners are allowed to engage with instructional elements of learning before entering a formal classroom**

- Face-to-face classroom time can then be devoted to the practical application of the already acquired knowledge through problem solving, discovery work, project-based learning, and experiments.
- Another notable open example of Internet-based education has been the development of **MOOCs (Massively Open Online Courses)** over the past five years or so.
- Now, MOOCs involve the **online delivery of courses on a free-at-the-point-of-contact basis to mass audiences**. At its heart, the MOOC model is **based on the idea of individuals being encouraged to learn through their own choice of online tools—what has been termed personal learning networks—the collective results of which can be aggregated by the course coordinators and shared with other learners**.
- This focus on individually directed discovery learning has proved especially appropriate to college-level education.
- Now it is possible for individuals of **all ages to participate in mass online courses run by professors from the likes of Stanford, MIT, and Harvard universities in subjects ranging from Roman architecture to fundamentals of neuroscience**.

- Another radical application of the Internet to support self-directed, non-institutional learning is initiatives such as **the hole-in-the-wall and School in the Cloud initiatives**. These programs are **built around an ethos of minimally invasive education where children and young people can access digital technology at any time, and teach themselves how to use computers and the Internet on an individually paced basis**. This approach is seen to be especially **applicable to locations such as slum communities in India where Internet access is otherwise lacking**
- The provision of such access and support is to be viewed as an **attempt to build self-organized learning environments and to encourage self activated learning as an ideal alternative for those who were denied formal schooling, especially in low-income countries**. These programs, projects, and initiatives are indicative of the variety of ways in which education and the Internet have combined over the past 20 years. Yet perhaps the most significant forms of Internet-based education are the completely informal instances of learning that occur in the course of everyday Internet use. In this sense the Internet's implicit support of various forms of informal learning could be seen as its most substantial educational impact

ADVANTAGES OF E-LEARNING:

1. **It offers Greater Opportunities**: -Distance learning affords educational opportunities to individuals unable to attend conventional classroom settings. Such individuals include the **disabled, those living in rural communities where travelling daily to university or college would prove difficult or even impossible, and finally those with various time restrictions that prevent them from attending pre-scheduled classes.**

➤ **2.Learner-determined location for learning**—whereby students are able to choose their own place of study;

➤ **3. Learner-determined time of learning**— students are able to organize their own individual learning schedule, rather than having to study on a specific day at a specific time, and finally;

➤ **4.Learner-determined pace of study**— students are able to set their own individual pace of study without being held up by slower students or vice-versa.

➤ 5. Shy students may **gain more confidence and perform better** in an online environment rather than being intimidated in the conventional classroom.

DISADVANTAGES.

- **1. Risk of Isolation** The arguments against online learning are centered largely on the concerns for the **loss of traditional classroom face-to-face interaction, and the potential feelings of isolation this can create.** Researches suggest that the majority of online courses still adopt an asynchronous approach to learning that limits the amount and depth of interaction amongst both students and instructors. Whereas a synchronous approach to online learning would provide students and instructors, a more interactive environment.
- **2. Reduced social and cultural interaction** **Reduced social and cultural interaction** is a **major drawback** in online education. **Students miss out on certain communication mechanisms that are often taken for granted in the conventional classroom, such as body language and peer-to-peer learning.** Most of the online learning materials are designed to work in an impersonal environment. This would definitely cause some hardships for the students in acquiring and developing certain skills and techniques needed for effective communication and interpersonal relationships. **Students who constantly interact via technology can find difficulty in confronting interpersonal interactions and the skills needed to negotiate with all kinds of people, and handle personality conflicts.** Ultimately, life is something more valuable than the ability to click through a series of menu bars.

3. Online learning offers more chances for distraction and deviation. When students are sitting alone in front of a computer they are more prone to distraction, and unless the online course material is interesting or providing sufficient amounts of interaction, the learner will become distracted and may even drop out. Even though, we can't ignore the significance of Internet as an ever-growing knowledge repository, we should also be aware of the fact that the web contains so many unwanted things also. So, there are more chances of students, especially the adolescents among them becoming an easy prey of porn sites and similar unwanted things. Some students who finds themselves disappointed with their online lessons, spends more time on social networking, chatting and very soon gets attracted by the dirty side of the Internet.

EDUCATIONAL SOFTWARE

- Educational software is **computer software the primary purpose of which is teaching or self-learning.**
- It is the **software, or computer applications developed for the purpose of teaching and learning. Educational software encompasses a variety of forms and purposes.**
- Mainly there are **two categories of Educational Software.**
- **a) Software designed to facilitate and support formal education/learning/training**
- **b) Software designed as self-learning or training Kits Educational software or programs are used mostly in pre-primary education.** These programs help kids to learn alphabets, sounds and grammar in English as well as other languages. It appears very much interesting for kids and promotes the play-way method of learning.
- Some educational software are **available in the form of attractive games that helps to stimulate the inquisitive spirit in kids' minds and make them capable of understanding patterns, relationships and similarities and also helps to enrich their vocabulary.**
- Such program which **combines education with entertainment is sometimes known as edutainment.**
- The most known examples of children's learning software are **Click'n KIDS, Disney Interactive learning titles based on characters such as Winnie-the-Pooh, Aladdin, The Jungle Book and Mickey Mouse.**

- There are also some other programs used **for introducing mathematical concepts for all grades, or are aimed at helping to develop good writing skills.**
- Some programs, such as flight simulators, teach professionals the details of their jobs.
- Still other programs, called **Learning Management Systems (LMSs)**, are designed **for use by certain grades for teaching or evaluation purposes.**
- **A learning management system is a software application for the administration, documentation, tracking, and reporting of training programs, classroom and online events, e-learning programs, and training content.**
- **At the college and university level, LMSs are powerful application management systems that offer courses via the Internet for non-formal students. These tools allow institutions to design entire online courses.**

COURSEWARE

- Courseware is **educational material intended as kits for teachers or trainers or as tutorials for students, usually packaged for use with a computer.**
- It is the **study material or course content made available in digital format. Courseware can encompass any knowledge area.**
- Educational institutions like **MIT have made available virtually all the study materials pertaining to almost all the courses offered by them. Eg; MIT Open Course Ware (ocw.mit.edu).**
- Courseware is frequently **used for delivering education about Information Technology, personal computer and its most popular business applications, such as word processing and spreadsheet programs.**
- Courseware can include:
 - **Material for instructor-led classes**
 - **Material for self-directed computer-based training (CBT)**
 - **Web sites that offer interactive tutorials**
 - **Material that is coordinated with distance learning, such as live classes conducted over the Internet**
 - **Videos for use individually or as part of classes**

E-BOOK

- An eBook is the **electronic version of a traditional print book that can be read by using a personal computer or by using an eBook reader.**
- E-book reader is **available either as a software application (eg. Microsoft's free Reader application), or as a book-sized computer that is used solely as a reading device.**
- Many **reference materials like dictionaries and encyclopedias which are now available in CD ROMs can be cited as the best examples of eBooks.**
- Users can **purchase an eBook on diskette or CD, but the most popular method of getting an eBook is to purchase a downloadable file of the eBook from a Web site.**
- Most of the book publishers are now offering their products in digital format too. There are also certain **free e-book sites that facilitate free and unrestricted downloading of e-books.**
- The **main advantages of e-books** over the conventional books include **its smaller size, larger storage, easy and less expensive accessing and easy navigation.**

E-JOURNALS

- An electronic journal or e-journal is **a periodical publication which is published in electronic format, usually on the Internet.**
- These are **scholarly journals or intellectual magazines that can be accessed via electronic transmission. They are a providing material for academic research and learning. They are formatted more or less like journal articles in traditional printed journals.**
- Many e-journals are the **electronic versions of already existing print journals.**
- For example, **Economic and Political Weekly (EPW), the most famous research journal in Social Science is now available both in print and electronic media.**
- An increasing number of e-journals are available as **open access journals, requiring no subscription and offering free full-text articles and reviews to all.**
- Most electronic journals are **published in HTML and PDF formats, but some are available in only one of the two format.**
- Electronic journals have several **advantages** over traditional printed journals such as;
 - **1. It provides anywhere and anytime access at a comparatively lesser expense.**
 - **2. Helps searching the contents pages and/or the full text of journals to find articles on a certain subject.**
 - **3. You can e-mail articles to yourself or download them for printing.**
 - **4. Hypertext links allow you to move to different sections within individual journals or articles and can link you to related resources on the Internet.**
 - **5. E-Journals can include more images and audio-visual material.**
 - **6. E-Journals are more interactive - you can e-mail the author or editor with your comments.**

OPEN ACCESS PUBLISHING

- Open Access (OA) stands for **unrestricted access and unrestricted reuse**.
- Most publishers own the rights to the articles in their journals. Anyone who wants to read the articles must pay to access them. Those who want to use the articles in any way must obtain permission from the publisher and is often required to pay an additional fee. Most of the researchers are accessing these costly journals via their institution that pays for it.
- Paying for access to content makes sense in the world of print publishing where providing content to each new reader requires an extra expenditure as it involves the production of an additional copy.
- But free and unrestricted accessing of these researches articles seems sensible in the online world as it is possible to provide access to all readers anywhere in the globe without the burden of any additional expenditure.
- **Open Access Publishing refers to the existence of online academic journals which facilitates publishing and accessing of research and scholarly articles from any part of the globe without having paid for it.**
- **Open Access journals are available online to the reader without financial, legal, or technical barriers other than those inseparable from gaining access to the internet itself. It is a significant initiative aiming the production and dissemination of knowledge.**
- **Authors can choose to publish their research articles in a growing number of journals that meet the full definition of Open Access. Articles are free to all interested readers, and the publishers place no financial or copyright barriers between the readers and the article.**
- The publisher of an open access journal is known as an **"open access publisher"**, and the process, as **"open access publishing"**.

➤ Open Access publishing is the **fastest growing segment of the scholarly publishing market, and journal options are now available for nearly every area of research.**

➤ Authors can make use of Open Access facility in any of the following ways.

➤ **(1)'Green'open access:-**Self-archiving their journal articles in an open access repository, also known as, or

➤ **(2)'Gold'open access:-**Publishing in an open access journal

➤ **Benefits of Open Access**

➤ **Accelerated discovery.** With open access, researchers can read and build on the findings of others without restriction.

➤ **Public enrichment.** Much scientific and medical research is paid for with public funds. Open Access allows tax payers to see the results of their investment.

➤ **Improved education.** Open Access means that teachers and their students have access to the latest research findings throughout the world.

EDUSAT

- **India's First Exclusive Educational Satellite EDUSAT, launched on September 20, 2004, is the first Indian satellite built exclusively for serving the educational sector.**
- **It is mainly intended to meet the demand for an interactive satellite based distance education system for the country.**
- **It strongly reflects India's commitment to use space technology for national development, especially for educating the population in remote and rural locations.**
- **The 1950 kg EDUSAT was launched from Satish Dhawan Space Centre (SDSC) Sriharikota, into a Geosynchronous Transfer Orbit (GTO) by ISRO's Geosynchronous Satellite Launch Vehicle (GSLV-F01).**
- **The extension of quality education to remote and rural regions becomes a herculean task for a large country like India with multi-lingual and multi-cultural population separated by vast geographical distances.**
- **Since independence, India has seen substantial increase in the number of educational institutions at primary, secondary and higher levels as well as the student enrolment. But the lack of adequate rural educational infrastructure and non-availability of good teachers in sufficient numbers adversely affect the efforts made in education.**

- **Satellites can establish the connectivity between urban educational institutions with adequate infrastructure imparting quality education and the large number of rural and semi-urban educational institutions that lack the necessary infrastructure.**
- Besides supporting formal education, a satellite system can facilitate the dissemination of knowledge to the rural and remote population about important aspects like health, hygiene and personality development and allow professionals to update their knowledgebase as well.
- Thus, in spite of limited trained and skilled teachers, the aspirations of the growing student population at all levels can be met through the concept of tele-education.
- **With the success of INSAT based educational services, a need was felt to launch a satellite dedicated for educational service and ISRO conceived EDUSAT Project in October 2002.**
- EDUSAT is the first exclusive satellite for serving the educational sector. It is specially **configured for audio-visual medium, employing digital interactive classroom and multimedia multicentre system.** It is primarily meant for providing connectivity to schools, colleges and other centres of higher education and also to support non-formal education. The scope of EDUSAT programme was planned to be realized in three phases.

- In the first phase of pilot projects, service utilities of the previously launched satellite INSAT-3B, was used. In this phase, Visveswaraiah Technological University (VTU) in Karnataka, Y B Chavan State Open University in Maharashtra and Rajiv Gandhi Technical University in Madhya Pradesh were covered.
- In the second phase, EDUSAT is being used in a semi-operational mode and at least one uplink in each of the five spot beams will be commissioned. About 100-200 classrooms will be connected in each beam. Coverage will be extended to the whole of India through spot beams.
- The commencement of fully fledged EDUSAT services on March 7, 2005 marks the third phase. EDUSAT became fully equipped with the launching of EDUSAT based Primary Education Project in Chamaraja nagar District under taken jointly by ISRO and Karnataka State

- EDUSAT is **operating from a central and 5 regional hubs or beams.**
- The Hub for **National Beam** has been established at **Ahmadabad**. The National Beam is planned to be used for nationally reputed institutions like **Indira Gandhi National Open University, National Council for Educational Research and Training, Indian Institutes of Technology at Kharagpur and Chennai, etc.**
- The five regional beams -- **Southern Beam, Western Beam, Northern Beam, Eastern Beam, and North-Eastern Beam** are specifically designed to meet the educational needs of respective regions.
- While **ISRO** provides the space segment for **EDUSAT System** and demonstrate the efficacy of the satellite system for interactive distance education, content generation is the responsibility of the user agencies.
- The quantity and quality of the content would ultimately decide the success of **EDUSAT System**. This involves an enormous effort by the user agencies. To help in this, **ISRO**, in cooperation with the user agencies, **organized five conferences at the regional level, one at the national level and one conference of vice-chancellors of Indian universities to create awareness about EDUSAT and its capabilities.** The successful launch of **EDUSAT** and its commissioning has provided a great impetus to countrywide distance education.

VICTERS

- **ViCTERS (Virtual Classroom Technology on EDUSAT for Rural Schools)** is the cable TV channel designed exclusively for promoting education.
- It is **India's first broadband network on EDUSAT for schools.**
- It was **inaugurated by A P J Abdul Kalam**, the then president of India on **28th July, 2005 at Thiruvananthapuram.**
- Through, ViCTERS, which is functioning on interactive IP based technology, Kerala has demonstrated how EDUSAT could be used to successfully empower teachers.
- The scheme which is being **executed by IT@School Project of Government of Kerala**, is mainly intended to **meet the demand for an Interactive Satellite based Distance Education system for the country.**
- It strongly **reflects India's commitment to use space technology for national development, especially for the development of the population in remote and rural locations.**
- ViCTERS **offers interactive virtual classrooms that enable the school students as well as the teachers to directly communicate with the subject experts and educationists**

- It also ensures the **dissemination of high quality education to the students and teachers from the original source.**
- ViCTERS has **two modes of operation - the interactive mode and non-interactive mode.**
- **Interactive mode of ViCTERS** is used for **video conferencing and other such educational training purposes.** Being India's first interactive broadband network for school, this mode is **equipped with 116 Satellite Interactive Terminals (SITs).** The **main users of the facility under Thiruvananthapuram Hub are IT@School Project, Directorate of Collegiate Education, Directorate of Technical Education, CDAC, SSA, Directorate of IT Lakshadweep etc.**
- The **non-interactive mode of ViCTERS** is the **complete educational channel, first of its kind in the country, which was officially inaugurated on 3rd August 2006 by Sri. V.S Achuthananthan, the then Chief Minister of Kerala.**
- The channel which is **telecast for 17 hours a day from 6 a.m. to 11 p.m.** is unique in the sense **that it caters to students & teachers on a need based manner, and programs are aired on demand, sensitive to school curriculum and even timetable.**

- The channel reaches out to as many as **12,500 schools and about 50 lakhs children and covers almost entire households in the State.**
- ViCTERS is the **only complete educational channel of the State which telecast programmes of educational value, general awareness programmes and content on general interest and is fast becoming the most sought after channel by students, parents, teachers and general public.**
- ViCTERS telecast specific **curriculum based programmes, regional, national and international programmes on education especially on Science and Technology.**
- The channel is now available throughout the State through local cable, receive only terminals and also via **live through internet at www.victers.itschool.gov.in,** enabling the students, teachers and general public to watch the channel live through internet from any part of the world.
- Various programmes telecast through ViCTERS are as follows;
 - • Padanakauthukam and Shastrakauthukam educational programmes
 - • Examination oriented programme for SSLC and Plus 2 level
 - • Shasthramuthukal (Science programmes).

- • Vazhikaatti (produced by State Institute of Educational Technology)
- • Ormayile Malayalam (Specific date-wise regional programme)
- • Kerala Sree (Produced by Department of Information & Public Relations, Kerala)
- • Pusthakangalkkoppam (Introducing various Books)
- • HarithaVidhyalayam (Educational reality show for schools)
- • KadhaparayumNeram (Story telling time)
- • Mozhimuthukal (Detailing famous quotes)
- • Drishyapaadam (produced by State Open School)
- • Naadavismayam (Introducing Musical instruments and symphonies)
- • Innalekalile Innu (Yesterday-Today) • Samrakshithasmaarakangal (Protected monuments)
- • Gaanamayooram (Familiarising patriotic songs)
- • Great Teachers (Familiarising famous and renowned teachers)
- • Career After 12th • Kalothsavam (State School Youth Festival)
- • IT for All (Technology outlook programme for students and public)

- • Inspire (career guidance programme)
- • Chithrashala (film based programme)
- • MAT (talent time Special)
- • EducationalNews
- • Anukalikam (Weekly cultural news programme)
- • Sasthralokam (Weekly science based programme)
- • Shasthranaadakam (Weekly science based programme)
- • BBC TIME (BBC Programme) • NFDC film (Classic films produced by National Film Development Corporation)
- • Weekend (Weekly global news)
- • Vibgyor (subject related programme)
- • AdhithiyodothuAlpaneram (Interaction with a renowned personality)
- • Beyond the text (text based programme)
- • Magic fingers (tricks and plays on magic),.....and many more.

DIGITAL LIBRARY

- A digital library is a **library** in which collections are stored in digital format (as opposed to the conventional paper and print media) and accessible through the medium of computers or similar digital devices.
- The digital content may be stored locally in a physical library, or accessed remotely via computer networks.
- A digital library is a **type of information retrieval system**.
- The widely accepted definition of digital library perceives it as **"a potentially virtual organization, that comprehensively collects, manages and preserves for the long depth of time, rich digital content, and offers to its targeted user communities specialized functionality on that content, of defined quality and according to comprehensive codified policies."**
- Even though, there is a tendency to use the terms **digital library** and **online library** interchangeably, there does exist a distinction between the two.
- A **digital library** is one available in digital format irrespective of the fact that it is available online or could be read offline.
- A digital library can function online with the collection of digital books available in mediums like **CD ROMs**.
- On the other hand, an **online library** is one existing in the virtual world and accessible remotely through the internet.
- More simply, **all digital libraries** are not necessarily online libraries; but all online libraries are digital libraries.

ADVANTAGES

1. It is Cost Effective: - The advantages of digital libraries as a means for easily and rapidly accessing books, archives and images of various types are now widely recognized. In contrast to traditional libraries which are limited by storage space; digital libraries have the potential to store much more information, simply because digital information requires very little physical space to contain it. As such, the cost of maintaining a digital library is much lower than that of a traditional library. A traditional library must spend large sums of money paying for staff, book maintenance, rent, and additional books. Digital libraries may reduce or, in some instances, do away with these fees.

2. No barriers of physical boundary: - The user of a digital library need not to go to the library physically; people from all over the world can gain access to the same information, as long as an Internet connection is available.

3. Round the clock availability: - A major advantage of digital libraries is that people can gain access 24/7 to the information.

4. Multiple accesses: - The same resources can be used simultaneously by a number of institutions and persons. A conventional library may have a license for "lending out" only one copy at a time.

5. Easy Information Retrieval: - In traditional libraries, searching for a particular book is a tedious task, even to a reader who is well versed in cataloguing techniques. In contrast, in a digital library, user is able to apply any search term (word, phrase, title, name, and subject) to search the entire collection. Digital libraries can provide very user-friendly interfaces, giving clickable access to its resources.

6. Digital content is less vulnerable to decay: - Digital content is comparatively less perishable than conventional books printed in paper. Preservation and conservation of digital resources too is much easier than the traditional library materials. There are also easier reprographic techniques by which we can take additional copies of the rare and damaged materials.

7. Added value: - Certain characteristics of digital media help to improve the quality of reading materials in contrast to the dullness and monotony of conventional books. A digital library could accommodate more interesting and interactive things such as audio and video books and could ensure the quality and clarity of images and text. Digitization can enhance legibility and remove visible flaws such as stains and discoloration.

- The major **criticism** against digital libraries is centering on its limitations such as the
- **high initial expenses** required for providing infrastructure,
- certain technology related issues such as **connection failure or network problems**,
- **risk of security vulnerabilities involved and comparatively higher chances of plagiarism.**
- Some critics are also trying to examine **e-reading in terms of man-machine interface**. They feel that physical books cannot be replaced by digital books as reading the former requires the total mental and physical involvement of the reader, whereas **reading books in digital format very often leads to an increased volume of mechanization.**
- Lastly, there is also some serious **health issues** such as vision problems and muscular-skeletal diseases caused from excessive e-reading

INFLIBNET

- Information and Library Network (INFLIBNET) is an **autonomous inter-university Centre (IUC) of University Grants Commission, Government of India.**
- It is involved in **creating infrastructure for sharing of library and information resources and services among Academic and Research Institutions.**
- INFLIBNET **works collaboratively with Indian university libraries to shape the future of the academic libraries in the evolving information environment.**
- This major National Programme was initiated by **UGC in 1991 with its Head Quarters at Gujarat University Campus, Ahmadabad.**
- It became an **independent Inter-University Centre in 1996.**
- **N-list is the major utility service of INFLIBNET aiming to provide instant access to a rich and diverse collection of electronic academic journals to its users.**
- INFLIBNET is involved in **modernizing university libraries in India and connecting them as well as information centres in the country through a nation-wide high speed data network using the technologies for the optimum utilization of information.**
- INFLIBNET is set out to be a **major player in promoting scholarly communication among academicians and researchers in India**

NICENET:-

- A free Web-based virtual classroom NICENET is a non-profit organization of internet professionals who donate their time to provide services for the Internet community.
- Everything in NICENET is offered free for public use. It was founded in 1995 with the primary objective of bringing communication tools and resources previously available only to those with large sums of money or substantial technical expertise to the education community across the globe.
- NICENET provides one of the most popular 'Learning Management System' of the world. NICENET offers a computer mediated conferencing system that acts as a place for interaction where the members of a group can share information, ask questions and get extra help.
- It is just like a classroom accessible only through the site www.NICENET.org. NICENET is conferencing software that resides on the Net. It is free and currently in use by many educators in the world.
- You need not even download the software.
- You simply bookmark NICENET in your browser and go there when you are online to read and send messages.

➤ Major **Advantages and special features of NICENET**

- **1. Internet Classroom Assistant (ICA):** - It is a sophisticated communication tool that brings **powerful World-Wide-Web based conferencing, personal messaging, document sharing, scheduling , linking and sharing of resources to a variety of learning environments.**
- **2. Anyone can set up a class in minutes and allow others to join.** After login, users are presented with a 'heads-up' display of class resources.
- **3. Conferencing:** Create your own private, threaded conferencing on topics you make for the class or opt to allow students to create their own topics.
- **4. Scheduling:** Put the class schedule on-line. With a seven day advance view on your class homepage, students will have a heads-up display of upcoming assignments and class events.
- **5. Document sharing:** Students and teachers have the ability to publish their documents on the NICENET website by using certain simple web-based techniques.
- **6. Personal Messaging:** Similar to traditional email but fully integrated with document sharing and conferencing, personal messaging is a great way to communicate with and between individuals in your class, comment privately on conferencing postings or give private feedback on papers or documents published.
- **7.Link Sharing:** Share links to relevant Internet resources sorted by topics that you create.

BIO-RESOURCE NETWORK (BRNET)

- Bio-Resource Network (BRNet) is a **prototype portal site for biological information.**
- An initiative of **Japan Science and Technology (JST) Corporation**, BRNET is basically **meant to bring together biological information resources scattered over different networks, so as to ensure its optimum utilization.**
- BRNET categorizes the information resources in such a manner that the **end user can easily search the desired information.**
- Furthermore, it also **allows the users to create their own bio resources database.**
- The **National Bio-resource Project (NBRP)** is a Japanese project that aims to establish a **system for collecting, preserving and providing bio-resources for use as experimental materials for life science research.**
- It is promoted by **27 core resource facilities, each concerned with a particular group of organisms, and by one information center.**
- The **NBRP database** is a product of this project. **Thirty databases and an integrated database-retrieval system known as the Bio-Resource World (BRW) have been created and made available through the NBRP home page.**
- The BRW is **designed for users who need to search across several resources without moving from one database to another.**
- BRW provides **access to a collection of 4.5-million records on bio-resources including wild species, inbred lines, mutants, genetically engineered lines, DNA clones and so on**

- In our country, **Indian Bio-resource Information Network (IBIN)** is being developed as a distributed national infrastructure to serve relevant information on diverse range of issues of bio-resources of the country to a range of end users.
- It is a project **funded by the Department of Biotechnology (DBT)**, Government of India.
- Its **major goal is to network and promote an open ended, co-evolutionary growth among all the digital databases related to biological resources of the country and to add value to the databases by integration.**
- Indian Bio-resource Information Network (IBIN) is designed to serve relevant information on bio-resources of the country to the professionals involved in bio-prospecting, marketing, protecting bio-piracy and the conservation of bio-resources.
- IBIN is proposed to be uniquely placed as a single portal data provider on India's bio-resources like plants, animals, marine, spatial distribution and microbial resources.
- The immensely rich collection of data stored in databases known as **Bio-resource networks** is usually being used for various purposes especially in learning and researching life science and its auxiliaries such as biomedical engineering, biotechnology, biochemistry, microbiology and the like.

I.T IN HISTORICAL STUDIES

- The tools and techniques of I.T could also be incorporated in a much higher level of historical studies, more precisely, in the area of historical research.
- Today, modern tools of I.T have definitely simplified the processing of all the **major stages involved in historical research such as identifying the research problem, formation of hypothesis, collection of data, interpretation of data and the presentation or publication of research findings.**
- The I.T tools used in the field of historical research may vary from the **simplest personal or laptop computers used for data storage to highly advanced Global Positioning System (GPS) and remote sensing techniques employed by archaeologists.**
- In addition to this, there are also certain specifically **designed software programs used for quantification and analysis of data such as SPSS and MATLAB.**
- **Some educational websites like Web Quests offers a popular way of providing structure to historical research on the Internet.**

- Typically, Web Quests have an introduction, a process, guidance, a task, a list of resources, a conclusion and an evaluation.
- **The motive behind such research sites is familiarizing students with certain key aspects of research in a particular topic.**
- The following section would attempt a review of major tools and techniques of I.T utilized in various stages involved in historical research such as identifying the topic, collection of data, interpretation of the collected data and finally, the presentation of their findings or the result of the research.

a.) Identifying the Research Problem or the Topic:

- The **starting point of any research** is the identification of the research problem.
- The topic of research should be taken with utmost care and concern by considering various aspects such as the **relevance, scope, capability of the researcher and the availability of sources**.
- More importantly, before, **finalizing the topic of research**, the researcher should also **satisfy himself with respect to the genuineness or novelty of the proposed research work**.
- For ensuring all these factors **one should have a clear idea about previous research works conducted on the subject and also in related fields**.
- Here, one can make the **maximum use of the immensely rich web resources or databases**. At present, **most of the standard universities and other research centres across the globe used to publish online, the list of research works undertaken by them**.
- Some institutions make the **full text of thesis available in their websites**. Besides, there are **also a large number of online or open access journals providing anytime and anywhere access to rich volumes of research works done in different parts of the world**.
- By referring these online sources, the researcher can **carefully choose his topic of research so as to avoid the possible chances of duplication and likely allegations of plagiarism**.

b.) Data Collection

- The second major step involved in historical research is the **collection of data based on which the researcher has to formulate his own research findings.**
- The collection of data is a **hazardous task involving the utilization of considerable time, money and effort from the part of the researcher. Here also, the tools and techniques of Information Technology could act as the most trusted companion of the researcher.**
- The **digital libraries and digital archives provides an easy, anytime anywhere access to rich volumes of both primary and secondary sources stored in digital repositories all over the world.**
- The web contains the richest collection of digital resources virtually on almost all areas coming under the discipline of history. It is possible to do some good research works exclusively on the basis of **Wiki resources** since over 60% of Wikis' content is on topics related to history.
- Some of the digital data could be accessed on open access terms and some others are available upon paying a nominal or reasonable registration fee. The researcher who is searching for useful data can also make use of the most sought after **databases like Geographical Information System (GIS) and Bio-resource Networks (BRNet).**
- However, one must take maximum care while dealing with the online resources as validity of the material on the Internet is always questionable. The researcher should **evaluate these sources critically by giving an extra emphasis to matters such as the authorship, authenticity and accuracy.**
- All the data so collected could be **stored intact in digital storage devices such as Laptops, PCs palm-top computers and also in secondary storage devices like CDs, DVDs and memory chips so as to facilitate future manipulation, analysis and interpretation.** The digital storage of data always offers an edge over the conventional media both in terms of high storage capacity and easy retrieval. **Scanners and cameras** of varying sizes and types may be utilized for reproducing the exact and clearer images of data stored in conventional format so as to digitalise them.

c.) Analysis or Interpretation of Collected Data

- The next major step involved in historical research is the **analysis and interpretation of data**. This means the **rearranging of all the scattered data to form a meaningful outcome or a reasonable conclusion**. This could be attained through **scrutinizing, reorganizing, investigating and collating the stored in data**.
- All these data manipulations **would be much easier** if it is stored in **digital format**. If all the materials collected by the researcher is **stored in the form of a database** it could **easily be analyzed and restructured by using database management techniques**.
- There are also certain **software packages like Statistical Package for Social Sciences (SPSS)** specifically designed for quantification and analysis of data.

d.) Presentation of Research Findings

- The final stage of the entire process of research is attained by **publishing the research findings in the form of a thesis or an article.**
- It is through publication that the **researcher publicly reveals his findings before the academic community.**
- **Preparing a presentation, making a hard copy of the thesis and publishing a research paper online, all would require a basic understanding of the tools and techniques of ICT such as word processing, PowerPoint Presentation and Desk Top Publishing (DTP).**
- The most easy and cost effective way to publicize the research findings is by resorting to **Open Access Publishing, a comparatively recent phenomenon that has revolutionized the world of academic publishing.**
- All these digital mediums adopted by researchers to express themselves, offers a greater possibility of **effective communication that too in a cost effective manner.**
- This is primarily because of the fact that **digital media always offer better opportunities for drawing graphs, charts and diagrams and reproducing images so as to enable a convincing illustration of the research findings.**

I.T AND ARCHAEOLOGICAL RESEARCH

- Archaeology is the study of human antiquities, especially of the prehistoric period and usually by excavation.
- Archaeology involves **three crucial elements; the past, material remains, and excavation.**
- Archaeologists are therefore dealing with the remains of past peoples, societies and cultures. **Remains have a tendency to be lost, buried and forgotten, so archaeology has developed a range of methods to recover partial remains.**
- Archaeological excavations conducted at places of historical significance have contributed the coining of the term **Field Archaeology**. Field archaeology is what archaeologists do in the field.
- The **first element of field archaeology is therefore, the creation of a research design.**

- The basic stages involved in any type of archaeological excavation are **identifying the site, designing the project, surveying, excavation, recording of the artifacts unearthed from excavations, interpreting the findings and publishing the report.**
- In our digital age, archaeology **incorporates a wide spectrum of digital tools and techniques in almost all the steps involved in an archaeological excavation.**
- The **increasing interaction between archaeology and digital tools and techniques gave currency to a new term, digital archaeology.** In simpler terms, **digital archaeology refers to the use of digital information and communication devices and practices in the field of archaeology.** Digital Archaeology explores the basic relationships that archaeologists have with Information and Communication Technology (ICT) and digital technology to assess the impact that such innovations have had on the very basic ways that archaeology is performed and considered.

THE MAJOR DIGITAL TOOLS AND TECHNIQUES BEING USED BY ARCHAEOLOGISTS ARE;

a.) Image Capturing

- The capture and analysis of image data is an integral part of the archaeological process and digital applications and techniques have revolutionized methods of data gathering.
- **Image capturing is the basic prerequisite for taking the exact measurement of micro sized artifacts. Image capturing also helps the rearrangement or conservation of broken artifacts through a process known as photocomposing.**
- **A variety of digital image capturing tools and techniques ranging from digital cameras to the high definition satellite photography are now being used for image capturing.**
- **Software applications** have enabled new processing and analysis techniques for these types of images. The most popular among such **software program is the Bonn Archaeological Software Package (BASP), a collaboratively developed suite of tools started developing since 1973.**
- It also includes **functions like clustering, correspondence analysis, and mapping.**
- **Airphoto19 is another low cost programme used for capturing images. It allows the user to correct a distorted aerial view and represent terrain as a relief model, combining the geometric accuracy of a map with the detail of a photograph.**
- **The use of multiple photographs to determine accurate measurements and to produce digital terrain models (DTM's) is a high standard technical process known as photo grammetry, for which a range of software is also available.**

b.) Google Earth

- Google Earth, one of the most popular utility services from Google acts **as an easily accessible and cost effective means for locating and surveying sites of excavation.**
- Google Earth's interoperability with GIS data makes it a potentially useful tool for modern archaeologists. **The benefits of using this system are however enticing and begin to offer the user some quite sophisticated geospatial referencing functionality.**
- Google Earth has the potential to provide serious benefits to archaeologists, in terms of time that it takes to achieve certain tasks in comparison with using standard GIS packages and dedicated aerial or satellite imagery.

c.) Remote Sensing

- **Generally, Remote Sensing refers to the activities of observing/recording/perceiving (sensing) objects or events at far away (remote) places. In remote sensing, sensors are not in direct contact with the objects or events being observed.**
- **The term is used for referring the technique of gathering images using equipment that is at some degree removed from the subject matter and therefore covers a very wide range of techniques for analyzing the environment.**
- **The electromagnetic radiation is normally used as an information carrier in remote sensing. This technology is particularly useful in excavations involving the unearthing of delicate or breakable objects and also in marine or underwater archaeology.**
- **Ground Penetrating Radar (GPR) was also used by archaeologists to equip them with a better understanding of sites to be excavated, especially in cases involving the unearthing of buried archaeological features or the deepest layers of ancient settlements.**
- **Another development in remote sensing was seen manifested in more recent initiatives such as LIDAR(Light Detection and Ranging or Laser Imaging Detection and Ranging)**

d.) GIS (Geographic Information System)

- It has been proposed that rather than being classified as a 'tool', **GIS might more accurately be labeled a sub-discipline in its own right, complete with its own competing methodologies and camps endorsing one approach over another in relation to the vast amount of functionality that GIS encompasses.**
- There are at least, **five categories of activity that GIS systems can address. They are;**
 - **Data acquisition**
 - **Spatial data management**
 - **Database management**
 - **Spatial data visualization**
 - **Spatial data analysis**
- **GIS is designed to allows users to describe some form of entity (situated in a landscape) in terms of its geospatial coordinates and to then make connections between that very explicit instance of data and any other information that might be pertinent to the description or analysis of that entity.**
- **This related information can take the form of text, images, statistics, graphs, multi-media; or anything that can be stored or referenced by a database. This enables GIS to act as both a visualization tool (displaying the database information spatially) and an analysis tool (displaying the spatial information quantitatively).**

e.) CAD

- Originally developed for architectural and engineering purposes, **CAD (Computer Aided Design)** software is now used in a multitude of disciplines and integrates seamlessly with the archaeological data that may be acquired from a variety of sources including Total Station surveys and GPS (Global Positioning System) readings.
- CAD packages enable the user to create 2D and 3D vector-based drawings and work with a coordinate referencing system, x and y for position and z for height.
- Drawings can consist of layers of information which can be edited and manipulated either separately or together adding functionality to the pre-digital technique of pin-bar drafting.

f.) Virtual Reality Environment

- Another field of **interaction between archaeology and digital technology** is the **interesting world of virtual reality**.
- It is the **Virtual Reality techniques** that shape a layman's understanding of the **past as they tend to reconstruct the past realities in an artificially simulated environment**.
- This side of archaeology is developing into one of the main and most important interfaces between archaeologists and the rest of the world – **connecting archaeology into the mainstream world of multimedia and the internet, presenting information in ways that can easily grasp the imagination, attention and interest of the nonprofessional public**.

ARCHAEOLOGY AND DIGITAL PUBLISHING TOOLS:

- The most significant impact of the digital revolution upon archaeology is in terms of dissemination of information. The **digital revolution facilitated the speedy publishing and easy accessing of the entire volume of information of archaeological excavations conducted worldwide.**
- The digital publishing tools **used to publicize the findings of archaeological excavations may vary from simple power point presentations targeting a limited audience to resorting to Open Access Publishing mode.**
- Today, archaeologist invariably **uses audio and video devices and the social media platforms to make their presentations attractive and appealing.**

QUANTIFICATION

- Quantification is the **approximation of a subjective aspect (like attributes or characteristics) of a thing or phenomenon into numbers through an arbitrary scale.**
- **Every aspect of nature could be quantified, even though many of them are not measurable.**
- **Quantitative data is the data that can be quantified and verified, and is amenable to statistical manipulation.**
- Quantitative data defines whereas qualitative data describes.
- In the social sciences, **quantification is an integral part of economics and psychology.**
- More recently, the **technique of quantification is gaining popularity among historians too, owing to the fast changing perception of history as a discipline and the analyses of historical data had already acquired a special name, historiometry.**

- Quantitative history is the term for an **array of skills and techniques used to apply the methods of statistical data analysis to the study of history.**
- Sometimes also called **cliometrics by economic historians, the term was popularized in the 1950s and 1960s as social, political and economic historians called for the development of a 'social history.**
- They were attracted by certain methods or strategies of social sciences, and started applying them in the treatment of historical problems.
- These historians also called for social scientists to historicize their research and consciously examine the temporal nature of the social phenomena they explored.
- For both types of questions, **historians found that they needed to develop new technical skills and data sources. That effort led to an array of activities to promote quantitative history.**
- **Classical historical research methodology relies upon textual records, archival research and the narrative as a form of historical writing.**

- Quantitative history is animated by similar goals but takes as its subject the aggregate historical patterns of multiple events or phenomena. Such a standpoint creates a different set of issues for analysis.
- **A classic historical analysis, for example, may treat a general election as a single event. Quantitative historians consider a particular general election as one element in the universe of all general elections and are interested in patterns which characterize the universe or several units within it.**
- Repeated phenomena from the past that leave written records, which read one at a time would be insignificant, are particularly useful if they can be aggregated, organized, converted to an electronic database and analyzed for statistical patterns. Thus **records such as census schedules, vote tallies, vital (e.g., birth, death and marriage) records; or the ledgers of business sales, ship crossings, or slave sales; or crime reports permit the historian to retrieve the pattern of social, political, and economic activity in the past and reveal the aggregate context and structures of history.**
- The standpoint of quantitative history also **required a new set of skills and techniques for historians. Most importantly, they had to incorporate the concept of the data set and data matrix into their practice.** In short, to make effective use of quantitative evidence and statistical techniques for historical analysis, practitioners had to integrate the rapidly developing skills of the social sciences, including sampling, statistical data analysis and data archiving into their historical work. That task led to the development of new training programs in quantitative methods for historians, to the creation of new academic journals and textbooks, and to the creation of data archives to support the research.

EARLY EFFORTS

- Historians had made use of quantitative evidence prior to the 1950s, particularly in the fields of economic and social history. The Annales School in France pointed the way in the pre-World War II period.
- The rapid growth and expansion of the United States had long required American historians to consider quantitative issues in their study of the growth of the American economy, population and mass democracy.
- Thus, for example, Frederick Jackson Turner's classic 1893 essay on '*The Significance of the Frontier in American History*' was largely based on a reading and interpretation of the results of the 1890 population census.
- But true 'data analysis' in the current sense had to await the growth of the social and statistical sciences in the first half of the twentieth century, and the diffusion to universities in the 1950s of the capacity for machine tabulation of numerical records, and then of main frame computing in the 1960s.
- One can see the emerging field exemplified in seminal studies in the late 1950s and early 1960s. In 1959, for example, Merle Curti and his colleagues at the University of Wisconsin published *The Making of an American Community: A Case Study of Democracy in a Frontier County*. This work explored Turner's thesis with an in depth look at the mid-nineteenth century history of Wisconsin, including its records of newspapers, diaries, private papers and county histories.

- In 1984, Noboru Karashima has attempted a quantitative analysis of Vijayanagara inscriptions as part of the joint research project on “*Socio –economic development in South India from the 13th century through the 18th century*”. This study was supported by the Institute for the Study of Languages and Cultures of Asia and Africa, Tokyo.
- It was conducted both in India and Japan under the aegis of the Mitsubishi Foundation and the Indian Council of Historical Research. The Indian part of the work was carried out by Y. Subbarayalu, and Dr. P. Shanmugham.
- The Vijayanagar Inscriptions in South India brought out by Noboru Karashima in 2002 is a remarkable example for computer assisted research in Indian history. Karashima used statistical tools to examine 568 Tamil Inscriptions, ranging from 15th to 17th century, dealing with various grants, revenue transactions and irrigation works.

DATA ANALYSIS

- Data analysis is the **process of evaluating data using analytical and logical reasoning to examine each component of the data provided**. This form of analysis is just one of the many steps that must be completed when conducting a research experiment.
- **Data from various sources is gathered, reviewed and then analyzed to form some sort of finding or conclusion**. There are a **variety of specific data analysis method**, some of which include **data mining, text analytics, business intelligence, and data visualizations**.
- **Quantitative historians have borrowed heavily from sociology, political science, demography and economics, and made use of the classic linear regression model and its variants for more complex analysis**.
- **Statistical packages, such as SPSS, SAS, STATA and the like support the analysis of quantitative historical work, as they do for the social sciences. SPSS is the most popular software package used for data analysis**.
- **SPSS is the acronym of Statistical Package for the Social Science. It can perform highly complex data manipulation and analysis with simple instructions. It is designed for both interactive and non-interactive uses**.

ATTEMPTS AT DECIPHERING THE INDUS SCRIPT

- The Indus script is an **undeciphered script** of the ancient world. In spite of numerous attempts over several decades, the script has defied universally acceptable decipherment. **Although the attempts for deciphering the Indus script was started even before John Marshal's official declaration of the discovery of Harappan culture, the matter is still shrouded in mystery without any definite success in providing a generally acceptable pattern for its decipherment.**
- **Sir Alexander Cunningham** who reported the first known Indus seal from **Harappa in 1875** had assumed that this unique find was a foreign import. A few years later he supposed that the seal might bear signs of the **Brahmi script** from its unknown early phase.
- After Cunningham, many scholars like **G. R. Hunter, S. R. Rao** have attempted the decipherment and concluded that the **Harappan Script** is the proto-type of the **Brahmi script**.
- Immediately after the discovery of the Indus Civilization became known in **1924**, the **British linguists A. H. Sayce, C. J. Gadd and Sidney Smith** pointed to its resemblance to the **Elamite and Mesopotamian civilizations** and compared the Indus signs with the pictograms of the **Proto-Elamite and archaic Sumerian scripts**.

- In **1974**, the **British scholar James Kinnier Wilson** tried to revive the hypothesis that the Indus language is related to **Sumerian** in his book '**IndoSumerian**'.
- **Sir John Marshall** thought that the language of the Indus script most likely belonged to the **Dravidian family, which is still represented in the Indus Valley and Baluchistan by the Brahui language**
- All the scholars worked on the subject came forward with their own hypothesis regarding language affinity and certain schemes for its decipherment. But, none of them were able to provide a digestible key for its decipherment.
- However, the **most serious attempts towards the decipherment of Indus script were started outside India in 1964.**
- The **two teams of computer-assisted scholars started working on the Indus script independently of each other, one in Russia, and other one in Finland.**
- What makes these two attempts really remarkable is the fact **that both these methods were carried out in a quantitative or statistical way by using computer technology.**

- **Both teams came to the conclusion that the language was Dravidian.**
- **The Russian team was led by Yuriy Knorozov, who initiated the decipherment of the Mayan script, and included a Dravidian specialist, Nikita Gurov.**
- **The Russians initially proposed only few interpretations, but in their final report from 1979, meanings are assigned to all the Indus signs. Their use of the computer seems to be limited to a comparison of samples of the Indus and Egyptian scripts.**
- **The Russians never published a text corpus or any computer analysis of Indus sign sequences.**
- **The Finnish team is consisting of Asko Parpola, his brother Simo Parpola and Seppo Koskeniemi, the computer specialist. They were inspired by the decipherment of the Mycenaean script without the help of bilinguals in the 1950s.**
- **They started by preparing a machine readable text corpus, and published an automated method to classify characters of unknown ancient scripts in 1970 and the first computer concordance of the Indus texts in 1973.**

- There is no doubt that the **most important publication in this field in recent years is the magnificent Corpus of Indus Seals and Inscriptions (Vol. I: 1987. Vol. II: 1991) by AskoParpola and others.** These superbly printed volumes illustrate the Indus seals and other inscribed objects in the collections in India and Pakistan.
- A noteworthy feature is that **each seal is reproduced in the original as well as from the impression.** The non-availability of the original publications and the inherent limitations of the hand-drawn or computer-made concordances need no longer stand in the way of would-be decipherers from looking at the inscriptions as they are.
- The **world of Indus scholarship is deeply indebted to AskoParpola and his coeditors for this landmark publication.**
- Indus script was rendered by **Tamil Scholar Iravatham Mahadevan.** Mahadevan, who has done remarkable work in the field of **Old Tamil epigraphy, started working on the Indus material in Indian museums in 1971.**
- In **1977, Mahadevan brought out his very useful computer-corpus and concordance with the assistance of KimmoKoskenniemi.** Then Mahadevan went on to **publish several papers proposing Dravidian readings for Indus signs.** Then, he initiated the project of publishing a **comprehensive photographic Corpus of Indus Seals and Inscriptions in international collaboration under the auspices of the UNESCO.**

DIGITIZING ARCHIVES

- The word **'archives'** is derived from **Greek word 'archion'** which means **a place in which public records are kept**. The same word is also used to denote **'a historical record or document so preserved'**.
- When we go back to trace the antiquity of archives, we can trace back **the history of archival institutions to the great civilizations**. According to the historians, it was the **Sumerian people who developed a system of maintaining the records**. In the modern world, the system of archival keeping was originated in **post-revolutionary France**.
- In India, the system was initiated by the British, though its roots may be traced back to the times of **Harshavardhana and imperial Cholas**. The rich corpus of records or documents kept in an archival repository is of extremely significant because of its **historical, administrative and cultural value**.
- To a professional historian, it **constitutes the most vital primary source material for reconstructing the past**.
- In ancient periods all the official documents are written in materials such as **palm leafs, papyrus and parchments**.

- **Later, paper became the commonly accepted medium for recording.**
- **All these organic materials used for writing would always have a natural tendency to perish or decay. It is because of this decaying tendency that archival repositories give too much importance to the process of preservation of records.**
- **It is only through employing proper scientific methods of preservation, the longevity of these documents could be increased.**
- **So, scientific method of preservation enjoys a prominent place in archival system.**
- **One of the most widely accepted procedure for preservation is the reprographic technique which is the art and science of taking copies out of the original, either by digital or mechanical means**
- **In the beginning, converting the documents into microfilms is the commonly accepted means of preservation. With, the ongoing digital revolution, digitizing became extremely popular in archival circles as the more effective and affordable way of preserving archival documents as it offers the added advantage of expanding access of such digitized materials.**

- **Hundreds of libraries, museums and archives have recently launched projects designed to digitize their collections and place them on the web.**
- **The potential of digital projects to present information in new and important ways seems limitless.**
- **Digitization is the process of transferring records or information into electronic form.**
- **Digitization converts materials from formats that can be read by people (analog) to a format that can be read only by machines (digital).**
- **Tools and techniques of I.T enable the conversion of records stored in paper or other conventional media to electronic or machine-readable form.**
- **Flatbed scanning, digital cameras, planetary cameras, and a number of other devices can be used to digitize archival materials.**

- Digitization **would lead to storing and viewing the information electronically, saving space and increasing accessibility.**
- **New scanning and imaging technologies makes the reproduction of exact images of traditional records and archives a comparatively easy affair.**
- **There are many types of scanners and equipment for viewing and reproducing scanned images.**
- Digitization is an increasingly popular activity in archival institutions in many countries.
- **National Archives of India, United Kingdom and USA have achieved greater success in their digitization projects.**

ADVANTAGES OF DIGITIZATION

- The main advantages of digitizing are **enhanced access and improved preservation**. By digitizing their collections, archives can **make information accessible from anywhere at any time that was previously only available to a select group of researchers**. Digital projects **allow users to search collections rapidly and comprehensively from anywhere at any time**.
- **Image quality can be quite good**, and is often enhanced, with continuously improving capabilities.
- There is an added advantage with the **possibility of full-text searching, cross-collection indexing and newly designed user interfaces that allow for new uses of the material and content**.
- **Flexibility of the digital material is another advantage**. Since the data is not “fixed”, as with paper or printed text, it is **easy to reformat, edit and print**.
- Another advantage of creating digital archives is that it **helps the preservation of documents**. This is done in **two ways**. Firstly, the **digital media is comparatively less vulnerable to decay or it is durable than those recorded in paper**. Secondly, the **use of the digital substitute reduces handling of original material which may be old or fragile, hopefully extending its longevity**.

DISADVANTAGES OF DIGITIZATION

- A major disadvantage of digitizing process is its **extremely higher financial costs**. Required staff expertise and additional resources are often the greatest costs in digitization projects.
- The digitization projects not only needs large budget allocations but also a considerably **longer time span**. Further, digital conversion projects would always require an added workload. These requirements pull staff away from their regular workloads. Costs for digitization continue even after a project's conclusion, as all digital files require maintenance to ensure that they will readable in the future.

Digital conversion is not yet a form of preservation that is proved absolutely successful. Certain digital storage devices may be affected with fungi and online archives may become targets of cyber attacks. Moreover, in the rapidly changing technological environment, there may be future incompatibility of many of these digital storage devices. Hence, it is generally said that the only accepted long-term preservation media are durable acid-free paper or preservation in the form of microfilm. Another disadvantage of creating digital archives is that users are completely reliant on computers and stable Internet connections to view and retrieve the digital information. Depending on users' hardware and software capabilities access may be frustrating because of the large variety of computer models, platforms, software, and hardware around the world.

VIRTUAL TOUR TO HISTORICAL SITES

- The term **virtual** is used to denote something that is not real
- Virtual reality is a **computer generated artificial environment**.
- It is presented to the user in such a way that it **appears and feels like a real environment**. To "enter" a virtual reality, a user dons **special gloves, earphones, and goggles, all of which receive their input from the computer system**.
- Recently, virtual reality techniques are seen **widely used in educational sector**. There are **two ways of using virtual reality in the classroom**.
- The first one is involving a traditional desktop setup in which the student explores a virtual environment using the computer, keyboard and mouse.
- The second set up is fully immersive and requires the student to wear a head mounted display (HMD) and data glove—for interaction—within a virtual environment. This environment may take the form of a series of large screens or a complete CAVE virtual reality system.
- Through the **Virtual Reality Modeling Language (VRML)**, teachers and students can have a **direct access to 3D learning environments**. VRML gives teachers the opportunity to enhance their students' knowledge, while simulated spaces can help students visualize information in new and realistic ways, give abstract concepts a realistic flavour and encourage cross-cultural, global communities.
- The most popular way of applying virtual learning environment in teaching and learning history is by conducting virtual tours to sites of historical significance such as ancient caves or historical monuments

- A virtual tour is a simulation of an existing location, usually composed of a sequence of videos or still images.
- It may also use other multimedia elements such as sound effects, music, narration, and text.
- The phrase **"virtual tour"** is often used to describe a variety of videos and photographic-based media.
- In virtual tour, still and moving pictures are presented to offer a panoramic view.
- The term **panorama** indicates an unbroken or sequential view designed to unfurl different phases of a single story or aspect. A panorama can be either a series of photographs or panning video footage.
- However, the phrases "panoramic tour" and "virtual tour" have mostly been associated with virtual tours created using still cameras.
- Such virtual tours are made up of a number of shots taken from a single advantage point. The origin of the term **'virtual tour'** dates to **1994**.

- The first example of a virtual tour was a museum visitor interpretive tour, consisting of 'walk-through' of a 3D reconstruction of Dudley Castle in England as it was in 1550.
- This consisted of a computer controlled laser disc based system designed by British-based engineer Colin Johnson.
- Virtual tours are usually presented in 3D mode allowing the user to move easily between different rooms or places and obtain an overall picture of the location.
- Hotspots guide the visitor through the doors into other rooms, down different streets or around the corners.
- Furthermore, virtual reality panoramas will let you navigate in a 360 degree circle, viewing everything that is visible from one spot.
- Interactive video virtual tour offers a virtual representation of some location, which allows audience to be fully immersed into presented environment.
- Virtual Tours can be staged both online and offline.

VIRTUAL TOUR TO SPANISH CAVES

- Virtual Reality tours are widely seen **adapted in different nations of Europe like Spain and France.**
- In both the countries, the **technique is largely used to organize virtual tours to ancient caves that houses rich and vivid collections of palaeolithic cave paintings.**
- Nearly **340 caves have now been discovered in France and Spain that contain art from prehistoric times.**
- There **depicted in the Spanish cave of Cueva de Las Monedas; attributed to the last Ice Age provides some clue as regards the antiquity of these caves.**
- Many of these caves **attract thousands of visitors every year because of its historical significance as well as artistic elegance.**
- The **cave was discovered accidentally in 1940**, while, four boys were playing in a nearby meadow. When their dog fell into a hole in the ground, the boys climbed down the hole to rescue and what they found inside was a rich array of prehistoric cave paintings! Over the years, many people visited the cave and the carbon dioxide from their breath began to destroy the paintings.
- As a result, the **caves were closed to visitors in 1963.**

- But, the closing down could not be accepted as an ideal solution for the problem, as in effect, it is the shutting down of the gates of rich treasures of human knowledge.
- It is totally unwise to shut down the gates of such historical monuments when viewed from the perspective of those who are interested in it either because of historical or aesthetic reasons.
- In this situation, **virtual reality tours are generally began to be viewed as an ideal substitute for accessing such places of historical significance without compromising the need for preservation and conservation.**
- So, most of these **prehistoric caves are now accessible on virtual reality mode. Virtual tours provide an ideal opportunity to have a clear inside vision of such caves without having any form of physical contact so as to avoid any sort of worries regarding the possibilities of damaging the site.**
- Some of the **virtual tours are onsite and some others are offsite.**
- There is also a **third category of online virtual tours which is accessible through a website specifically designed for the purpose.**
- The **second and third categories (off-site and online) have an added advantage of providing easy access to prehistoric sites situated at remote locations, without bothering the constraints of time, space and money.**
- **Spain that houses a large number of prehistoric caves is greatly successful in transferring virtual tours as an ideal alternative to physical tours.**
- The **most famous Spanish caves are:** •Ardales cave in southern Spain famous for Paleolithic paintings
•Cuevas DelDrach, onMajorca, containing one of the largest subterranean lakes in the world. •Cave of Altamira, inCantabria,northern Spainfamous for its Upper Paleolithic paintings

VIRTUAL TOUR TO ARDALES CAVE IN SPAIN


- One of the famous sites of virtual tour in Spain is in Ardales. **Ardales cave in southern Spain is well known for a series of Paleolithic paintings and engravings it houses.** It was always been a major attraction of tourists causing serious reservations as regards to its safety and conservation.
- **To conserve and promote this rich treasure of antique knowledge, the local government there in developed a Virtual Tour operating from nearby Interpretation Centre outside the cave.**
- **The virtual visit developed by Virtual-ware displays the three-dimensional environment of the cave which is shown on a projection system in the Interpretation Centre.**
- The guides who are in charge of the projections can stop the visit at any of the virtual information points found throughout the cave to find out more about the engravings and paintings dating from the Upper Paleolithic age. **To carry out this project, it was necessary to perform a laser scan of the entire cave. The resulting data was used to model the more complex geometrical elements of the cave in a 3D environment.**
- Along with the **laser scanning, more than 300 digital high resolution photographs were used to assist in developing the virtual surface, giving the resulting model a highly realistic result.** To add **another element of interactivity to the installation, visitors can also navigate through the virtual cave themselves on large screens using videogame controllers.**
- **The 3D Virtual Tour of the Ardales cave became a clear example of how technology could be used for the conservation and diffusion of the archaeological heritage of the region.** Visitors of all ages can enjoy a safe virtual journey through the cave and learn a great deal about this unique geological and archaeological treasure through the engaging installation.

GOOGLE EARTH AND GOOGLE MAPS

- powered by **Google**.
- While **Google Maps** is available through the window of your browser, **Google Earth** is a **downloadable application** which can be installed on your computer in order to view the **satellite imagery** straight from your desktop.
- **Google Earth** can provide better photos bundled with improved functionality. While both **Google Earth** and **Google Maps** use satellite imagery to share geographical information, such as the location of a building or driving directions, **Google Earth** provides a more powerful, interactive user experience and offers more tools for learning about a location.
- The **Google Earth** experience is one of fast, fluid flight -- zooming and rotating and tilting imagery to view the geographic data you're interested in. You can wind along hairpin turns, view buildings in 3D, and fly to your favorite shopping destinations.
- **Google Earth** also allows you to easily measure distances and areas, draw lines and shapes, and even import your own data. However, both applications received quite revolutionary functions that lured a considerable number of consumers.
- While **Google Maps** received **Street View**, the innovative feature which shows street-level panoramas **Google Earth** was updated with **Flight Simulator** and **Sky**, two abilities which provide a different perspective over the satellite imagery included in the downloadable tool.

JSTORE

- JSTOR is the short form for **Journal Storage**. It is a digital library founded by **William G. Bowen in 1995**.
- Originally containing **digitized back issues of academic journals**, it now also includes **books and primary sources, and current issues of journals**. It provides full text searches of **almost 2,000 journals**.
- More than **8,000 institutions in more than 160 countries have access to JSTOR**.
- Most of the journals are **available on subscription basis**. But, some older public domain content is freely available to anyone.
- JSTOR is a **service of ITHAKA (ithaka.org)**, a not-for-profit organization that helps the **academic community use digital technologies to preserve the scholarly record and to advance research and teaching in sustainable ways**.
- By digitizing many journal titles, JSTOR allowed libraries to outsource the storage of journals with the confidence that they would remain available long-term. Journals, books, and pamphlets on JSTOR are all full-text.
- All the materials on JSTOR are **scholarly and academic**. Almost all **journals are peer-reviewed**. However, some journal issues pre-date today's standard peer-review process, and some are literary/ primary materials – these would not have gone through a peer review process.

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- Online access and full-text search ability improved access dramatically. In addition to the main site, the JSTOR labs group operates an open service that allows access to the contents of the archives for the purposes of data analysis at its Data for Research service.
 - This site offers a search facility with graphical indication of the article coverage and loose integration into the main JSTOR site.
 - JSTOR Plant Science which is available in addition to the main site provides access to content such as plant type specimens, taxonomic structures, scientific literature, and related materials and aimed at those researching, teaching, or studying botany, biology, ecology, environmental, and conservation studies.
 - JSTOR launched its Books at JSTOR program in November 2012, adding 15,000 current and backlist books to its site. The books are linked with reviews and from citations in journal articles.

ARCHAEOLOGICAL SURVEY OF INDIA (ASI)

- Archaeological Survey of India functioning under the **Ministry of Culture, Government of India** is the premier **organization for the archaeological researches and protection of the cultural heritage of the nation.**
- **Maintenance of ancient monuments and archaeological sites and remains of national importance is the prime concern of the ASI.**
- Besides, it regulates all archaeological activities in the country as per the provisions of the **Ancient Monuments and Archaeological Sites and Remains Act, 1958.**
- It also **regulates Antiquities and Art Treasure Act, 1972.**
- The Archaeological Survey of India (ASI) is **headed by the Director General.**
- The **major activities** of the Archaeological Survey of India are
 - **a) Survey of archaeological remains and excavations;**
 - **b) Maintenance and conservation of centrally protected monuments, sites and remains and improvements of their surroundings through horticultural operations;**
 - **c) Chemical preservation of monuments and antiquarian remains;**
 - **d) Architectural survey of monuments;**
 - **e) Development of epigraphical research and numismatic studies;**
 - **f) Setting up and re-organization of site museums;**
 - **g) Expedition abroad;**
 - **h) Training in Archaeology;**
 - **i) Publication of technical report and research works.**

- ASI was established in the year **1861** during the viceroyalty of **Lord Canning**, with the **appointment of Alexander Cunningham, a Second Lieutenant of the Bengal Engineers as the first Archaeological Surveyor of India from December 1861**. Later, Cunningham came to be known as the **father of Indian Archaeology**.
- However, archaeological and historical pursuits in India started much before Cunningham with the efforts of **Sir William Jones, who put together a group of antiquarians to form the Asiatic Society on 15th January 1784 in Calcutta**. Other individuals who contributed enormously for the cause of Indian Archaeology, included **James Fergusson, Markham Kittoe, Edward Thomas and Sir John Marshal**.
- The Archaeological Survey was revived as a distinct department of the government and Cunningham was appointed as Director General who assumed his charge in February 1871.
- The department was entrusted with the task of doing - **‘a complete search over the whole country, and a systematic record and description of all architectural and other remains that are either remarkable for their antiquity, or their beauty or their historical interest’**.
- Cunningham was also entrusted **‘to direct his attention to the preparation of a brief summary of the labours of former enquirers and of the results which had already been obtained and to the formulation of a general scheme of systematic enquiry for the guidance of a staff of assistance in present and future researches’**.

- The surveys of Cunningham led to several discoveries such as **monolithic capitals and other remains of Asoka, specimens of architecture of Gupta and post-Gupta period; great stupa of Bharhut; identification of ancient cities namely: Sankisa, Sravasti and Kausambi.** He also brought to prominence the **Gupta temples at Tigawa, Bilsar, Bhitargaon, Kuthra, Deogarh and Gupta inscription at Eran, Udayagiri etc.** However, the most significant achievement of ASI so far is the **discovery of Harappan culture during the early decades of the preceding century.**
- The founding of the **journal Indian Antiquary in 1872 by James Burgess enabled publication of important inscriptions and their decipherment by scholars like Buhler and Fleet, Eggeling and Rice, Bhandarkar and Indraji.** Cunningham also brought a new volume known as **Corpus Inscriptionum Indicarum** which was aimed at **publishing inscriptions of connected epigraphical material in a compact and handy volume.**
- To ensure the maintenance of ancient monuments, archaeological sites and the remains of national importance the **entire country is divided into 24 Circles under ASI.** The organization has a **large work force of trained archaeologists, conservators, epigraphist, architects and scientists for conducting archaeological research projects through its Circles, Museums, Excavation Branches, Prehistory Branch, Epigraphy Branches, Science Branch, Horticulture Branch, Building Survey Project, Temple Survey Projects and Underwater Archaeology Wing.**

- A remarkable achievement of ASI is its exceptionally designed website that stands as an excellent example for academic website.
- Anyone can access this site by simply googling the web address **www.asi.nic.in**.
- The website provides **a comprehensive account of all the archaeological excavations conducted by ASI with the assistance of maps, pictures and charts.**
- The vast array of useful information available in the site is categorized in different links such as **monuments, excavations, museums, publications etc each leading to different sub links.**
- The website also provides for the **online booking of gate passes to visit historical monuments like Tajmahal.**
- Another, major feature is the **online digital library providing anytime and anywhere access to a large number of scanned in versions of rich collections of primary and secondary sources of history ranging from manuscripts to inscriptions.**

KERALA COUNCIL FOR HISTORICAL RESEARCH [KCHR]

- Kerala Council for Historical Research [KCHR] is an **autonomous institution committed to scientific research in history and social sciences. Funded by the Ministry of Higher Education, Government of Kerala, KCHR is a recognized research centre of the University of Kerala.**
- **KCHR** is located at **Thiruvananthapuram**, in the multi-purpose cultural complex Vythipilly SamskrithiBhavan, at Nalanda. It is housed in the blocks dedicated to the inspiring memory of the two pioneering researchers of Kerala history, K.P. Padmanabha Menon and ElamkulamKunjanPillai.
- KCHR **offers doctoral, post-doctoral and internship programmes and short term courses in social theory, research methods, epigraphy, palaeography and numismatics.**
- **Research, publication, documentation, training and co-ordination** are the other major activities carried out by Kerala Council for Historical Research.
- KCHR has a **well-equipped library and research resource centre with a fairly large collection of books on Kerala history and society.**
- KCHR publications include **twenty-seven volumes on Kerala society** that is widely acclaimed as works of vital research significance.
- The multi-disciplinary and multi-seasonal **archaeological research at Pattanam near north Paravur in Ernakulam district undertaken from 2007** by the Kerala Council for Historical Research is a pioneering initiative in the history of Kerala Archaeology.

- Another major project of KCHR is the **'Digitizing Kerala's Past'**. It is an **inter-disciplinary initiative to survey, store and study the historical, cultural and intellectual legacies of the people of Kerala.**
- The **'Digitizing Kerala's past'** project envisages the **collection and creation of a digital repository of various sources related to archaeology, anthropology and history, lying scattered across the state and outside it as texts, images, monuments, artifacts, oral traditions, myths, experiences and memories.**
- KCHR has a **three tier organizational set up with a Patrons Council, Advisory Council and Executive Council.**
- The **Chairman of KCHR is Prof. K.N.Panikkar**, a renowned historian of modern Kerala.
- The **Director is Prof. P.J. Cherian**, former State Editor, Gazetteers Department.
- The **Patrons Council** headed by Governor of Kerala [Chief Patron] is consisting of **Chief Minister, Minister of Cultural Affairs, Speaker, Kerala Legislative Assembly, leader of Opposition, Kerala Legislative Assembly and Chief Secretary, Government of Kerala.**
- The **Executive Council of KCHR** has **nine distinguished social scientists along with the Principal Secretaries of the Departments of Culture and Finance, Government of Kerala and the Directors of the State Archaeology and Archives Departments.** It also includes the chairman and the director of the council.

AIMS AND OBJECTIVES OF KCHR

- ☐ To form a forum of professional historians to promote research and exchange of ideas on history;
- ☐ To create a comprehensive worldwide database of research on Kerala History;
- ☐ To publish source materials and studies to further historical research;
- ☐ To set up a library and resource centre with the latest facilities;
- ☐ To identify important research areas and initiate and encourage research in those areas;
- ☐ To organize and sponsor seminars, workshops and conferences for the promotion and dissemination of historical knowledge;
- ☐ To institute and administer fellowships, scholarships and sponsorships on historical research;
- ☐ To provide professional advice and direction for the proper conservation of archival materials and archaeological artifacts as a nodal agency of the State Archives Department and the Archaeology Department;
- ☐ To facilitate exchange programmes for teachers and scholars of history to provide exposure to advanced scholarly practices;

- ☐ To attempt to historicise areas like science, technology, industry, music, media etc. conventionally held to be beyond the range of historical analysis;
 - ☐ To assist and aid the Education Department in restructuring history curricula and syllabi, so as to impart the critical component in teaching and learning practices;
 - ☐ To restore local history to its rightful position and help set up local museums and archives;
 - ☐ To develop popular and non-reductive modes of historical writing;
 - ☐ To undertake the publication of a research journal on Kerala History;
 - ☐ To optimally utilize the electronic media and information technology in the dissemination of historical knowledge worldwide;
 - ☐ To undertake projects entrusted by the Government. www.Keralahistory.ac.in is the official website of KCHR.
- It could be treated as a **good example for academic website.**
 - The website provides an **overview of major projects and initiative of KCHR.**
 - It also **accommodates a rich collection of digital resources for historical studies in different forms such as archives and research articles. The website contains links to certain highly useful digital resources of archival sources like local history archive and family history archive.**
 - The website also **hosts user friendly online platform for publishing articles and uploading manuscripts.** There is also an **online discussion group under the title, KCHR Friends Forum. The KCHR website is updated regularly so as to incorporate the latest findings at Pattanam excavation, one of its major project.**