Research Paper Library Science

Information Technologies in Education Sector

* Ms. B OBI REDDY

* RESEARCH SCHOLAR, DEPT OF LIBRARY AND INFORMATION SCIENCES, S V UNIVERSITY, TIRUPATI 517502

INTRODUCTION

Information technology (IT) is the application of computers and telecommunications equipment to store, retrieve, transmit and manipulate data,[1]often in the context of a business or other enterprise. The term is commonly used as a synonym for computers and computer networks, but it also encompasses other information distribution technologies such as television and telephones. Several industries are associated with information technology, such as computer hardware, software, electronics, semiconductors, internet, teleco equipment, e-commerce and computer services.

In a business context, the Information Technology Association of America has defined information technology as «the study, design, development, application, implementation, support or management of computer-based information systems». The responsibilities of those working in the field include network administration, software development and installation, and the planning and management of an organisation›s technology life cycle, by which hardware and software is maintained, upgraded, and replaced.

Humans have been storing, retrieving, manipulating and communicating information since the Sumerians in Mesopotamia developed writing in about 3000 BC, but the term «information technology» in its modern sense first appeared in a 1958 article published in the Harvard Business Review; authors Harold J. Leavitt and Thomas L. Whisler commented that "the new technology does not yet have a single established name. We shall call it information technology (IT)."Based on the storage and processing technologies employed, it is possible to distinguish four distinct phases of IT development: pre-mechanical (3000 BC – 1450 AD), mechanical (1450–1840), electromechanical (1840–1940) and electronic (1940–present).This article focuses on the most recent period (electronic), which began in about 1940.

Devices have been used to aid computation for thousands of years, probably initially in the form of a tally stick. The Antikythera mechanism, dating from about the beginning of the first century BC, is generally considered to be the earliest known mechanical analog computer; it is also the earliest known geared mechanism Comparable geared devices did not emerge in Europe until the 16th century, and it was not until 1645 that the first mechanical calculator capable of performing the four basic arithmetical operations was developed.

Electronic computers, using either relays or valves, began to appear in the early 1940s. The electromechanical Zuse Z3, completed in 1941, was the world's first programmable computer, and by modern standards one of the first machines that could be considered a complete computing machine. Colossus, developed during the Second World War to decrypt German messages was the first electronic digital computer. Although it was programmable, it was not general-purpose, being designed to perform only a single task. It also lacked the ability to store its program in memory. Instead, programming was carried out using plugs and switches to alter the internal wiring. The first recognisably modern electronic digital stored-program computer was the Manchester Small-Scale Experimental Machine (SSEM), which ran its first program on 21 June 1948.

Data storage

Early electronic computers such as Colossus made use of punched tape, a long strip of paper on which data was represented by a series of holes, a technology now obsolete.[14] Electronic data storage, which is used in modern computers, dates from the Second World War, when a form of delay line memory was developed to remove the clutter from radar signals, the first practical application of which was the mercury delay line. The first random-access digital storage device was the Williams tube, based on a standard cathode ray tube,[16] but the information stored in it and delay line memory was volatile in that it had to be continuously refreshed, and thus was lost once power was removed. The earliest form of non-volatile computer storage was the magnetic drum, invented in 1932and used in the Ferranti Mark 1, the world's first commercially available general-purpose electronic computer.

Most digital data today is still stored magnetically on devices such as hard disk drives, or optically on media such as CD-ROMs. It has been estimated that the worldwide capacity to store information on electronic devices grew from less than 3 exabytes in 1986 to 295 exabytes in 2007, doubling roughly every 3 years.

Data bases

Database management systems emerged in the 1960s to address the problem of storing and retrieving large amounts of data accurately and quickly. One of the earliest such systems was IBM'sInformation Management System (IMS), which is still widely deployed more than 40 years later. IMS stores data hierarchically, but in the 1970s Ted Codd proposed an alternative relational storage model based on set theory and predicate logic and the familiar concepts of tables, rows and columns. The first commercially available relational database management system(RDBMS) was available from Oracle in 1980.

All database management systems consist of a number of components that together allow the data they store to be accessed simultaneously by many users while maintaining its integrity. A characteristic of all databases is that the structure of the data they contain is defined and stored separately from the data itself, in a database schema.

The extensible markup language (XML) has become a popular format for data representation in recent years. Although XML data can be stored in normal file systems, it is commonly held inrelational databases to take advantage of their «robust implementation verified by years of both theoretical and practical effort".As an evolution of the Standard Generalized

Markup Language(SGML), XML's text-based structure offers the advantage of being both machine and human-readable.

DATA RETRIEVAL

The relational database model introduced a programming-language independent Structured Query Language (SQL), based on relational algebra.

The terms "data" and "information" are not synonymous. Anything stored is data, but it only becomes information when it is organised and presented meaningfully. Most of the world's digital data is unstructured, and stored in a variety of different physical formats[a] even within a single organization. Data warehouses began to be developed in the 1980s to integrate these disparate stores. They typically contain data extracted from various sources, including external sources such as the Internet, organised in such a way as to facilitate decision support systems (DSS).

DATA MANIPULATION

Data transmission has three aspects: transmission, propagation, and reception.

XML has been increasingly employed as a means of data interchange since the early 2000s, particularly for machine-oriented interactions such as those involved in web-oriented protocols such as SOAP,describing "data-in-transit rather than ... data-at-rest".[31] One of the challenges of such usage is converting data from relational databases into XML Document Object Model (DOM) structures

ACADEMIC PERSPECTIVE

In an academic context, the Association for Computing Machinery defines IT as «undergraduate degree programs that prepare students to meet the computer technology needs of business, government, healthcare, schools, and other kinds of organizations .... IT specialists assume responsibility for selecting hardware and software products appropriate for an organization, integrating those products with organizational needs and infrastructure, and installing, customizing, and maintaining those applications for the organization's computer users.

"The business value of information technology lies in the automation of business processes, provision of information for decision making, connecting businesses with their customers, and the provision of productivity tools to increase efficiency.

Worldwide IT spending forecast **(billions of U.S. dollars)**		
Category	2012 spending	2013 spending
Devices	627	666
Data center systems	141	147
Enterprise software	278	296
IT services	881	927
Telecom services	1,661	1,701
Total	3,588	3,737

Sources Wikipedia

The Indian Government acquired the EVS EM computers from the Soviet Union, which were used in large companies and research laboratories. In 1968 Tata Consultancy Services—established in SEEPZ, Mumbai by the Tata Group—were the country's largest software producers during the 1960s. As an outcome of the various policies of Jawaharlal Nehru (office: 15 August 1947 – 27 May 1964) the economically beleaguered country was able to build a large scientific workforce, third in numbers only to that of the United States of America and the Soviet Union. On 18 August 1951 the minister of education Maulana Abul Kalam Azad, inaugurated the Indian Institute of Technology at Kharagpur in West Bengal. Possibly modeled after the Massachusetts Institute of Technology these institutions were conceived by a 22 member committee of scholars and entrepreneurs under the chairmanship of N. R. Sarkar.

Relaxed immigration laws in the United States of America (1965) attracted a number of skilled Indian professionals aiming for research. By 1960 as many as 10,000 Indians were estimated to have settled in the US. By the 1980s a number of engineers from India were seeking employment in other countries. In response, the Indian companies realigned wages to retain their experienced staff. In the Encyclopedia of India, Kamdar (2006) reports on the role of Indian immigrants (1980 - early 1990s) in promoting technology-driven growth:

The ground work and focal point for the development of the information technology industry in India was led by the Electronics Commission in the early 1970s. The driving force was India's most esteemed scientific and technology policy leader M. G. K. Menon. With the support of the United Nations Development Programme (UNDP) under project IND/73/001, the Electronics Commission formulated a strategy and master plan for regional computing centers, each to have a specific purpose as well as to serve as a hub for manpower development and to spur the propagation of informatics in local economies. The first center, the National Centre for Software Development and Computing Techniques (from 1973 onward) was at the Tata Institute of Fundamental Research in Mumbai and was focused on software development. A key decision of the strategy was to not focus on large-scale hardware production but rather intellectual capital and knowledge development. The success of this decision can be seen in the global leadership of Indian entrepreneurs and computer scientists in software development. Jack Fensterstock of the United States was the program manager on behalf of the UNDP and the key advisor to the Indian Government for the implementation of the master plan.

The National Informatics Centre was established in March 1975. The inception of The Computer Maintenance Company (CMC) followed in October 1976. During 1977-1980 the country's Information Technology companies Tata Infotech, Patni Computer Systems and Wipro had become visible. The 'microchip revolution' of the 1980s had convinced both Indira Gandhi and her successor Rajiv Gandhi that electronics and telecommunications were vital to India's growth and development. MTNL underwent technological improvements. During 1986-1987, the Indian government embarked upon the creation of three wide-area computer networking schemes: INDONET (intended to serve the IBM mainframes in India), NICNET (the network for India's National Informatics Centre), and the academic research oriented Education and Research Network (ERNET).

On 25 June 2002 India and the European Union agreed to bilateral cooperation in the field of science and technology. A joint EU-India group of scholars was formed on 23 November 2001 to further promote joint research and development. India holds observer status at CERN while a joint India-EU Software Education and Development Center is due at Bangalore.

Big Five IT Services company

Firm	Revenues	Employees	Fiscal Year	India Headquarters	Source
TCS	$10.17 billion	254,076	2012	Mumbai	[11]
Cognizant Technology Solutions	$7.05 billion	185,045	2012	Chennai	[12]
Wipro	$5.73 billion	140,569	2012	Bangalore	[13]
Infosys	$6.69 billion	153,761	2012	Bangalore	[14]
HCL Technologies	$4.3 billion	85,335	2012	Noida	[15]

Major IT Hubs

Rank	City	Description
1	Bangalore	Popularly known as the Silicon Valley of India and leading software exporter from India. Bangalore is considered to be a global technology hub of India.
2	Chennai	Chennai is the second largest exporter of IT and ITES of India, and is the BPO hub of India.[16] Chennai has the largest operations centers of TCS, and Cognizant.
3	Hyderabad	Hyderabad is a major it hub in India which is also known as Cyberabad which consists of many Multinational corporation companies such as Google, Facebook,Microsoft, Amazon and Electronic Arts, etc.
4	Mumbai	The Financial capital of India, but recently many IT companies have established offices.
5	Delhi	The National Capital Region comprising Delhi, Gurgaon and Noida are clusters of software development.
6	Pune	Major Indian and International Firms present in Pune. Pune is also C-DAC Head-Quarter.
7	Kolkata	One of the largest cities in India, Kolkata contributes significantly to IT exports. IBM has second largest headcount after Bangalore, Cognizant has second largest headcount after Chennai and TCS has third largest headcount after Chennai & Mumbai. Other significant players here are Wipro and Capgemini while other biggies have also opened shop here except Infosys.
8	Thiruvanathapuram	The capital of Kerala, now houses all major IT companies including Oracle, TCS, Infosys, and contributes in IT export of India

Criticisms

Despite its rapid growth, the IT industry in India has attracted its fair share of criticism. This is primarily leveled against the industry's excessive political influence - as articulated through its association, NASSCOM - which, it is claimed, far exceeds its economic contribution to the country. This has allowed the industry to secure the support and resources of the Indian state ahead of other sectors of the national economy where the developmental returns would be greater.

Information technology has widened access to education. By the mid-1990s, many universities had begun using computers to provide classes remotely. Since then, rising numbers of adults have used online education to earn college credits, according to the U.S. Department of Education. Computers also allow enrichment and remote learning for students in kindergarten through high school.

Importance of Information Technology in Education sector Need

- Education is a life long process therefore anytime anywhere access to it is the need
- Information explosion is an ever increasing phenomena therefore there is need to get access to this information
- Education should meet the needs of variety of learners and therefore IT is important in meeting this need
- It is a requirement of the society that the individuals should posses technological literacy
- We need to increase access and bring down the cost of education to meet the challenges of illiteracy and poverty-IT is the answer

Importance

- access to variety of learning resources
- immediacy to information
- anytime learning
- anywhere learning
- collaborative learning
- multimedia approach to education
- authentic and up to date information
- access to online libraries
- teaching of different subjects made interesting
- educational data storage
- distance education
- access to the source of information
- Multiple communication channels-e-mail,chat,forum,-blogs,etc.
- access to open courseware
- better accesses to children with disabilities
- reduces time on many routine tasks

REFERENCES

www.wekipedia journals