A Short Note on Computer Application in Higher Education

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Abstract :
In recent years, the dramatic change in the use of computer in higher education has come to the point that its use for a range of learning tasks is now a part and parcel of a student's basic learning toolkit, as much as taking notes or reading texts. Use of Computer in higher education is increasing exponentially and computers are playing an important role in education system. Here we mainly concentrate on college education. But the ideas are quite general. Also the nature and extent of application varies with the subject of study but the underlying principles remain the same. We will not discuss distance education which has the widest scope for computer applications.

Introduction :
The application of computer and information technology in higher education is becoming a major consideration as a focus on improving the quality of education. There have been extensive studies in application of Computers in education systems during last few decades [1-6]. Computers now-a-days are being used almost in every department to do the work at a greater speed and accuracy. Computers have proved to be excellent teachers. They can posses the knowledge given to them by the experts and teach you with all the patience in the world. You may like to repeat a lesson hundred times, go ahead, you may get tired but the computer will keep on teaching you. Computer based instructions and computer aided learning are common tools used for teaching. Computer based encyclopedia such as Britannica provide you enormous amount of information on anything. The rapid developments in technologies and consequent opportunities and changes in education present many challenges for research including issues relating to focus, design and methodologies[7-8].

Use of documents :
Reduction of board work for
a) Saving of time
b) Increasing students' participation
c) Increasing teacher-student interaction

Types of documents:
Documents may be of various types – Text, Spreadsheet, Database,Presentation.

Text documents :
Text documents allow the inclusion of
a) Colour and other highlighting (e.g., font size and type)
b) Pictures: diagrams, schematic drawings and photographs
c) Tables and graphs

Word processors:
Word processors offer help in
a) Checking spelling and grammar
b) Cut-and-paste operations
c) Inserting pictures, equations, etc.

Text styles:
The Royal Army was dealt the *Coup de grâce* in the battle of Sabook. The Second World War brought about a fundamental change in the *Weltanschauung* throughout the Western World. The most important poet of this period was **William Shakespeare. Information**

Technology refers to a whole collection of technical innovations that work together to revolutionize today's communication. This is one of Mathematics' most challenging problems – Fermat's Last Theorem. The untimely atmospheric behaviour is due to the Western Disturbances.

Tables :

City	Population (Cr.)	Water (j) Per capita	Expenditure (Rs.) Per capita
Delhi	0.86	128	84,763
Mumbai	1.24	106	79,440
Chennai	0.76	114	77,578
Kolkata	1.08	119	69,876

Addition of pictures :
Examples of Mughal Architecture :
The Moghuls ruled India for three hundred years and contributed to various aspects of life here. The most evident images of their influence are the monuments built by them. The most well known are the Taj Mahal and Agra Fort in Agra, The Red Fort and the Jumma Masjid in Delhi and Fatehpur Sikri and Sekandarabad halfway between Agra and Delhi.

Product of a vector and a matrix :

Let A = $[a_{ij}]$ be any m x n matrix and x = $(x_1, x_2, ..., x_m) \in R^m$, y = $(y_1, y_2, ..., y_n) \in R^n$
We define the product xA and Ay as follows :

$$xA = (x_1, x_2, ..., x_m)\begin{bmatrix} a_{11} & a_{12} & \dots & a_{1n} \\ a_{21} & a_{22} & \dots & a_{2n} \\ \dots & \dots & \dots & \dots \\ a_{m1} & a_{m2} & \dots & a_{mn} \end{bmatrix}$$

$= (a_{11}x_1+a_{21}x_2+...+a_{m1}x_m,\ a_{12}x_1 + a_{22}x_2 + ... + a_{m2}x_m,\ ...$
$... ...,\ a_{1n}x_1 + a_{2n}x_2 + ... + a_{mn}x_m)$

$$Ay = \begin{bmatrix} a_{11} & a_{12} & \dots & a_{1n} \\ a_{21} & a_{22} & \dots & a_{2n} \\ \dots & \dots & \dots & \dots \\ a_{m1} & a_{m2} & \dots & a_{mn} \end{bmatrix}\begin{bmatrix} y_1 \\ y_2 \\ \\ y_n \end{bmatrix} = \begin{bmatrix} a_{11}y_1 + a_{12}y_2 + \dots + a_{1n}y_n \\ a_{21}y_1 + a_{22}y_2 + \dots + a_{2n}y_n \\ \dots \\ a_{m1}y_1 + a_{m2}y_2 + \dots + a_{mn}y_n \end{bmatrix}$$

Clearly, xAy =

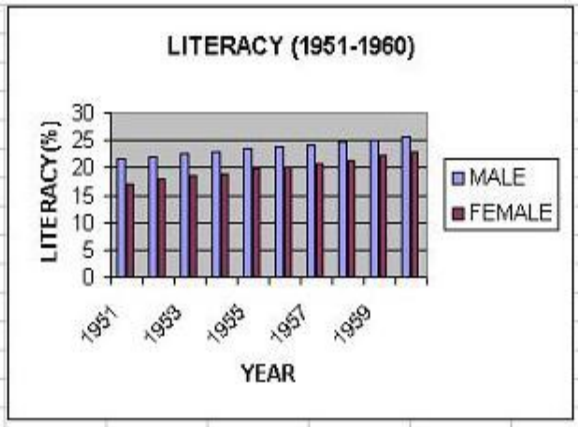
$$\sum_{i=1}^{m}\sum_{j=1}^{n} a_{ij}x_i y_j .$$

Spreadsheet documents:

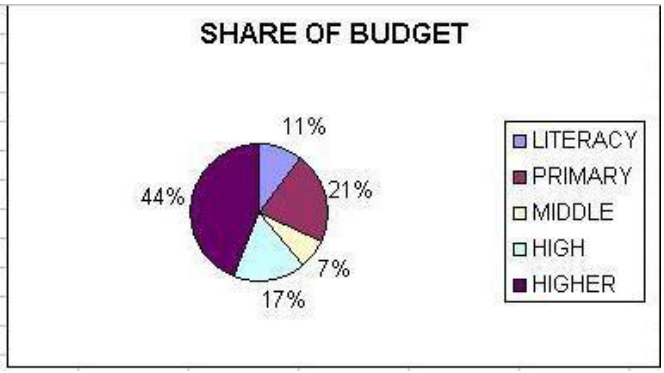
Spreadsheet documents present data in easily readable tabular form. Spreadsheet programs help to do calculations, perform analysis, draw graphs and manipulate data like sorting. **Spreadsheet with chart:**

Literacy rates

	LITERACY RACES(%)	
YEAR	MALE	FEMALE
1951	21.5	17
1952	22.1	17.8
1953	22.6	18.5
1954	22.9	19
1955	23.4	19.7
1956	23.9	20.2
1957	24.2	20.6
1958	24.7	21.4
1959	25	22.3
1960	25.8	22.9



EXPENDITURE ON EDUCATION	
	(RS. CR)
LITERACY	10.5
PRIMARY	21.4
MIDDLE	7.1
HIGH	16.8
HIGHER	44.2



Database documents:

Database documents are a special kind of spreadsheet documents where rows represent records and columns represent fields. Database programs help in the manipulation and analysis of databases.

Database Table:

ROLLNO	NAME	MATH	BENG	ENGL	PHYS	CHEM
MTH101	ANIMA DAS	62	45	36	54	66
MTH102	RAJAT KAR	78	49	50	69	71
MTH103	ANANDA DEY	86	59	62	79	81
MTH104	HAMIDA BANU	64	44	47	56	65
MTH105	SUBIR MITRA	94	70	73	84	85
MTH106	RITA MANDAL	77	60	63	71	74
MTH107	RANJAN LAHA	80	65	59	75	70
MTH108	SOMA SEN	94	70	75	88	85
MTH109	GORA DUTTA	66	51	55	64	68
MTH110	BIPLAB JANA	75	61	64	70	0

Presentations :

Presentations are the most elegant and attractive kind of documents used in the classroom. Unlike the other three types of documents, they are not meant for direct distribution to students. They are, as name suggests, for direct presentation in the classroom, though handouts in various forms may be generated. An LCD projector is necessary if the audience is not too small.

Slide show :

A presentation document consists of slides. Each topic or sub-topic is covered in one or more slides. The slides generally have a heading or title and a body. The body may be plain text, but it may contain tables graphs or pictures. Various design and layouts are possible for the slides to make them more attractive and more suitable for the subject matter.

Computer Simulations:

We will consider two items

1. Sorting : Bubble Sort
2. Puzzle : Tower of Hanoi

Tower of Hanoi Puzzle:

It is a popular puzzle of the late 19th century. It consists of 3 pegs A,B and C mounted on a board and n concentric circular discs of decreasing size. Initially these n discs are placed on one peg say, A in order of diminishing size upwards.

Rules of Puzzle :

In no instant of time a larger disc be placed on a smaller disc. Only one disc can be moved at a time.

Myth of puzzle:

There is an ancient myth about the Tower of Hanoi puzzle. In a monastery at Hanoi the monks were busy transferring 64 gold discs from one peg to another following the rules of the puzzle . They took a second to transfer a single disc from one peg to another. The myth says that the world will be destroyed when the monks finish transferring all the 64 discs We , the rational ones are not to believe in myths. But the fact remains that it will really take a very very……long span of time to complete the transfer.

Calculation of time:

- The monks needed 18,446,744,073,709,551,615 moves to finish their job
- Assuming 1 move needs 1 second , the monks will take more than 50,000 crores of years

Use of the Internet:

The Internet is a worldwide network of computers that can communicate among themselves. The two most important aspects of the Internet for us here are Electronic Mail (e-mail) and the World Wide Web.

Electronic Mail:

There are various e-mail service providers like Yahoo, gmail, Microsoft, Rediff, etc., who let us open an e-mail account for sending and receiving mail. Basic services are free. An e-mail generally has a plain text message but one can attach any document.

Use of e-mail:

Electronic Mail can be used for easy, fast and uninterrupted communication between a teacher and his/her students or among students in the same class. It is not always easy or possible to meet face-to-face, and telephone conversations do not always serve the purpose. In an efficient system the need for physical meeting is minimized. Handout material may be sent and received by mail. Distribution, collection and grading of assignments can all be done through e-mail.

Use of Intranet : An **intranet** is a computer network that uses Internet Protocol technology to share information, operational systems, or computing services within an Institution. The term is used in contrast to *internet*, a network between different departments, and instead refers to a network within an Institution. If there is an on-campus network, preferably with a server, the previously discussed tasks may be done through an intranet.

The World Wide Web:

The World Wide Web (abbreviated as WWW, commonly known as the Web), is a system of interlinked hypertext documents accessed via the Internet. With a web browser, one can view web pages that may contain text, images, videos, and other multimedia, and navigate between them via hyperlinks.

The World Wide Web is a huge reservoir of knowledge. We may find short, precise answers to specific questions or detailed answers with references. There are general purpose resources like the Wikipedia or subject specific resources for different areas. Search engines like Google help us locate the appropriate resources.

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