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Computer *for* NURSES



Ashok Kumar
Sunil Kumar
Chanchal Garg

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CONTENTS

1. Introduction to Computer **1**
- ✤ What is Computer? 1
- ✤ Brief History 1
- ✤ Generations of Computer 3
- ✤ Computer's Components 6
- ✤ Requirement for Working of a Computer System 9
- ✤ Applications of Computer 14
- ✤ Applications of Computer in the Field of Nursing 17

2. Disk and Windows Operating System **22**
- ✤ Main Functions of Operating System 23
- ✤ Classification of Operating Systems 23
- ✤ Disk Operating System 24
- ✤ Windows Operating System 27
- ✤ DOS and Windows Comparison 29

3. Microsoft Office **32**
- ✤ Needs of Microsoft Office 32
- ✤ Components of Microsoft Office 33

4. Multimedia **45**
- ✤ Etymology of the Multimedia 46
- ✤ Multimedia and its Older Formats 46
- ✤ Multimedia and its Relation with Education 46
- ✤ Importance of Multimedia in the Education Technology 47
- ✤ Features of Multimedia 47
- ✤ Important Components of Multimedia 48
- ✤ Types of Multimedia 49
- ✤ Uses of Multimedia 50
- ✤ Computer-aided Teaching and Testing 51

5. Internet **61**
- ✤ Network Devices 62
- ✤ Transmission Media 62
- ✤ Network Topology 65
- ✤ Internet 67
- ✤ Definition 68
- ✤ Web and Internet 68
- ✤ Features of Internet 69
- ✤ History of Internet 69
- ✤ Main Components of Internet 71
- ✤ Use of the Internet 73

6. Statistical Packages: Types and its Features **77**
- ✤ Types of Statistics 77
- ✤ Statistical Packages 78
- ✤ Statistical Package for the Social Sciences 79
- ✤ Statistical Analysis System 81
- ✤ STATA 81
- ✤ R 83
- ✤ RapidMiner 84

7. Hospital Management System **88**
- ✤ Features of Hospital Management System 89
- ✤ Main Modules of Hospital Management System 90
- ✤ Automation of Hospitals with Some Popular Hospital Management Systems 96

Index *105*

Chapter 4

Multimedia

LEARNING POINTS

After reading this chapter reader will be able to:

- Understand about the multimedia, its types, computer-aided learning, teaching, modeling and testing, benefits of technology driven education, and uses of the multimedia
- Know about the key features of multimedia and computer-aided teaching (CAT)
- Know about the important components of multimedia, difference of various types of multimedia and CAT
- Role of the multimedia in various sectors and computer applications in computer-aided teaching and testing

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INTRODUCTION

Multimedia means a mixture of numerous broadcasting formats. These broadcasting formats can container of transcript, audio, illustrations, drawings, pictures, etc. For example, a story map or a timeline that includes transcript, audio, illustrations, drawings, pictures to tell a story. Marshall McLuhan's idea of the globe as a "Global Village" emphasizes the similar point that the globe is progressively linked together through media **(Fig. 1)**.

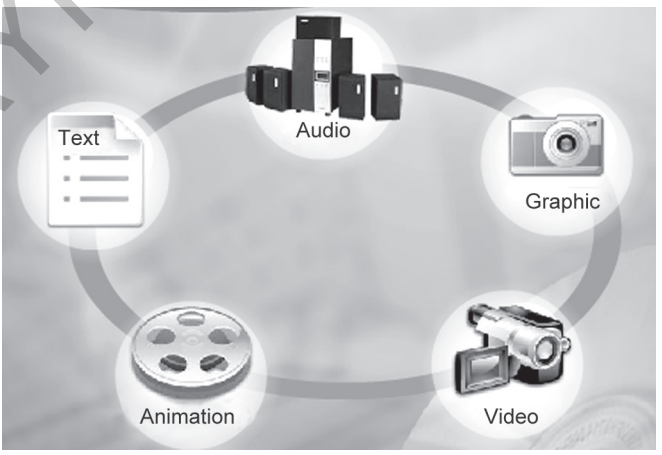

Fig. 1: Multimedia.

According to a report, merely a few corporations and internet-related industries, such as Google, Time Warner, and Yahoo are producing the large amount of the multimedia contents. Regular progress or improvisation in technology is giving birth to new ideas in multimedia.

ETYMOLOGY OF THE MULTIMEDIA

The term multimedia is a combination of two words Multi and Media. Multi word comes from Latin word "maltus" which denotes many or much whereas media word also comes from Latin word "medium" which denotes the meaning of middle ground or intermediate. These words simplify the understanding about multimedia. We mostly heard this word in the concept of computer technology. In simple words, multimedia is a bunch of various presentation forms in a single file or web pages. Text, graphics, images, audio, and visuals are all the examples of multimedia.

MULTIMEDIA AND ITS OLDER FORMATS

Regular interval and advancement in technology across the globe is playing a hard role and forcing the movement toward machinery control. Gutenberg is credited as introducing recording knowledge in the 15th century by introducing printing technology. Guglielmo Marconi also plays an inventor's role by introducing radio transmission. Microfilms, photography, sound tapes, and video tapes were some initial inventions of this multimedia. India is going through a digital revolution. The amount of growth which India has seen in terms of internet penetration is unprecedented. India comes under the categorization of those countries where people mostly use automation and internet technologies.

It got revolutionized with the initiation of the Internet after that it became a common application in information technology (IT). It creates a great impact in the global technology and corporate sector. It also makes easy understanding of concepts. Various sectors, such as the graphic design sector, animation sector, and hardware sector are involved in it.

MULTIMEDIA AND ITS RELATION WITH EDUCATION

Multimedia is not a single term, basically it is combined term that refers to the numerous types of media, such as sounds, videos, animations, text, and pictures. Multimedia stretches the understanding and visibility of the object. It reforms the presentation material in an interactive way.

In learning, interactive program are used to produce computer-based exercise courses (commonly named CBT means computer-based test). It increases the accessibility of the tests. A CBT leases the operator drive over a sequence of performances, typescript about a specific theme, and related artworks in numerous information arrangements.

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IMPORTANCE OF MULTIMEDIA IN THE EDUCATION TECHNOLOGY

Multimedia denotes the volume of computers to deliver a demonstration of all broadcasting and sensory styles of training, broadcasting, such as visuals, typescripts, and simulation. It is the formation, storing, and practice through the use of digital technology.

- Learners using idea plotting packages to brainstorm.
- Learners using a spreadsheet or graphing calculator to record facts and produce charts.
- A minor collection of learners making a digital motion picture to exhibit a process.
- A lecture website that shows learner creation.

Immersive multimedia in training denotes to learning that used digital media tools. In this situation, a learner learns through the real simulation approach. It creates real effects for the learner that makes easy learning. A reaction also seems to be real in simulation technology. These education surroundings may necessitate a student to use three-dimensional (3D) eyeglasses, earphones or dedicated panels to move an avatar **(Fig. 2)**.



Fig. 2: Multimedia in education technology.

FEATURES OF MULTIMEDIA

Features of multimedia have been shown in **Figure 3**.

1. **Improved understanding:** Visuals are always used to memorize things. Multimedia does not only improve the understanding but also produce pictorial sketch of things in our minds. 3D modeling and concept mapping improve the brain capacity. Colored X-rays, ultrasound, magnetic resonance imaging (MRI), etc., are the best and are also few examples of medical science that improve our understanding.
2. **Improve problem-solving techniques:** It also boosts our research and problem-solving techniques through various multimedia techniques,

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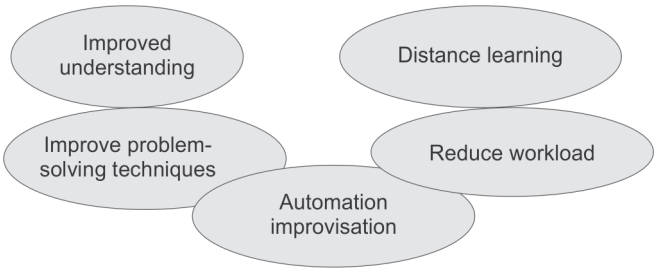

Fig. 3: Features of multimedia.

such as simulators. It also prevents any kind of harmful physical accident. Graphic calculating, computer-aided designs, and electrocardiography are also good examples of it.

3. **Automation improvisation:** Some virtual techniques also come under the category of multimedia, such as e-book readers. Virtual presentations and navigation techniques are also great examples of simplifying life through automation in various sectors.
4. **Reduce workload:** Multimedia presentation reduces the workload to describe lengthy lectures. Online catalog, virtual tour of places, simulating experimentation, etc., help to reduce workload.
5. **Distance learning:** Multimedia components make easy distance learning through webinars and online conferences.

IMPORTANT COMPONENTS OF MULTIMEDIA

There are many components included in the multimedia terms, such as printed language (text), graphics, images, sounds, and visuals.

- **Printed language:** Language is combination of severe symbols or characters that is understandable to human minds. We often called this written or printed language as a text or typescript. Typescript, text or written language is the utmost common way to share information. It is unique in the basic mechanisms of multimedia programs. It was initially well-defined by published media, such as books and newspapers that used numerous typographies to exhibit the script, statistics, and unusual letterings. Although multimedia products include images, audio-visual, typescript may be the most collective data type found in multimedia applications. Besides this, text also delivers chances to spread the traditional control of text by linking it to other media, thus making it an interactive medium. Though Chinese are credited with the manufacture of paper and movable types, German goldsmith Johannes Gutenberg first developed the printing press in 1439. The presses that were developed soon after were used for mainly publication of books, especially the religious texts and the Bible.
- **Graphics:** Anything that we see on a display device is a picture or a graphic. The subject deals with storage, representation, display, and manipulation

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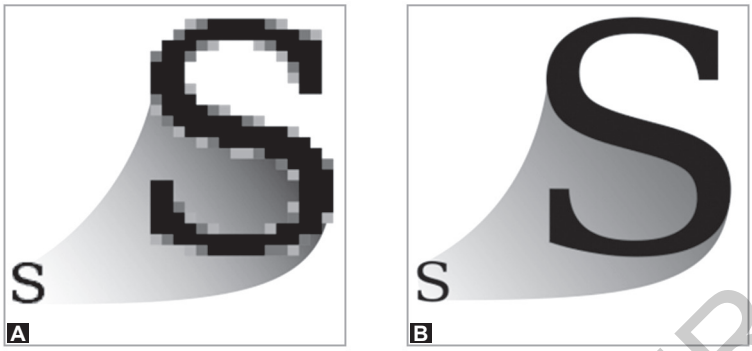

Figs. 4A and B: Raster and vector multimedia.

of pictorial information. There are two ways of representing a graphic are: (1) Raster graphic **(Fig. 4A)**, and (2) Vector graphic **(Fig. 4B)**.

– *Raster or bitmap*: Matrix or rectangular array of pixel values.
– *Vectors*: Combination of mathematical objects and equations.

Difference between raster and vector has been shown in **Table 1**.

Table 1: The difference between raster and vector.

Raster	*Vector*
Represented as matrix of pixel values	Represented as a set of mathematical equations
Resolution/pixel dimension-dependent	Resolution-independent
File size is larger	Smaller file size
Editing is easier	Editing and manipulation is difficult
File formats: bmp, jpg	File formats: …….
Editing tools: Photoshop, GIMP	Editing tools: CorelDraw
Standards: PHIGS, GKS, OpenGL	Standards: SVG

TYPES OF MULTIMEDIA

Interactive multimedia: Interactive multimedia gives options to users for interaction with media, for example, video games provide control to the users. Another example of interactive media is our computer that provides an interface to the user for interaction with the system. Simulator is also one good example of interactive multimedia because it provides visual information that can be controlled by human input.

Noninteractive multimedia: In noninteractive multimedia, there is no involvement of the user, for example, presentation without any interactions, video, e-books.

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Linked/hybrid multimedia: Basically, it is a combination of both types of multimedia. In simple words, it is media that needs the user interaction open documents and other media. This is mostly used in web technologies. It has two types:

1. **Hypertext:** It is a text that is encoded through a programming language to link documents. By just a click the user can move to the original media.
2. **Hypermedia:** It is just an extended form of hypertext that also used coding to make it interact. Only difference is hypermedia can be in the form of images or videos in spite of text.

USES OF MULTIMEDIA

- **Creative industries:** Most creative industries are linked with advertising sectors. Creative industries provide different types of media to the advertisers for promoting products of different customers **(Fig. 5)**.
- **Commercial sectors:** Most of the commercial sectors are based on multimedia. Commercial sectors including businesses are aware with uses of multimedia. Most of commercial activities used interactive presentations, models, and multimedia devices for describing the real meaning of strategy.
- **Entertainment:** Entertainment area also not untouched from multimedia. In other words, the entertainment industry is based on multimedia. It completes the various phases of development of multimedia. In the initial period, it was based on the traditional equipment, such as television and sounds. Human involvement was necessary but with the development

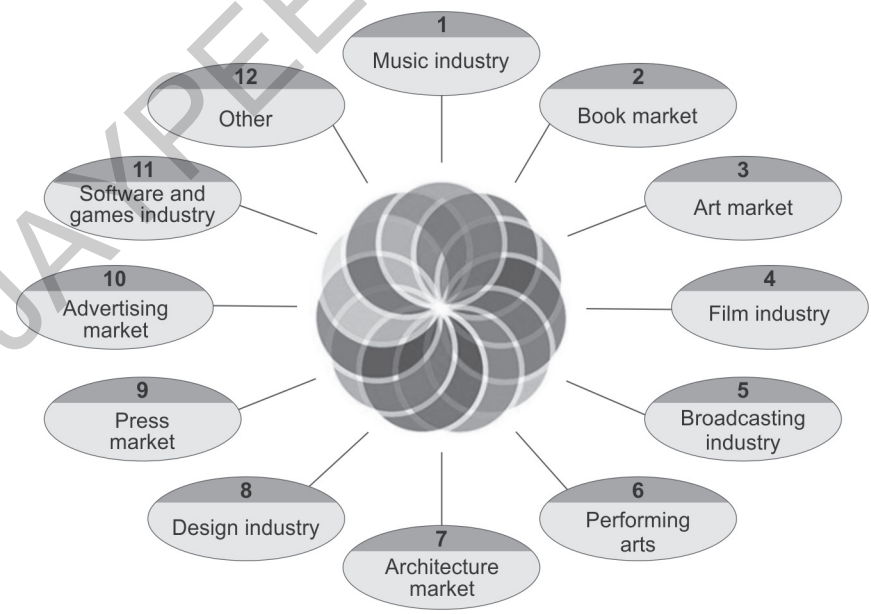

Fig. 5: Multimedia in creative industries.

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Fig. 6: Multimedia in entertainment sector.

of multimedia animation and graphics takes the place of human beings **(Fig. 6)**.

- **Education**: Graphics, presentations, and virtual learning material have changed the definition of education. These all are part of the multimedia. It does not only develop the understanding of the new things but also make an easy way to interact and self-learning.
- **Social work**: "Gestures are better than the words" saying is fit for the social messaging, for example, many organizations used graphics and symbols to symbolize their massages. It was also noticed that people better understand graphics than text because graphics are far from the language barriers. So, today's social work industry also uses the multimedia to reach out to various areas of the globe.
- **Engineering**: Today's engineering and quick computer-aided designs make attractive engineering. It provides preunderstanding of their designed model like a real-time system.
- **Medicinal research**: In the experimentation of medical science, it can be blessing for the animals and humans. Multimedia can be used as a simulator in the experimentation of medical science. With the help of multimedia, we can design expert systems those may be useful for new practitioners and beneficiaries.

COMPUTER-AIDED TEACHING AND TESTING

Technology helped teaching and testing is a strategy to utilization of technology as a guide cutting-edge the formation, change, exploration, or enrichment of teaching technology. Different types of strategies are used to acceleration the proficiency of the instructing, grow the estimation of training, expand substitutions through proper technology, and recording for the future explanations. Technology-based training helps in making a large view, proper scaling, and simulative guide of things. Computer or technology-aided learning

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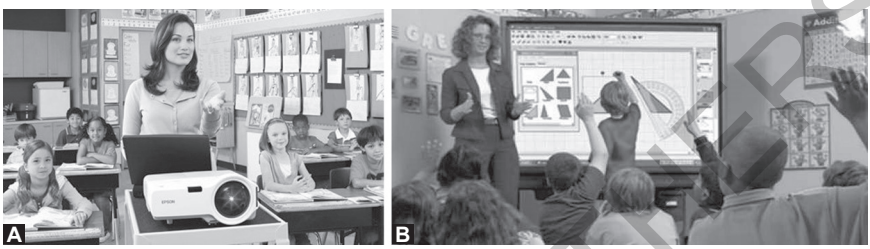
program in the prior decade ago of the 20th century was seen in India with advanced substances of science, english, and mathematics. These kinds of program gave essential information and communication technology (ICT) and substance conveyance preparing to the educators of the program. Ongoing advances in science and innovation have changed the structure and the training frameworks of social orders. The expanding significance of gifted individual not exclusively to utilize information however to be a maker of information puts extra obligations on the instructors of science **(Figs. 7A and B)**.



Figs. 7A and B: Computer-aided teaching and testing.

Computer or technology-aided learning or teaching is needed in present learning environment. Teaching through computer-aided technology is:

- An intuitive technique utilized in teaching and testing modules.
- Graphically presenting materials to the learners in an easy to understand design.
- Improve learning and identifying and curing misguided judgments of the learners with the assistance of technology.
- Computer-aided teaching as a rule incorporates mixed media instructional organizations, for example, video and recreation, and virtual learning conditions.
- Computer-aided teaching methodology is featured in all present educational plan changes far and wide. Indian study halls are likewise focusing on this methodology.

Technology helped in instructing which basically implies that the instructor utilizes the PC and unified frameworks to take study hall exercises. Educators can utilize distinctive delicate products for this reason. Student's learning can be encouraged with the computer-aided teaching **(Fig. 8)**.

Don Knezek, the CEO of International Society for Technology in Education uniquely compares education with the medical profession in their lines. He clearly said "If in 1970 you had knee surgery, you got a huge scar", he also added further "Now, if you have knee surgery you have too little".

Einstein gives an example of pencil and said pencil was more intelligent than he was—it clearly described that he could better describe with the help of assisted technology because it helps in describing ideas with easy ways.

Benefits of Computer-aided Teaching/Testing

- The teaching and testing process must become student centered and evaluation process can be accelerated through technology.

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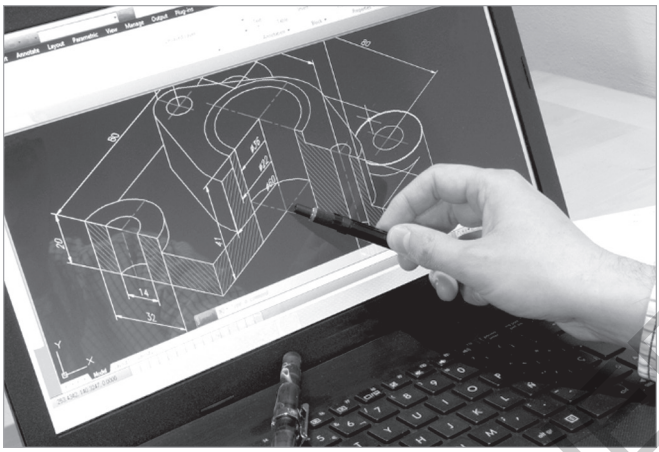

Fig. 8: Engineering design with computer-aided technology.

- Assessment—indicative, developmental, and summative—must be improved and profoundly coordinated into the learning and instructing process.
- National and state scholarly gauges must be met or surpassed.
- Learning must turn out to be progressively dynamic.
- The development of long-lasting learning practices must be encouraged.
- Well-planned, innovation empowered instruction change will act naturally developing, self-transforming, and self-recording.
- Teaching and learning content must be of the most elevated conceivable quality, current, and applicable.
- Proven instructive techniques and the best research from all fields with a heading on learning and training must be coordinated into instruction.
- The needs of everything being equal (understudies, instructors, guardians, organization, government, business, and so forth) must be served.
- Reform should likewise deliver the need to improve the development and accomplishment of professional objectives by understudies.
- Where least principles exist, the objective must be close general dominance instead of a standard circulation of accomplishment.

Types of Computer-aided Teaching

Computer-assisted Translation

Multi-language translation or transliteration is only possible through the machine interpretation or computer interpretation, which not only accelerate the translation process but also helps the students to understand exactly meaning in their language **(Fig. 9)**.

Multi-language translation is one of the significant kinds of automated teaching learning process. This is utilized to move the element in the wake of moving all purposes of new substance are corresponding to all purposes of

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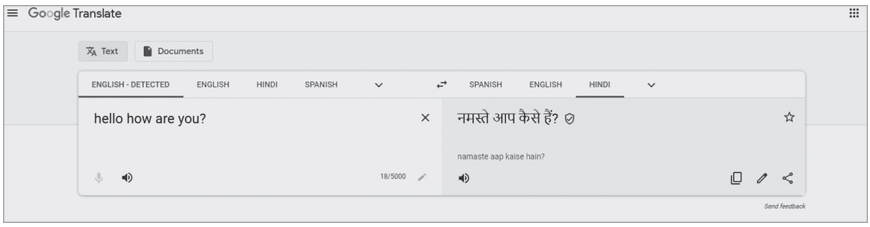

Fig. 9: Computer-assisted translation.

old elements. This concurrent engineering is sometimes called simultaneous engineering. Here while the item is planned, the structure and assembling process are completed at the same time this system encourages the structure specialist to improve the effectiveness of item structure and procedure.

Benefits for the Teacher and Learner

- Learner easily understands in their native languages
- It reduced the workload of teachers
- Improve the self-learning and self-expressiveness
- Save the extra cost of dictionaries

Teaching through Presentations

Presentations though PowerPoint

PowerPoint is a product of Microsoft and it is used in Windows as application software to simply and design presentations. It was a famous software that already used in various teaching and training sessions **(Fig. 10)**.

It is a viable instructive tool in the learning environment. It very well may be utilized in the classroom for introductory educating, projects, training, penetrating, audits, and tests.

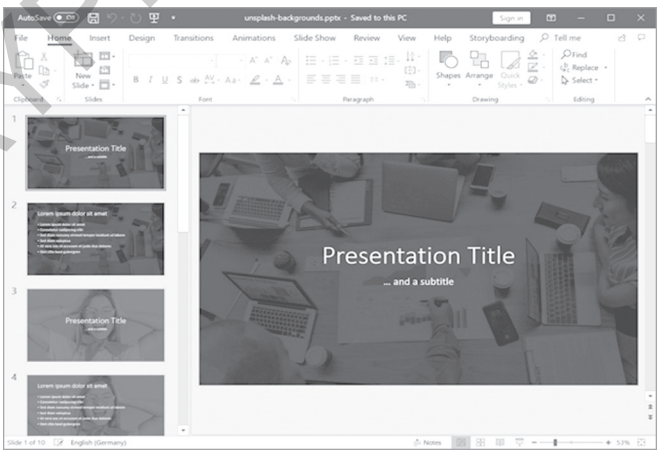

Fig. 10: PowerPoint presentation.

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Presentations through Linux Impress

As compare to MS PowerPoint, it is a piece of application in the open-source environment especially of Apache Open office that is a product of Sun Microsystem. A teacher or instructor can add content with additional features, such as animation, sound, and video. This makes a bridge of teacher's and learner's communication. One can likewise make an independent self-running "appear" with the application.

It can trade introductions to Adobe Flash records permitting them to be played on any PC with the Flash player introduced. It likewise incorporates the capacity to make PDF records. An introduction comprises of page(s) that can be seen on the screen as typical and with the utilization of a projector, can be seen on the divider or on an outer screen. Typically, a PC is utilized since it has great compactness.

Impress resembles a slide show. One page after the other is anticipated. A page that is anticipated is known as a slide. The accompanying can be remembered for a slide.

- Animation
- Three-dimensional illustrations
- Bullets and numbered lists
- All the typical stuff that is in a word processor and in spreadsheets, for example, strong hues, content arrangement, fringes, drawing, layouts, and so on.

Benefits for Teachers

- Teachers can utilize presentations to upgrade the viability of study hall guidance from multiple points of view and in each branch of knowledge.
- Teachers can change exercises and use them again and again. In this manner, instructors can save their spare time on distributing instructional material, composing on blackboard, rehashed discourse, etc.
- Presentations can advance the data in an exercise, and make the introduction increasingly sorted out and adaptable.
- Main focuses can be underscored by utilizing designs, activity, and sound.
- Presentation can be utilized for content audit.
- Rather than giving truant understudies composed notes of an exercise they missed, you can replay your exercise or introduction utilizing a slide appear. Missing understudies get a similar guidance as the individuals who are available, so they do not fall behind.
- Teachers can share exercises and introduction just utilizing a document sharing framework or blaze drive. Educators can share the remaining task at hand of making introductions.

Computer-aided Modeling-based Teaching

Computer-aided teaching through modeling in the classroom means vocalizing a thinking process. Modeling-based teaching improves the understanding level of a learner.

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It may be two types: interactive or noninteractive. Interactive means which user's involvement exists. Noninteractive described as which user only can see or learn but involvement does not exist.

Computer-aided Mathematical-based Teaching

There is need to perceive that numerical advancements are the pencil of today and that we will just completely use the advantages of computerized advances in educating, learning, and science projects when it gets unbelievable for a learner to take care of a complex scientific issue without prepared access to advanced mechanical devices.

Beginning from blackboards, it now converts into technology-oriented learning. Many of technological devices have taken the place of traditional teaching in mathematics, few of them are Radio, Slide Rules, Televisions, Interactive Boards, Calculators, Graphic Pads, Digital Pens, Computers, and Projectors.

Computer-aided Online/e-Learning

Skype discussions, and talk rooms or virtual study halls hypertext archives, sound video courses, and person to person communication using web 2.0 changes the scenario of online learning. Computer-aided online learning is a procedure of teaching and learning via using various technologies. It has two types: (1) synchronous or concurrent learning and (2) asynchronous or nonconcurrent learning.

Synchronous or Concurrent Learning

Synchronous learning alludes to the trading of thoughts and data with at least one member during a similar period. Models are up-close and personal conversation, online continuous live instructor guidance and input, Skype discussions, and talk rooms or virtual study halls where everybody is on the web and working cooperatively simultaneously. Since learners and teachers are working cooperatively, synchronized learning assists students with turning out to be increasingly receptive in light of the fact that they need to effectively tune in and gain from their friends. Synchronized learning cultivates online mindfulness and improves numerous learners' composing aptitudes.

Asynchronous or Nonconcurrent Learning

Nonconcurrent learning may utilize advances, for example, learning the executive's frameworks, e-mail, online journals, wikis, and conversation sheets, just as web-bolstered reading material, hypertext archives, sound video courses, and person to person communication using web 2.0. At the skillful informative level, making may unite simulated operational lodgings. Technological integrated learning is advantageous for learners who have medical issues or who have kid care obligations.

Linear Learning

Technology-based training refers to self-guided training exercises conveyed on a computer. Computer-based training at first conveyed content by means

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Computer for NURSES

Salient Features

- This book is specifically designed for the nursing students to support the work of nurses and other healthcare team members.
- Computers and its literacy do not only provide growth and opportunities in their field but it also facilitates them to speed up and manage their services easily.
- Every chapter of the book is enriched with knowledge and expert perspective which demonstrates all the technical and professional concepts of computer technology.
- The book focuses on how computers work and how to apply it to organizational work.
- It explains the brief as well as lengthy philosophies of information technology and presents a practical view in front of the learner that makes the concepts easy.
- It is one of the books that simply satisfy all aspects of the basic and advanced computer information for nursing students.

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