Course: Uses of ICT in Science Education (6439)
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ASSIGNMENT No. 2

Q.1 What is desktop publisher? Explain anatomy of desktop publishers.

Desktop publishing is the production of page designs with your computer using a special DTP software that integrates text and images.

The first DTP software was released in the mid-80s and desktop-publishing skyrocket from there. In the early 90s desktop publishing had almost completely replaced previous technologies used for that purpose.

While in the 80s and 90s desktop-publishing was almost exclusively used by professionals and for print, now it is also used for digital products, such as e-books, websites and much more.

Today, thanks to better devices, faster internet connections and cloud solutions basically everyone can use desktop publishing technology. Some DTP programs are even available for free online, no installation needed.

Desktop-publishing software can be used to create the layout for a wide range of different publications, such as:

- newspapers and magazines
- brochures, posters, flyer, leaflets and catalogues
- books and e-books
- PDF
- web pages
- banner
- newsletter
- design of resume

The number of desktop publishing programs is growing and growing. The good news, a lot of them are for free or available for subscription.

The leading desktop publishing software these days comes from Adobe. Products from the **Adobe Creative Cloud** are available for subscription. The costs vary, depending on the product and plan selected. For example, you can subscribe to all the apps starting from US$52.99 per month. This package includes programs, such as Illustrator, Photoshop and InDesign. But you can also opt for a single app.

Adobe InDesign CC is a top-rated desktop publishing software, one of the market leaders and used by most professionals.

Functions of desktop publishing software these days seem endless and InDesign CC is no exception. It offers a wide range of tools, to just name a few:

- layout and typesetting tools
- setting character and paragraph attributes
- tools to create multicolumn pages
- transparency and vector editing

Principles of Layout and Design

This section addresses the fundamental themes of page layout and design:

- Purpose and Audience
- Organizing Information
- Getting Their Attention
- Balance
- Alignment
- Repetition
- Emphasis
- Proximity

Purpose and Audience

Approach page layout the same way that you do writing: determine your audience, define your purpose, and communicate your message. When you're writing, you present information in a logical order, so do the same when you lay out the page.

Organizing Information

Photographs, pull-quotes, decks, and headlines help you tell the story. Other elements such as subheads, boxes, rules, and white space help you organize the story.

For example, if you laid out three short articles on the same page, you would use rules, white space, and headlines to show readers that the articles were separate, not related.

A good layout improves readability by arranging text and graphics in a logical order.

Every time you place a textual or graphic element on the page, you are making a rhetorical decision, and where you place that element depends on its relationship to the other pieces.

When you're writing, you organize sentences and paragraphs in a logical sequence so that readers will understand your message. You should approach layout the same way.

Just remember that page design is a flexible process. There are no hard and fast rules, just guidelines. Keep good communication with readers as your top priority, and you will make the right design choices.

Getting Their Attention

In today's media-intensive culture, people often decide that reading an ad, brochure, or newsletter is not worth their time, so even if your publication is important, it may end up in the wastebasket. An unusual design, however, can spark their interest. Even the most sophisticated readers get bored with staid designs.

Bottom line: grab their attention first, and then keep them reading.

Jan V. White, author of Editing by Design: A Guide to Effective Word-and-Picture Communication for Editors and Designers, says that readers often look through magazines from back to front (and newsletters are specialized magazines), so you should use a hook to capture people's attention.

A hook is anything that contrasts against the uniformity of the text such as a photo, graphic, masthead, or a pull-quote hanging in a column of white space. Everything from the text to the paper it's printed on affects whether or not your publication is read with interest, so be creative.

We just have one word of caution. **Readability**. An effective page layout improves reader comprehension, so you have to balance the imaginative elements with the functional elements. In other words, a splashy graphic laid out at an unexpected angle is eye-catching, but three columns of centered text is a nuisance.

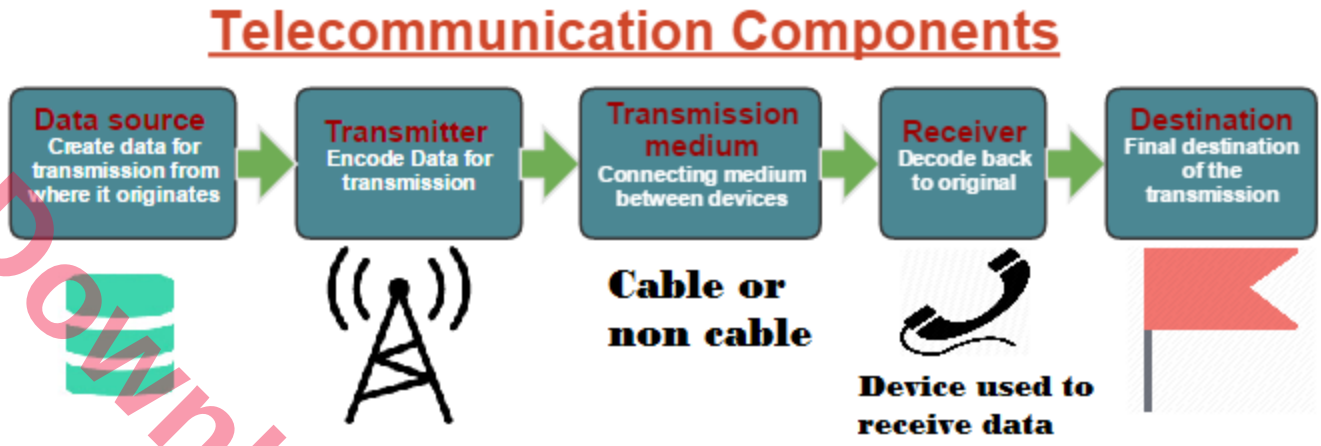
Good page design balances function with form, consistency with contrast, and places successful communication with the reader above all other considerations. Think of layout as a jigsaw puzzle. Every piece fits together to make the whole.

Q.2 Identify at least ten telecommunication strategies. Write importance these strategies in learning process.

Telecommunication systems is a specialized system for communicating at a distance. The term telecommunication sometimes also referred as telecom. A Device refers to the exchange of information by electronic and electrical medium over a significant distance. An arrangement which is made up of two or more station with equal number of transmitter and receiver devices is a telecommunication system. Telecommunication devices are telephones, telegraph, radio, microwave communication arrangements, fibre optics, satellites and the internet. Telecommunication is a vast range of information-transmitting technology such as mobile phones, land lines telephone, VOIP and broadcast network. Data transmitted in the form of electrical signals known as carrier waves, which are modulated into analog or digital signals to transmit information.

Telecommunication systems is emphasis of some of the essential components that transmit data from one end to another through an electronic medium and each component perform different task. Now learn what they component exactly do and the task perform by each component.

One of the most important component required is **computers to process information.** Then **input or output devices** to send and receive data which are also referred as terminals. Input and output are starting and stopping poles of any communication. In network these terminals known as nodes which can be a computer or peripheral devices and if we take real life example then mobile phone/landline is as example of terminals. **Communication channels** that link the terminals by the various ways of cables and wireless radio frequencies to transmit and receive data. **Communication processor** like modem which provide control and support functions and help to convert the signal from one form to another by providing communication support for data transmission and reception. **Communication Software** is used to manage the network and specify the protocol which handle the telecommunication system also handle and control the activities and functionality.



Now we are going to discuss Functions of Telecommunication. Learn about functions of telecommunication get help in Telecommunication assignment help and get to know about telecommunication and its components.

- The primary function of telecommunication systems is Transmits information to far distance and establish interface between sender and receiver by some means of transmission mode or way.
- Since terminals and nodes are connected randomly in the network so this systems route the message along the most efficient paths that take minimum time to send message to the receiver end. Transmission of the data and reception of the message is done in uninterrupted way and come shortest path and minimum time.
- This systems also ensure that right message received by right user only and while transmitting is also check for transmission errors.
- As we know network use different software and hardware to transmit data via communication channels and that vary with the different medium so the telecommunication is responsible for converting and managing the speed of transmission independent to the platform. Also convert message from one format to another because information represented in different way to the different platform.
- Control the flow of information that dependent on the communication channels and the terminals used to transmit information. So this system control both of them accordingly.

Q.3 What are advantages and limitations of simulations used for science learning.

Computer simulation was pioneered as a scientific tool in meteorology and nuclear physics in the period directly following World War II, and since then has become indispensable in a growing number of disciplines. The list of sciences that make extensive use of computer simulation has grown to include astrophysics, particle physics, materials science, engineering, fluid mechanics, climate science, evolutionary biology, ecology, economics, decision theory, medicine, sociology, epidemiology, and many others. There are even a few disciplines, such as chaos theory and complexity theory, whose very existence has emerged alongside the development of the computational models they study.

Computer system users, administrators, and designers usually have a goal of highest performance at lowest cost. Modeling and simulation of system design trade off is good preparation for design and engineering decisions in real world jobs.

In this Web site we study computer systems modeling and simulation. We need a proper knowledge of both the techniques of simulation modeling and the simulated systems themselves.

The scenario described above is but one situation where computer simulation can be effectively used. In addition to its use as a tool to better understand and optimize performance and/or reliability of systems, simulation is also extensively used to verify the correctness of designs. Most if not all digital integrated circuits manufactured today are first extensively simulated before they are manufactured to identify and correct design errors. Simulation early in the design cycle is important because the cost to repair mistakes increases dramatically the later in the product life cycle that the error is detected. Another important application of simulation is in developing "virtual environments" , e.g., for training. Analogous to the holodeck in the popular science-fiction television program Star Trek, simulations generate dynamic environments with which users can interact "as if they were really there." Such simulations are used extensively today to train military personnel for battlefield situations, at a fraction of the cost of running exercises involving real tanks, aircraft, etc.

Dynamic modeling in organizations is the collective ability to understand the implications of change over time. This skill lies at the heart of successful strategic decision process. The availability of effective visual modeling and simulation enables the analyst and the decision-maker to boost their dynamic decision by rehearsing strategy to avoid hidden pitfalls.

System Simulation is the mimicking of the operation of a real system, such as the day-to-day operation of a bank, or the value of a stock portfolio over a time period, or the running of an assembly line in a factory, or the staff assignment of a hospital or a security company, in a computer. Instead of building extensive mathematical models by experts, the readily available simulation software has made it possible to model and analyze the operation of a real system by non-experts, who are managers but not programmers.

A simulation is the execution of a model, represented by a computer program that gives information about the system being investigated. The simulation approach of analyzing a model is opposed to the analytical approach, where the method of analyzing the system is purely theoretical. As this approach is more reliable, the simulation approach gives more flexibility and convenience. The activities of the model consist of events, which are activated at certain points in time and in this way affect the overall state of the system. The points in time that an event is activated are randomized, so no input from outside the system is required. Events exist autonomously and they are discrete so between the execution of two events nothing happens. The SIMSCRIPT provides a process-based approach of writing a simulation program. With this approach, the components of the program consist of entities, which combine several related events into one process.

In the field of simulation, the concept of "principle of computational equivalence" has beneficial implications for the decision-maker. Simulated experimentation accelerates and replaces effectively the "wait and see" anxieties in discovering new insight and explanations of future behavior of the real system.

Consider the following scenario. You are the designer of a new switch for asynchronous transfer mode (ATM) networks, a new switching technology that has appeared on the marketplace in recent years. In order to help ensure the success of your product in this is a highly competitive field, it is important that you design the switch to yield the highest possible performance while maintaining a reasonable manufacturing cost. How much memory should be built into the switch? Should the memory be associated with incoming communication links to buffer messages as they arrive, or should it be associated with outgoing links to hold messages competing to use the same link? Moreover, what is the best organization of hardware components within the switch? These are but a few of the questions that you must answer in coming up with a design.

With the integration of artificial intelligence, agents and other modeling techniques, simulation has become an effective and appropriate decision support for the managers. By combining the emerging science of complexity with newly popularized simulation technology, the PricewaterhouseCoopers, Emergent Solutions Group builds a software that allows senior management to safely play out "what if" scenarios in artificial worlds. For example, in a consumer retail environment it can be used to find out how the roles of consumers and employees can be simulated to achieve peak performance.

Equation-based simulations are most commonly used in the physical sciences and other sciences where there is governing theory that can guide the construction of mathematical models based on differential equations. I use the term “equation based” here to refer to simulations based on the kinds of global equations we associate with physical theories as opposed to “rules of evolution”. Equation based simulations can either be particle-based, where there are n many discrete bodies and a set of differential equations governing their interaction, or they can be field-based, where there is a set of equations governing the time evolution of a continuous medium or field. An example of the former is a simulation of galaxy formation, in which the gravitational interaction between a finite collections of discrete bodies is discretized in time and space. An example of the latter is the simulation of a fluid, such as a meteorological system like a severe storm.

Q.4 Write procedure of creating hypertext.

Hypertext is a compositional tool as well as a conceptual approach to communication. As a compositional tool, hypertext markup languages allow the author of a hypertext to establish links among the parts of a document, or between any number of complete documents, for ease of reference or for amplification of an idea. Since the reader of a hypertext can choose to follow these links or not (and in some contexts, such as a Web site, establish new links), hypertext tools also permit the reader to become an "author" as well. The "final" hypertext document, therefore, may take any number of forms, depending upon the needs of the audience.

Hypertext technical documents are very useful for training and for communicating instructions and procedures.

Guidelines for Creating Hypertext Links

- Consider the audience for your document, their limitations and demands.
- Let subject matter determine the kind and number of links between documents (or Web sites). Unexplained and arbitrary links will make your audience feel "lost in hyperspace."
- Structure the pathway of links in a coherent, useful way. Move your reader from general principles or important first steps down into subsidiary elements of your topic.
- Establish a context for a link when that link is to related but not crucial supporting material. That way, readers can decide if they want to access that information at that time.

There is literally a glut of information available about hypertext. Hundreds of articles announce and hail the "phenomena" of hypertext--a system of non-sequential writing.

But most seem to be caught up in the technology of hypertext. Many books talk about the development of the software and hardware, while magazine articles proclaim the glories of the latest hypertext software system.

There's quite a bit of theorizing about the applications of hypertext to education, and even making analogies to literary issues (such as an essay by John Slatin in "Text, Context and Hypertext" that calls hypertext a "literary concept," citing problems similar to intertextuality in poetry). Quite honestly, though, not much has been written on how to write for this new medium. Besides trying to overcome the mechanics of "marking up" documents to appear properly in hypertext, professional writers should be equally, if not more concerned over the application of their writing to this different medium. After all, we know that writing a movie script requires a much different style and approach than if we were going to write a novel. Why then, should we not investigate this concept of writing for hypertext as well?

In this article, I have attempted to answer some common questions about hypertext, specifically for writers not familiar with the medium. But readers familiar with the concept, history, and reason behind writing in hypertext may wish to jump directly to some guidelines on how to write for hypertext. I have approached that section by applying hypertext to some of the essential elements of writing: content, organization, style, and audience.

Hypertext is simply a non-linear way of presenting information. Rather than reading or learning about things in the order that an author, or editor, or publisher sets out for us, readers of hypertext may follow their own path, create their own order-- their own meaning out the material.

The idea behind hypermedia is not a new one. In fact, 50 years ago Vannevar Bush, the head of the Office of Scientific Research and Development during World War II, proposed a method of cataloguing and retrieving information prophetically like today's hypermedia.

His "memex" machine would use a series of gears where a reader could sit at a desk and call up information--both text and pictures--associatively. This, argued Bush, is how the mind really works:

"Our ineptitude in getting at the record is largely caused by the artificiality of systems of indexing. When data of any sort are placed in storage, they are filed alphabetically or numerically, and information is found (when it is) by tracing it down from subclass to subclass. It can be in only one place, unless duplicates are used; one has

to have rules as to which path will locate it, and the rules are cumbersome. Having found one item, moreover, one has to emerge from the system and re-enter on a new path.

The human mind does not work that way. It operates by association. With one item in its grasp, it snaps instantly to the next that is suggested by the association of thoughts, in accordance with some intricate web of trails carried by the cells of the brain...

Man cannot hope fully to duplicate this mental process artificially, but he certainly ought to be able to learn from it. In minor ways, he may even improve, for his records have relative permanency. The first idea, however, to be drawn from the analogy concerns selection. Selection by association, rather than indexing, may yet be mechanized."

The only problem with Bush's mechanism, however, was that gears would act out the thinking. That's an analog system. (At the time of his writing, it still wasn't clear if the future of technology lay in analog or digital machinery.)

Since then, researchers have carried on the ideals of hypertext in a digital arena. Doug Engelbart was the first to be influenced by Bush's concepts of associative links and browsing in the early 1960s (Byte, 10/88). His system, Augment, stores information in a sophisticated hierarchical structure allowing non-hierarchical branching. To make viewing easier and increase user speed, he also developed the "mouse" and viewing filters.

But it was Ted Nelson who coined the term "hypertext" over 29 years ago to mean non-sequential writing. His publishing system released in 1989, Xanadu, attempted to hold the world's literary treasures under one roof. It interconnected linked electronic documents and other forms of media, such as movies, audio, and graphics.

Other hypertext systems and "browsers" have since been created, one of the most popular being Macintosh's HyperCard. While all of these work well self-sufficiently, there still wasn't a universal system of exchanging information freely and making links between it.

That was, until Switzerland's high-energy physics laboratory CERN developed the World Wide Web, the skeleton of computer networks upon which all on-line information can be placed. The U.S.'s decentralized networks--designed to survive a nuclear attack--were created roughly a quarter-century ago for researchers in the defense industry.

And in 1993, the National Center for Computing Applications (NCSA) released the software Mosaic, a graphical information "browser," that allowed users to pleasurably view all the information now available on the network.

Q.5 What is the probe ware? Write importance of probe ware for mathematics learning.

Probeware has it's origin in research and engineering where sensors connected to computers allow for quick data collection, with often having the ability to see real-time results displayed graphically. In the classroom, many vendors have created both software for display on computers, calculators, and now handheld mobile devices, hardware that connects the sensors to the computers, and hundreds of sensors that can be used in multiple disciplines. These devices can be used within the classroom or remotely (e.g. within the field for

environmental stream studies or on roller coasters for physics studies) and have different interfaces for use within elementary and secondary settings. For example, in elementary settings probeware often uses one sensor, such as temperature. In secondary settings, the probeware can be used with multiple sensors such as force and acceleration probes to discover Newton's 2nd law of motion.

Probeware has long been encouraged for student use within inquiry based science education. Minnesota Academic Standards in Science state that students should "determine and use appropriate safety procedures, tools, computers and measurement instruments in science and engineering contexts" by grade 9. Probeware also helps students see how in grade 3, "tools and mathematics help scientists and engineers see more, measure more accurately, and do things that they could not otherwise accomplish." Probeware allows for conversations on the relationship between how science guides the technology created by engineers and how the use of this technology helps support the work of scientists. Probeware, may be used with guided activities, open investigations and whole class instruction. For example, a teacher could either allow students to individually use the probes when exploring the relationship between carbon dioxide and temperature on germinating peas or could have one setup projected for a whole class investigation of the phenomena.

A teacher who is helping students explore the relationships between different types of motion (changing velocity and constant velocity) and how they are displayed graphically, could use a motion detector in a large classroom setting. Groups of students could make predictions as to how a student walking at a constant velocity towards the detector would be displayed graphically. The teacher would then solicit student responses and then the student would walk. The students would then compare the shape of the graph displayed to their predicted graphs. This would continue with students walking away and towards the detector with different motions. After a summary of what can be learned by these changes in motion from the graphs, the teacher would then allow groups of students to design their own experiments to measure the changes of motion.