AVICENNE WBT: DESIGN & IMPLEMENTATION STRATEGIES – II

TOPIC OUTLINE

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IDI1 - CONCEPT MAP

Objectives of the Lesson

At the end of this lecture learners will be able to

1. **Analyze an interactive system based on interactive vocabulary**
2. **Develop an interactive system including links, hypertext or hypermedia, nodes, node map, and etc.**
3. **Investigate a multimedia system with respect to drivers and components**
4. **Analyze users interfaces for their effectiveness and efficiency**
5. **Evaluate and make recommendations for an interface**
6. **Establish a relationship among concepts multimedia, interactivity, and user interface**

IDI 1 - Interactive Design Principles

1.1. Interactive Vocabulary

1.1.1 Hypertext
A tool placed or embedded into text. However, this text differs from normal texts due to its functionality that allows users to link, go, and jump to other related segment of content. It is fundamental term of interactivity. It can be also stated as the most primitive type of interaction. It is the origin of interactivity civilization.

Extra resources
1. What is hypertext? Wikipedia online free encyclopedia. Available at http://en.wikipedia.org/wiki/Hypertext,
2. Hypertext. http://www.webopedia.com/TERM/H/hypertext.html
3. A complete resource for Hypertext and Hypermedia. Available at http://www.scholars.nus.edu.sg/cpace/ht/htov.html


1.1.2 Hypermedia
It is a different type of hypertext. In hypertext, your destination is another text. Unlike hypertext, hypermedia takes users to a sound, a picture, a video, a graphic, or any kind of media. While users just read something after clicking hypertext, they not only read a text but also hear, see or watch the content by hypermedia.

Extra resources
1. What is hypermedia? Wikipedia online free encyclopedia. Available at http://en.wikipedia.org/wiki/Hypermedia
2. A complete resource for Hypertext and Hypermedia. Available at http://www.scholars.nus.edu.sg/cpace/ht/htov.html

1.1.3 Link
Link is sometimes an action and sometimes a definition. It refers a direction if it is used as an action. It helps user to reach different information or same but other part of information. A link is composed of two elements. One is "*anchor node*" and another is "*destination node*". Anchor node contains the link itself and its label information that explains where the link is going to go. Destination node is final result of the link's action if the user gives necessary command to activate it.
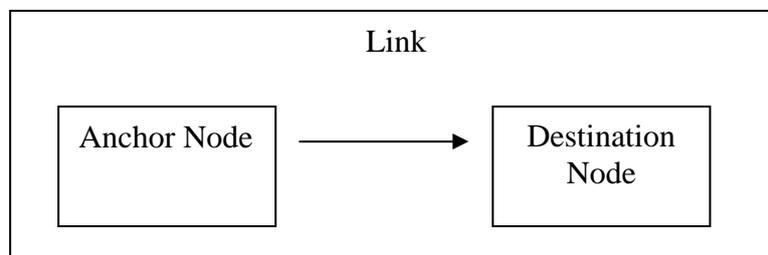
1.1.4 Nodes
Nodes are defined as chunks of either content or software. They includes not only content containing more than text but also interactivity including more than links. There are two types of nodes:

1. Linear Nodes: There is no need for interaction. They just lead the user to another node. Action of linear nodes is so simple that user can use only backward and forward type buttons or any other interface elements. Linear nodes are so similar to books, in fact. Only difference is nodes are developed on computer platform.
2. Interactive Nodes: Interactive nodes require active action of users. Users have to initiate action or respond to some prompts from the application.

Samples:

- Sign-on screens: To become a member of a web site you have to fill a form. This action is a sample for interactive nodes.
- Introduction Pages: An introductory document providing information about a product, i.e. Windows XP tours for new features. This sample is for linear nodes.
- Main Menu: It is an interactive node and gives opportunity to jump other nodes in the application.
- Search Tool: An interactive tool to reach information directly on an application. Users enter a keyword and then based on results they move necessary search results. For example, Google, Yahoo, AltaVista are the most well known search engines and you can use them to observe what a search tool looks like.
- Activity: It is an interactive node. For instance, a flash game on internet or virtual coloring book software for children. A sample game at http://www.addictinggames.com/wings1915.html.
- Level: An interactive node. Users should overcome some obstacles, puzzles, and defeat an enemy to advance to the next level. It is used in games in general.
- Title: Linear node providing title sequence of a product.

Extra resources
1. Multimedia Technologies. Available at http://edtech.uis.edu/MM/models.htm
2.

1.1.5 Branching

Users move from one node to another node by help of branching. It could be initiated by users or supported by the application. With branching, users can go deeper part of information presented in the application. Moreover, they can jump other information related to the content covered in the application. It guides users with way of movement in an application. Sometimes, users must click to start branching. However, in some cases, users are directed automatically to branching. For example, after entering a web page, there is a message that "you are directed to … page in 5 seconds. Please wait."

At first glance, branching and links seem as the same concepts, though, they have a main distinction. Term of branching is used for off-line multimedia applications such as a CD-ROM related to math lecture but term of link is suitable for on-line content like web pages.

Extra resources
1. Multimedia Technologies. Available at http://edtech.uis.edu/MM/models.htm
2. A sample branching. Available at
http://faculty.mc3.edu/prahmlow/Presentations/Spackle/03_pat_and_linda_Storyboard%20Logic%20Flow%20Form.doc

1.1.6 Node Map

In most cases, a multimedia application has too many numbers of nodes so they cause a challenging situation for users. There should be some summarized guides to show users how to move a desired destination with minimum effort. Node Map is a type of guide to solve the problem aforementioned. It is a visual element including main titles of content and their relations. You can see which page is connected to which other pages. It is useful tool for highly loaded node systems. Site maps on web sites are good example for node maps.

Extra Resources
1. Concept Maps as Hypermedia Component. Available at
   http://ksi.cpsc.ucalgary.ca/articles/ConceptMaps/
2. Alpert, S. R. & Grueneberg, K. (2001). *Multimedia in Concept Maps:
   A Design Rationale and Web-Based Application.* Available at
   http://www.research.ibm.com/AppliedLearningSciWeb/Alpert/KnowledgeMap/Edme
   dia.htm
3. A good sample of node mapping. Available at
   http://www.edb.utexas.edu/projects/mmdesign/fall96project/home.html
4. Examples from Physics. Available at
   http://hyperphysics.phy-astr.gsu.edu/HBASE/hph.html

1.1.7 Navigation

In big oceans, every sort of sailor needs a navigator to find correct route. Internet is an information ocean made up of huge amount of nodes. Every user requires a navigation tool to reach correct nodes efficiently. Navigation means that "finding your way". With million nodes finding correct destination seems impossible. However, designers struggle with this issue by working on navigation concept. In this essence, there are three different modes of navigation you can use in a multimedia product:

- The Browse Mode: It is multimedia format of freedom to move. User can move anywhere. There is no restriction and direction. It is a kind of exploration in a multimedia application. Internet is the most popular example of this mode. That is why the programs ensure surfing on the net are named as browsers, such as Internet Explorer or Mozilla.
- The Customization Mode: This mode provides information regarding your interest, need or what you want. It narrows information and present with narrowed format. Many help, search pages are example of this mode. In addition to these examples, choice of difficulty level in games is accepted as type of customization mode.
- The Guided Tour: It is an interactive linear, predetermined orderly application. User is being guided while they are in program. Animated story books and troubleshooters are examples of this mode.

Extra Reources
1. Navigation Maps. Available at http://www.usu.edu/sanderso/multinet/wwwnavi.html

1.2 Multimedia as a System

Multimedia designer is an experience constructor for users using text, pictures, graphics, audio, databases, computer software, and hyperlinks to other multimedia environments. Like every developmental process, Multimedia Application Design process requires a set of decisions based on some factors. To complete decision making process, a MD should ask many questions like the following questions:

1. How do I organize and present all of this information so users can control it?
2. Should this be a game or a reference product?
3. How will I use graphics, text, animation, video, sound effects, music, and narration for important information?
4. What should the buttons and icons look like and where should they be located on the screen?
5. How will the overall experience of the user be rewarded?

The main duty of MD is organization of function, action and reaction of a system containing information about a topic. It is a common misunderstanding that MDs put content in an order. It is just one of their jobs.

Extra sources
1. The writing process in multimedia environment
http://horizon.unc.edu/projects/monograph/CD/Language_Music/Simard.asp
2. Forman, D. C. (2004). *Benefits and Value of Multimedia Learning System.* Available at http://www.ascilite.org.au/aset-archives/confs/iims/1994/dg/forman.html
3. Pant, A. (1999). *Methodology of Multimedia Production.* Available at http://www.ignca.nic.in/clcnf180.htm

1.3 Component of the System

A multimedia system can be imagined as an engine or a machine. This machine has some sub-components that are connected to each other. Each of them has some special functions. They are working collaboratively and produce common product. These components are *content, features, structure, functional controls, and look and feel*. Furthermore, when components ensure development of a multimedia system, there are outside determinants that have an impact on these components. They are not part of the system but they really shape design of the system components. The most critical drivers are target user, venue, purpose, subjects and genres. Let's see these possible drivers directly influence components of multimedia system.

Extra resources
1. BECTA (2001) Guidelines for developing interactive educational resources at Key Stages 1 and 2–for developers. Available at http://www.ict.educ.ucsm.ac.uk/multimedia/reading/docs/becta_guidelines.pdf

1.3.1 Component Drivers

The components of a multimedia system have five critical drivers that are: (1) Target Users, (2) Venue, (3) Purpose, (4) Subjects, and (5) Genres. Each of them is explained in detail in the following sections.

1.3.1.1 Target User

All multimedia products have their own special user group. It is a wide range, such as children, parents, teachers, small or big groups and managers. Their common characteristics play an important role on components. Another issues regarding target user is individual characteristics of the groups rather than common ones. It is a kind of scope and your products' goal is critical here. If it is possible, MD should collect information as much as possible maximum amount. One of the main problems of unused multimedia products is a small or big forgotten point about target user. It occurs due to not enough analysis of users.

1.3.1.2 Venue

This drive answers the questions of where and how this product will be run. Possible venues are CD-ROM, web-site, a game, digital channel on television, an application on kiosk, a java environment on mobile phone, a program on Palm, and etc. Venue leads your design of multimedia in the light of advantages and constrains of these platforms.

1.3.1.3 Purpose

Without clearly defined goals, you would not have seen you're your multimedia products. Purpose of multimedia product can give a chance MD to forecast the final draft of the program. Every multimedia products have own private purpose(s). For instance, educational software has the purpose of instruction or learning, a game has the purpose of entertainment, a bank web site has the purpose of helping the customers to arrange their financial business. Every component of multimedia system is shaped by type of your purpose. The drivers of purpose can be considered in two levels that are general goals and specific goals. General goals are stemmed from general characteristics of multimedia program. Examples of this are mentioned above. Specific goals are more related to content covered in the product.

1.3.1.4. Subjects

Every multimedia product is related to a subject. For example, gardening, math, science, ancient history, animals are just small part of huge subject collection. Every subject has advantages and disadvantages concerning potential use in multimedia system. For instance, in a literature course, you do not have wide preference of multimedia tools while you have too many choices in science course. At these times, creativity plays an important role. However, too many chance of using tools is another problem because it makes MD decision process harder. Unless MD can make reasonable selections, the product seems too much crowded with unnecessary tools.

1.3.1.4 Genres

Every product can be put into a category of the market. These categories are called as "genres". The most common genres in the multimedia market are games, educational programs, reference materials, information and office utilities. In fact, genres are data about data to make their accessibility easier. The concept of data of data is simple definition of "meta-data".

Drivers emphasized in this section are the most influential one on multimedia components. Although they are most influential ones, there are other drivers that are client needs, budget, time line and marketing issues. Moreover, a MD should be aware of all related to the multimedia product development process as much as possible.

1.3.2 Multimedia Components

A multimedia system is composed of five different components regardless of user, venue, genre, or subject. Each of them is moving part of the system. Like a car engine, some of the components are related usage of the system so they can be seen by users in most times. However, some of them are hidden parts and are working with visible components. To understand multimedia components, a MD must consider the following points:

1. Each component intricately linked to each other. Their improvement should be progressed reciprocally. Each component must be hold together to produce interactive experience of users.
2. Each component cannot be completed at the end of the final product. Iterative processes are always in charge. Therefore, each component's improvement can be controlled in an interdependent structure.

Extra resources
1. Jakob Nielsen (1995) Guidelines for Multimedia on the Web. Available at
http://www.ict.educ.ucsm.ac.uk/multimedia/reading/docs/nielsen%20multimedia%20guidelines%201995.doc

1.4. The User Interface

User interface is a product of combination of functional controls and the look and feel components. Interactivity is an abstract content that becomes concrete in a user interface. It is a bridge between content and user in multimedia product. For computer world, it is a very important issue so there is a special field which is called Human-Computer Interaction.

Extra resources
1. Hanna, L et al, Microsoft Corporation The Role of Usability Research in Designing Children's Computer Products (extract). Available at
http://www.ict.educ.ucsm.ac.uk/multimedia/reading/docs/microsoft%20children%20usability.doc

1.4.1 The Metaphor

A good interface has things that are already in users' world. Therefore, adaptation process becomes easier. Images, sounds, and other design elements and behaviors the user already knows is called metaphor. Metaphor is the most suitable way for developing an interface. For instance, example of Apple and Microsoft's metaphor of desktop are the most famous ones. They think computer screen as a normal desktop in the office. You can put all your materials on this desktop like your ordinary office desktop. There are also other metaphors, such as folders, files, document's folders and etc. They have a purpose of creation of familiar environment for average computer users. Interface is not only graphical representation but also systematical presentation – how the multimedia application works. They are working cooperatively.

Extra Resources
1. Apple Human Interface Guidelines. Available at
http://developer.apple.com/documentation/UserExperience/Conceptual/OSXHIGuidelines/index.html

1.4.2. Principles of Good Interface

Anticipation, Intuition, Consistency: Designing a user interface is a kind of anticipation that contains users' expectations and needs. Consistency must be a part of an interface. In other words, users can easily adapt themselves to interaction system and do not have any surprise. For example, a button assigned for exit command should be kept as exit button overall the application. Consistency should be supported not only within but also between products, especially in same genres but different subjects.

Another issue for an interface is awareness of users what the system is doing while they are using. In Heuristics Evaluation model, Nielsen emphasizes this point is an evaluation criteria. Good interface should demonstrate what the system is doing and where the user is as much as possible amount.

Interface is not a puzzle. Therefore, it is easily assumed to use by user. User should make some conclusions about features, functional controls and looks and feels. For instance, a right-pointing arrow with beveled edges means forward on all video players. If you put that button at the bottom of a video, user can easily understand that this button forward the scenes of video faster than play button. User would like to see this button used for this function always. This type of consistency support adaptation to functional controls. In fact, intuition is a kind of collection of same types of experiences about the product. With intuitive interface, we attempt to get same experience among users. Finally, intuition reduces learning time of an interface so after a while user just focus on content.

Important relation between user and genre:

Consistency and intuition is also a consideration for users and genre drivers. If your target is pre-schoolers, you must use just image based elements, otherwise, the product seems as pre-school software but in practical dimension it does not work well. Similar appropriateness is true for genre drivers. For instance, if your genre is related to formal management issues, colorful and cheerful designs would not work effectively.

Extra Rerouces

2. Principles of Interface Design. Available at
   http://ibis.nott.ac.uk/guidelines/ch2/chap2-2.2.4.html
3. Mueller, W. (1998). *Effective Design of Computer-Based Instructional Materials.*
   Available at
   http://www.math.duke.edu/education/ccp/resources/write/design/ictcm98.html
4. Apple Human Interface Guidelines. Available at
   http://developer.apple.com/documentation/UserExperience/Conceptual/OSXHIGuidelines/index.html

Assessment Questions

1. **As a user, please explain an interface which meets your expectations completely**
2. **Please find a driver which affects multimedia component except for the drivers explained in this lesson and support it with reasonable information.**
3. **Why is a multimedia application thought as a system? What is the relationship between multimedia and system concept? Please explain in detail.**
4. **You are a multimedia designer in a school. Two teachers want you to help them to develop a simple multimedia CD. One of the teachers is social studies and another one is science teacher. Do you use same way to determine content? Please support your answer.**

IDI1 - CONCEPT MAP