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網路教學系統教學方法介面之發展

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Visual Interface design for panel discussion in web-based environment

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中文摘要 (關鍵詞：網路教學系統、介面設計、教學方法)

　　遠距教學目前大多數系統在使用的介面方面仍多是以「文字」介面為主，其次在教學方法上因學科的差異，尚未有更適當的教學介面與支援環境。教師與學生除了系統基本互動功能之外，更需要關於教學方法方面的介面與策略的運用原則。因此本研究主要目的在於發展網路教學方法之視覺介面，以發展網路專家討論與小組討論之網路教學策略。

　　本研究將將常用之專家討論、小組討論等網路教學方法，發展為教學系統中之視覺介面。並以使用者效能測試(usability test)之觀察與訪談方式，收集修習網路教學課程之評鑑資料，以做為網路教學系統之教學方法介面設計之原則。

Abstract

(keywords: web-based instruction system, interface design, instructional method)

Distance education is predicted to be a major growth area for education in the future.　With this growth come challenges in instructional design in terms of new skill acquisition for instructors.　The focus of this study is to design interactive visual interface for instructors and students to interact successfully in a web-based instructional environment.　Interface of common used instructional methods such as panel discussion and group discussion were developed for web-based system.　By using usability testing methods, interview and observation were performed.　Three groups of undergraduate students were interviewed to examine what interface design elements were used and how they were implemented in relation to current web-based environment.　Designing guidelines for on-line panel discussion interface were further examined after the evaluation.

Introduction

　　The user interface is the part of a computer and its software that people can see, hear, touch, talk to, or otherwise understand or direct (Galitz, 2002). Proper interface design will provide a mix of well-designed input and output mechanisms that satisfy the user's needs, capabilities, and limitations in the most effective way possible (Robin & Tollett, 2000).　A well-designed interface is very important to the users. It is their window to view the capabilities of the system, it is the system, being one of

the few visible components of the product we developers create.   It is also the vehicle through which many critical tasks are presented. The best interface is one that is not noticed, one that permits the user to focus on the information and task at hand, not the mechanisms used to present the information and perform the task. These tasks often have a direct impact on an organization's relations with its customers, and its profitability (Galitz, 2002).

Today, teachers can use web-based technology to instruct, explore and create interactive environment at their own desktop or deliver virtual web worlds.   A good interface design can make navigation simple and perception obvious, and inappropriate design will bring frustration and anxiety for users of web-based instruction system.   On-line discussion has been implemented for instruction since the beginning of web-based instruction; however, the appropriate interface for web discussion is still in short.   Therefore, the focus of this study is to design visual interface for panel discussion in the web-based environment.

Design of panel discussion interface

The first objective of this study is to identify various functions and correspondent authoring system for interface creation.   A protocol metaphor for on-line discussion was first created for function identification.   For example, an expert could learn about the interface of the on-line panel discussion so that when he or she attends the discussion, they would be familiar with the on-line metaphor and how to operate relevant controls. Basic operation and interface in the discussion environment includes:

1. Registration (log in).
2. Assess the broadband rates.
3. Create different modes for moderator, panels and members.
4. Estimates screen size for moderator, panels and members.
5. Provides controls for moderator, panels and members.
   - Moderator: Audio, video, text, nametag input control.
   - Member video screen fade in/out control.
   - Member text display fades in/out control.

Development of panel discussion interface

The second phase of this study was to create a visual interface for on-line discussion according the design guidelines from the evaluation.   The information obtained from design phase was analyzed to generate a list of guideline for the interface design.   Basics of web video technology were explored, such as adjustment of screen size, audio control and broadband estimation. Macromedia Flash MX was

selected to create modules from different mode programming.　It speeds up the production for different modes by changing the script and Flash MX communication server helps programmer easily set up video server.　3D Studio MAX was used to create complete three dimension scenes containing major figures and discussion room depth of field, which simulate virtual discussion environment. Hardware and software requirement were listed below:

- Windows 2000, PC, P4 2.0 double CPU, 640MB RAM
- Flash MX
- Flash MX communication server
- 3D Studio MAX, Adobe PhotoShop
- Web camera

The production of visual interface for panel discussion lasted for ten weeks. The visual metaphors were designed to help the participator feel what it is like to be in the discussion.　Major production steps included transforming discussion function to visual metaphor, creating prototype graphical representation, programming control devices according to function, delivering audio and video signal to the video server, and other operations. Following is the prototype visual interface design for panel discussion.
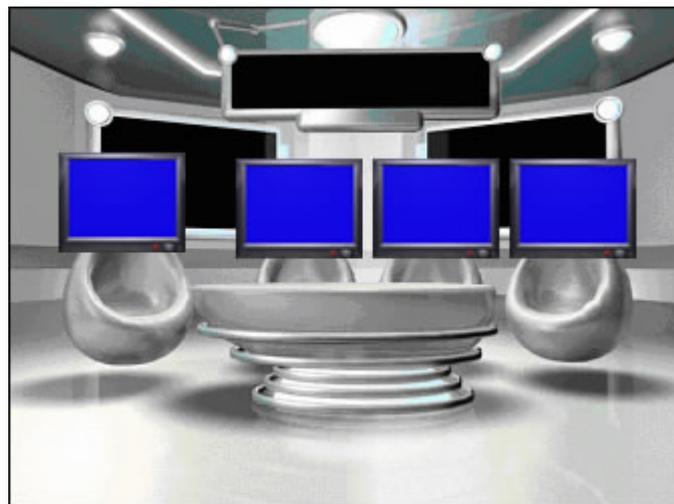

Figure 1: prototype visual interface design for panel discussion

Evaluation of the visual interface

After the production, usability test procedure was implemented for this stage of evaluation.　The phrase usability testing has been coined to represent the process of involving users to evaluate a system to ensure that it meets usability criteria (Corry, Frick, & Hansen, 1997).　Dumas and Redish (1993) defined usability testing is a systematic way of observing actual users trying out a product and collecting information about the specific ways in which the product is easy or difficult for them.

Usability testing was effective because real users perform real tasks under the eye of experienced observers.   In order for the evaluation to be predicted accurately, it has to be evaluated with the eventual end users, performing realistic tasks, and in a realistic environment (Hewson, & Maguire, 1999).   Weinschenk, Jamar and Yeo (1997) also stated "all you need to test is ten people if they are representative of your real users, testing ten people who are truly representative will capture 95% of the problem".

The purpose of the testing was to determine how efficiently and effectively that users could discuss in the on-line discussion environment.   The study used qualitative data collection methods.   Participant observation and interview were used to collect information from the participators.

Subjects used in this study were undergraduate students who were familiar with Web environment and did not used web panel discussion interface before.   Eighteen students were divided into three groups for each interface evaluation. The evaluation took place in three days and each day six students were asked to participate the on-line discussion.   They spent about five minutes going through the orientation and then engaged in on-line discussion.

Six observers oversaw and recorded the process and they interviewed the subjects immediately after the discussion.   Interview questions focused on the ease of use, locus of controls, media formats, clearness of explanation and demonstration and other usability problems during their learning.

Expert review was also used to gather information from interface design experts. After the interface was created, three interface design experts were contacted for interviews.   The experts interviewed in this study were instructors of "Instructional Message Design" courses.   Based on years of experience in interface design of Web-based software, they evaluated the on-line panel discussion interface with the evaluation guide provided.

The general interview guide for this study involved outlining a set of issues that were to be explored with each respondent before the interview took place.   Users were also encouraged to address issues not represented in the interview guide. Interview questions focused on the ease of use, consistency, content structure, media formats, clearness of explanation and other usability problems. For the interview portion of this study, the questions were listed below.

1. How well did the visual metaphor used contribute to the understanding of the discussion environment structure?
2. How did the interface tool assist or hinder your discussion?
3. What was the necessary interface in the discussion environment?
4. How would you improve the discussion interface?

Evaluation on the panel discussion interface revealed several usability problems. Major problems found in the evaluation were listed below.

- Moderators were not familiar with the panel discussion interface. The system needs to provide on-line instruction for moderators.
- Members did not know when to participate.
- Panels need textual information cues from member's question.
- Member screens were hindered by panels screen. Providing one member video and one text screen is enough.
- Member's screen may cause distraction when experts were discussing.
- Moderator has no control over the member

An interface for panel discussion was developed according to the evaluation suggestions. Following is the revised on-line panel discussion interface.
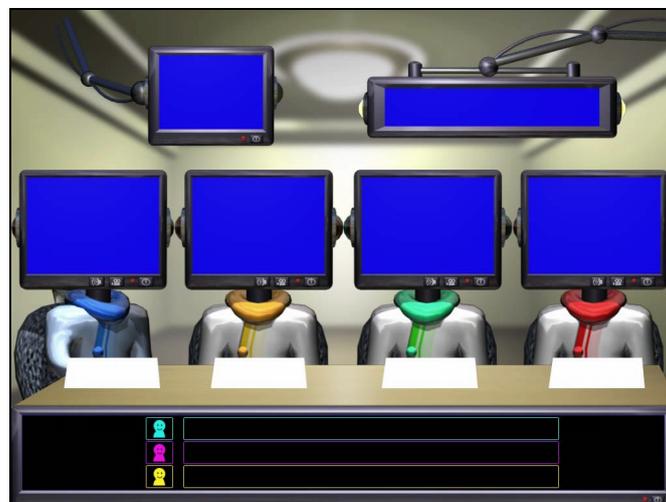

Figure 2: revised visual interface design for panel discussion

Results of usability testing

The results of this study revealed that an on-line panel discussion environment that is confusing to operate could interfere with the navigation process. The information obtained from the evaluation were analyzed and synthesized to generate a list of designing principle for on-line panel discussion interface. From the observation and interview, a list of guidelines was integrated for the design of panel discussion interface. The results were outlined below:

1. Navigation

- A discussion room contains and conveys more information than a list of directions. A well-designed visual interface for discussion not only

shows the functions of the discussion but also reveals information on relative discussion organization and sequences.

- When member participate in the discussion, provides visual transition and fade in/off effect to create sense of moving.
- Provides overall control for moderator to monitor the discussion.
- Instruction on how to navigate could be presented at the beginning of the web page.
- Provide animated orientation instruction to describe the function of the interface for each discussion mode.
- Use metaphor from the real world. Provides metaphors for information objects (moderator, panels, members, nametag, table, curtain and room).

2. Modes for participator

- Provide modes for each different participators' needs: three modes were created: moderator, panels and member modes.
- Provide visual, audio, and text input and on/off control for participator
  - ➢ Moderator: overall visual, audio, text input and on/off control.
  - ➢ Panels: off-line control
  - ➢ Members: text input and off-line control.

3. Visual aids

- Provides timeout device for moderator to point out how much time left for each speaker.
- Text could be placed at the button of movie window, or pop up window
- Provide nametag input for moderator.

4. Other suggestions

- Provide the only necessary control from function.
- To prevent the members from getting bored provides a masks for each member screen and indicates which screen is currently on the moderator's screen.
- Lower volume of background music that matches the visual environment was pleasing to the users.
- Provides light indicators that signify "You are on", so users will know he or she is supposed to talk.

Conclusion

It is important for designers of web-based instruction system to reduce cognitive loading as much as possible by using different sensory inputs such as visual, audio and text; they also need to allow for users reverting back to usual behavior in times of stress and cognitive overload (Noyes & Cook, 1999). The author suggests that

designers of user interfaces should have more training or background knowledge and more evaluations should be conducted to improve the interface of web-based discussion environment.

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