Content and Page Design in Distance Education

Su-Ting Yong
Business School, Curtin University of Technology,
CDT 250, 98009 Miri, Sarawak Malaysia.
yong.su.ting@curtin.edu.my

Abstract

This paper is a review of the content design and page design of distance education software programme (DESP) used over the Internet. To design an effective and good DESP, a content designer and a page designer need to consider some important elements in their programmes. Multimedia elements to be considered includes video, picture, audio and animation. Besides content design, a page designer has to consider the page layout, text used, blank space and the metaphor design. This review presents a brief suggestion on the improvement of the content and page design for DESP that cater to the international learners.

Abstrak

Kertas kerja ini merupakan ulasan rekaan kandungan dan rekaan muka halaman bagi program perisian pendidikan jarak jauh (PPPJJ). Bagi menghasilkan satu PPPJJ, seseorang pereka kandungan dan muka halaman hendaklah mengambilkira beberapa elemen penting dalam program mereka. Unsur multimedia yang dipertimbangkan termasuk video, gambar, audio dan animasi. Selain reka bentuk kandungan, seseorang pereka muka halaman juga hendaklah mengambilkira paparan muka halaman, teks yang digunakan, ruang kosong dan rekabentuk metafor. Ulasan ini juga mengutarakan cadangan ringkas peningkatan rekaan kandungan dan muka halaman bagi pelajar-pelajar di peringkat antarabangsa.

Introduction

In mid 1980s, the wave of computing technologies including multimedia, information visualisation and virtual reality presented even more opportunities for the design of distance education software (DESP). Today, contemporary DESP cannot be separated from the component of communication technologies of the World Wide Web (WWW). The Internet originated in 1969 as a special communication tool among selected academic and governmental researchers (Lu & Yeung, 1998). Now, there is growing interest in tertiary education in the use of computer-based technologies, and in particular, in the WWW as a learning tool (Oliver, 1997). Online learning environments has changed course delivery and the Internet has been used

extensively in learning and instruction (Abdelraheem, 2003). Although the Internet plays an important role in learning environments, the main concern of a DESP is to enable learning processes, including the delivery of course content as well as motivation to the students.

However, the use of DESP faced some challenges such as the misuse of technology and the lack of basic design consideration. Other problems highlighted by Thissen (2000) in university virtual learning environments or virtual learning catalogue is primarily an information pool offering a package of multimedia material which learner can passively assimilate, unintuitive user interfaces and basic ergonomic rules, such as, screen colors, text layouts and attention to human factors, are neglected. This is where Human-Computer Interaction (HCI) comes in. According to McCracken and Wolfe (2004), "HCI is a discipline concerned with the design, evaluation and implementation of interactive computing systems for human use and with the study of major phenomena surrounding them". HCI consists of few disciplines and the content design and page design are parts of it. Content and page design are as important as the learning contents. If content is the king, then content design and page design are the queens. Good content and page design makes it easier to locate the information and enable a positive learning experience as the DESP becomes more user-friendly.

Content Design

Content design of DESP enables the content and information to be delivered to the learners effectively, with content as the main focus. An analogy is, when you are giving a lecture in the class, you want the students to be discussing on how great your lecture is and not how great your custom is. Therefore, when learners are using a DESP, we want them to be discussing how great the content and learning experiences are and not how great the graphic designs or sound effects are. There are a number of factors that contribute to making the computer learning environment pleasing to use, such as the appearance of the site, the use of text and graphics, the amount of materials presented on each page (Abdelraheem, 2003).

Written Content
The content of DESP has to be written in such a way that it can attract learners' attention and more important it should allow the learner to read at ease. According to Dehoney & Reeves (1998) (as cited in Abdelraheem, 2003), detailed evaluation of computer-based learning frequently revealed that courses tend to be electronic versions of the conventional print-based versions from

which they have been derived. Learners normally are impatient and they want to get the required information with minimal efforts. Earlier studies of how people read on the web indicated that they prefer to scan rather than read, want text to be short and to the point (Morkes & Nielsen, 1998). They usually glance through the content by looking at the titles or read the first few sentences in order to determine whether to continue reading or to scan through other pages to look for required information. Research has shown that reading from computer screens is about 25% slower than reading from paper (Nielsen, 2000). Therefore, remember to keep it short and simple (KISS). DESP is different from other educational software as the materials need to be downloaded from the server and it may take considerable time if the content is too long or the network traffic is heavy. As the consequence, the content should be short and precise and make use of diagrams if necessary. Avoid forcing students to scroll down reading a full page of text. This may burden their eyes, as they have to keep staring at computer screen. Short and precise content can reduce the learner's cognitive load, which results in faster and more efficient processing of information.

When writing the content for DESP, one should not overlook the design of questions for quizzes, tutorials and tests. Questions can be constructed by using text boxes, option buttons, check boxes, combo boxes and other controls. Before designing questions, one should assess whether they are relevant to the learning objectives and appropriate. Questions should be designed to encourage thinking. Therefore, there should be a variety of questions that require not only recognition but also remembering, understanding, applying, evaluating, typing, constructing and drawing (Alessi & Trollip, 2001). Questions also need to be designed with various formats such as closed and open-ended questions. Placement of quizzes, tutorials and tests should be considered, whether it is going to be administered between topics or after all the relevant information is delivered.

Content Layout
Since no teacher is available to tell the learners what facts and information are important when learning through DESP, it is vital to have some indicators in the layout of the content to assist the learner. It is important to provide the content and information in a clear and concise way by using bullet points, small paragraphs, highlights, bold, color and italics to alert the learners to focus on the key concepts and important facts. Learners normally dislike reading pages, which are full of text. They prefer to scan text for keywords and information, which are of their interest. Besides that, frames can be used to organise the content in a proper layout. Frames can transform a boring page of block text

into an eye-popping array of menus, fields and pictures that you can fully control (Davis, 2003). However, the use of frames has to be considered carefully.

Language
DESP used around the world should be designed in different languages to satisfy the needs of international learners. Whatever language is chosen, it should be plain and simple. The most important thing is designers need to know who the users are, whether they are primary school students, university students or adult learners. Different groups of learners have different level of language proficiency. If humor is used, make sure it is appropriate and does not offend anyone. Humor can be used to enhance the learning experience but use it only when is humor necessary.

Breaking Up Pages
One of the goals of the content design is to make the text shorter than the one used in the traditional media. Information should be arranged and simplified in a non-threatening manner so that users are not overwhelmed by the amount of information contained in DESP. Fountaine & O'Dea (as cited in Dowse, Fortes & Smee, 2002) reported that since the beginning of Internet-based learning, significantly higher student pass rates have been achieved by breaking content into small learning objects and enhancing courses with special effects. However, designers should be wary of losing the depth of the context if it is too brief. Perkins (1991) (as cited in Oliver & Herrington, 2001) suggested that the temptation to over-simplify learning environments should be resisted, and instead designers and teachers should search for new ways to provide appropriate scaffolding and support. On some occasions, the content is too long and it needs to be extended into multiple screens. Information of interest to a minority of readers can be made available through a link without penalizing those readers who don't want it (Nielsen, 2000). Giving users the option to read the information only if they are interested.

Headlines
Users normally will read the headlines or titles while scanning through the content. Some guidelines recommended by Nielsen (2000) for writing headlines are: clearly explain what the article is about in terms that relate to the user; write in plain language; make the first word an important one and do not start all page titles with the same word. Headlines need to be obvious and some effects like bold and italic can be used to differentiate it from the content. Besides that, different color or fonts can be applied to the headline but do not underline it as users may mistaken it as a hyperlink.

Legibility

Designers should ensure that the color for the text and background have a high level of contrast and does not create any discomfort while reading it. Optimal legibility requires black text on a white background (Nielsen, 2000). Besides that, font sizes should be suitable, so that majority of the learners can read the text comfortably. Small font can be used for information of minor importance and bigger font for titles or headlines. Designers can consider the use of faces like Verdana and Arial. To assist reading, avoid using all uppercase text, as it is difficult to be read and make sure that the text for reading is standing still.

Page Titles

It is necessary to include a meaningful title for each page so that the page titles address "where am I?" as the learners surf through the materials over the Internet. Avoid using the same page title over the pages as it may cause confusion and learners may get lost in the hyperspace. Each page should contain a different title, unless if frames are used. Titles need to be more in the nature of billboard slogans (Nielsen, 2000). Use a short and meaningful title.

Multimedia

In addition to text, multimedia can be used to support learning environment. According to Weinschenk (1997) (as cited in McCracken & Wolfe, 2004), the term multimedia refers to combination of two or more media and according to Dyrli & Kinnaman (1995) (as cited in Dowse et al., 2002), multimedia is defined as the "seamless digital integration of text, graphics, animation, audio, still images and motion video in a way that provides individual users with high levels of control and interaction".

Nowadays, multimedia is widely used in DESP because it can offer a richer learning experience and it serves the purpose to inform, persuade or entertain the users. Besides, it allows teachers to create interactive presentations through integration of text, images, animation, video and audio (Dowse et al., 2002). Multimedia facilitates critical thinking, problem solving, group and network learning communication (Dowse et al., 2002). According to Smith & Jones (1989) (as cited in Hall, Watkins & Eller, 2003), it is also true that integrating rich and dynamic multimedia into the learning experience can increase students' interest and motivation. According to Jacobson & Spiro (1995) (as cited in Hall, Watkins & Eller, 2003), students learn complex information most effectively if they are allowed to experience the information in various formats. Multimedia encourages users to become active learners. However, over usage of multimedia can make it harder for the users to focus on the content and increase the download time in web environment. When using multimedia

elements in the DESP, designers need to consider the download time of the home users due to the bandwidth problems. According to Elges (2003), one of the W3C guidelines to make web sites accessible is to provide alternatives to auditory and visual content. This is because not everyone can benefit fully from the images, multimedia and audio on the web. However, multimedia should be used only when they can support the learning objectives.

Video

Before using a video, designers should assess whether it is appropriate. Video is an appealing medium, but storing video in digital form requires a large amount of disk space and is extremely slow to download. If possible, avoid video altogether (McCraken & Wolfe, 2004). If video is used, make sure that it can be played on all target computers and the time required to access the video is acceptable. When designers use the video in DESP, narration in the video needs careful consideration, as the voice of the speakers may be sloppy or has a strong accent. This may cause difficulty to the learners in understanding the words spoken.

Pictures

Pictures may include graphics, photos, images, charts, graphs, maps and diagrams. They not only contribute additional information to the content, but you can also use them to grab a reader's attention, lead him into the article and keep him there (Whitcomb, 2003). Besides that, pictures can be used to illustrate or break up the text blocks. However, the designer should try to avoid unnecessary pictures, as they will increase the download time on the web. Designers can consider the use of thumbnail or crop of picture. Higher-level pages should minimise the number of illustrations because the user has not yet indicated a concrete interest in an individual object that needs to be depicted (Nielsen, 2000).

Audio

Audio like speech, sound and music can supplement the effects of visual aspects of DESP. Audio can be used to provide a sense of place or set a mood (Nielsen, 2000). Non-speech effects like hand clapping sound when learners have given a correct answer can enhance the users' experience. New designers have the tendency to over-do "bells and whistles", including superfluous multimedia components that don't contribute to the learning goals (Hall, Watkins & Eller, 2003). The misuse of audio in a DESP can also create an annoying situation. When audio like music is used to set a mood, make sure it is appropriate and keep the volume low. However, it is recommended that we ensure that users are offered an option to turn off and replay the sound. The

quality of the audio should be acceptable. If hearing impaired people are expected, make sure that the written version of the audio is available.

Animation

Animation is synthetic apparent motion created through artificial means (McCraken & Wolfe, 2004). Animation is good to attract attention but the frequency of animation should be limited because it may distract the attention of the learners towards the content and the learners' learning experience. Animation can be good for:

- Showing continuity in transition or movement (i.e. showing how a car engine functions and how an airplane flies into the sky).
- Illustrating and showing the change over a period of time (i.e. showing how a seed grows into a plant and how an embryo grows into a baby).
- Visualising 3-D structures to make a sense of reality (i.e. virtual reality for the aircraft pilots and software for entertainment and educational purpose).
- Attracting attention for subsequence action (i.e. marquee or dynamic Hypertext Markup Language).
- Explaining complex systems (i.e. showing what is going on in human food digestion system).

However, designers should avoid animation on the content like moving text or marquee because it may cause difficulty in reading it. Animation should not be too slow as learners might get bored and should not be too fast as learners might overlook what is being demonstrated. It is advisable to provide an option to control the speed and repeat the animation.

Page Design

A page is what appears on the computer screen or program window. Unlike traditional media, the size of a DESP page can be infinitely large in terms of height and width. Therefore, designers need to adjust the page size based on the purpose and the content of the display. The main goal of a designer is to lie out pages that will catch a reader's eyes (Whitcomb & Dustman, 2003). It is not an easy job if the content to be displayed is in the form of heavy text. However, with or without art, you can design eye-catching pages (Whitcomb & Dustman, 2003). There are four principles of visual organisation: proximity, alignment, consistency and contrast (McCracken & Wolfe, 2004). All these principles can be used as guidelines for page design.

Page Layouts

Top-Left-Bottom (TLB) layout is commonly used in web-based DESP. The top of the page normally contains titles and primary navigation. The left of the page is normally reserved for navigational elements (i.e. links to other topics) and the bottom of the page can be used for additional text links and information such as copyright.

Text Used

It is important to make sure that the texts used for displaying the content are readable. Designers need to choose the suitable font face, size, style, color, effects and layout of the text. It is recommended to set at least two alternative font faces within a web page in case a certain browser does not support a certain font style. Jones & Okey (1995) suggested that specific fonts, font sizes and font characteristics should be chosen to represent certain types of information.

Blank Space

Blank space is a white space that does not contain anything. According to (Gage, Graham & Pagel, 2001), trends in technical communication lean toward including white space as a way to improve the visual appearance of a document, whether it is hardcopy or on the web. Every page should have a balance between the content and the blank space. A page with little blank space may look cluttered but too much blank space may cause content to be extended into a long page. Blank space is important because it provides rest to learners' eyes, directs attention and provides a neat design. Therefore, before designers begin the production of DESP, they have to decide the conventions for paragraphing, spacing between sentences, and hyphenation.

Metaphor Design

Most of the DESP is built on graphical user interface (GUI) with metaphor design. Metaphor design is a type of design, which supports the idea of making an image or icon, which looks similar to the real one or its real-life equivalent. One way that learners can intuitively understand DESP is through metaphor. The computer screen is the world (Brockerhoff, 2000). This is the most obvious metaphor design in DESP. When learners encounter DESP with metaphor design, they use their own understanding to decode the metaphor, which is influenced by their culture, education background, experience and mind set.

However, it is very difficult to predict how a learner will react to certain metaphor. Metaphor design must be something that learners are familiar with

because confusion may be caused by varied interpretation. Icons used should reflect their functions and consistent with the metaphor of the program. An example of metaphor is an E-book that contains tools like pages, bookmarks, appendices and references. Not every DESP needs a metaphor design. Metaphor can be used if it reflects the program contents and make it obvious to users (Jones & Okey, 1995). The advantage of using metaphor is that it makes learning easier through learners' familiarity with the real-life equivalents, which are highly memorable. Unfortunately, some learners are unable to recognise or understand the metaphor. The study done by Lee (2002) found out that one of the major problems of the user interface of "Quick-Time VR", image-based environment for distance learning classroom, is the inappropriate metaphor design. Before choosing a certain metaphor, a designer should make sure the metaphor is appropriate and it can enhance the learning of the content.

Future Promises of DESP Design

As the Internet will be the main communication medium in DESP environment, quality of page design and content design have to be emphasised in the low level design. Normally, professional designers will be involved in the design and implementation phase of the DESP development. Unfortunately, designers rarely notice the students' learning style and they do not understand clearly the nature of the subjects (i.e. Science, Mathematics etc.) being presented in the DESP. Designers are good at designing the DESP but teachers are the one that understand the learners and subject matter best. So, what is the best way to get a good DESP designer? Teachers trained as designers or vice-versa? It is recommended that teachers, designers and learners should be involved actively in content design and page design of DESP. This is because teachers have the pedagogical knowledge, whereby designers are trained on how to create a good design and learners are the end users.

Conclusion

Content design and page design are small areas in HCI design but they play an important role. There are no universal rules of thumb for page design and content design for DESP due to the differences in objectives, learners, environments, cultures and technologies available. It is recommended that more research be done on content design and page design for a specific subject (i.e. Mathematics) focusing on the international learners. In other words, the DESP need to be customized to certain group of learners, as we have to accept the fact that every human being has different learning needs.

References

Abdelraheem, A.Y. (2003). Computerized Learning Environments Problems, Design Challenges and Future Promises. The Journal of Interactive Online Learning, *2*(2). Retrieved December 3, 2003, from http://www.ncolr.org/jiol/archives/2003/fall/01/index.pdf

Alessi, S.M. & Trollip, S.R. (2001). Multimedia for Learning: Methods and Development. United Sates: Pearson Education Company.

Brockerhoff, R. (2000). User Interface Metaphors. Retrieved 18 December, 2003, from http://www.brockerhoff.net/Paper2000.pdf

Cambridge Advanced Learner's Dictionary. Retrieved June 16, 2004 from http://dictionary.cambridge.org/default.asp?dict=CALD

Davis, S.M. (2003). For picture-perfect pages, organize Web content using frames. Active Server Developer's Journal, *7*(10), pp. 10.

Dowse, G., Fortes, R. & Smee, A. (2002). Virtual property: an interactive computer-based learning experience. Pacific Rim Real Estate Society Conference, 21-23 January 2002 Christchurch, New Zealand. Retrieved December 3, 2003 from http://business.unisa.edu.au/prres/Proceedings/Proceedings2002 Dowse_Virtual_property_an_interactive_computer.PDF

Elges, M. (2003). Designing for Web accessibility: More benefits than you may imagine. Nonprofit World, *21*(4), pp. 26.

Gage, S., Graham, N. & Pagel, D. (2001). Web Development for Electronic Publications. Minnesota State University's Undergraduate Research Conference. Retrieved January 9, 2003, from http://www.intech.mnsu.edu/researchoffice/URC/Online%20Publications/URCproceedings2001/webdevelopment2001.htm

Hall, R.H., Watkins, S.E. & Eller, V.E. (2003). A model of web based design for learning. In Moore, M. & Anderson, B. (Ed.). The Handbook of Distance Education (pp. 367-376). Mahwah, NJ: Erlbaum. Retrieved December 13, 2003, from http://medialab.umr.edu/papers/handbook_2003_hall.pdf

Jones, M.G. & Okey, J.R. (1995). Interface Design for Computer-based Learning Environments. Retrieved December 10, 2003, from http://www.gsu.edu/~wwwitr/docs/idguide/index.html

Lee, S.C. (2002). Evaluation and development of the user interface of "Quick-Time VR," Image-based environment for Distance Learning classroom at Tamkang University. International Journal of Instructional Media, *29*(3), pp. 337-344.

Lu, M.T. & Yeung, W.L. (1998). A framework for effective commercial web application development. Internet Research, *8*(2), pp. 166.

McCracken, D.D. & Wolfe, R.J. (2004). User-Centered Website Development: A Human-Computer Interaction Approach. New Jersey: Pearson Prentice Hall.

Morkes, J. & Nielsen, J. (1998). Applying Writing Guidelines to Web Pages. Retrieved December 10, 2003, from http://www.useit.com/papers/webwriting/studyfiles

Nielsen, J. (2000). Designing Web Usability: The Practice of Simplicity. USA: New Riders Publishing.

Oliver, R. (1997). Using computer-based learning environments to connect learners: Learning through collaboration, communication and talk. Proceedings of the 6th International Conference on Computer Assisted Instruction, (pp. 16-21). Taipei. Retrieved December 3, 2003, from http://elrond.scam.ecu.edu.au/oliver/docs/97/Taipeido.pdf

Oliver, R. & Herrington, J. (2001). Online Learning Design For Dummies: Professional Development Strategies For Beginning Online Designers. In P. Barker & S. Rebelsky (Eds.), Proceedings of ED-MEDIA 2002, World Conference on Educational Multi-media, Hypermedia and Telecommunications, (pp. 1500-1505). Norfolk, VA: AACE, Retrieved December 15, 2003, from http://elrond.scam.ecu.edu.au/oliver/2002/edmedia1.pdf

Thissen, F. (2000). The medium and the message: Interface design for online learning environments and cooperative learning in virtual worlds. ALT-C 2000 Programme. Retrieved December 15, 2003, from http://www.frank-thissen.de/medium and message.pdf

Whitcomb, J. (2003). Organizing layout content, part 2: Using graphic objects. Inside PageMaker, *9*(12), pp. 5.

Whitcomb, J. & Dustman, R. (2003). Using the basic concepts of good design to save gray. Inside PageMaker, *9*(9), pp. 9.