ADDING VALUE TO EDUCATIONAL MULTIMEDIA: THE ROLE OF GRAPHIC DESIGN

Jennifer Kirk & Gregor Kennedy
Biomedical Multimedia Unit
The University of Melbourne, Australia
jkirk@unimelb.edu.au

Abstract

This paper presents an overview of the role of graphic designers in the design and development of educational multimedia. Three critical aspects of graphic designers' contribution to the design and development of educational multimedia are discussed including developing a visual concept, visual communication and developing conceptual ideas. An example of how graphic design has contributed to the educational value of a multimedia program, DNAexplorer, is presented.

Keywords

graphic design, conceptual design, educational multimedia, visual communication

The Design and Development of Educational Multimedia

An organised approach to the design and development of educational multimedia is vital as often considerable resources are invested to achieve an effective outcome (Phillips, 1997). Often a formal design and development cycle, such as the one outlined by Keppell (1998), provides a useful scaffold for the graphic design team. Such a design and development cycle outlines a number of development tasks, such as needs assessment, content collection, and story boarding, which are completed before substantive graphic design input. The completion of these tasks helps define the scope of the project generally and, as a result, contributes to the brief of the graphic designer. In addition the design and development cycle helps to define the graphic designer's role in relation to others within the development team (content provider, project manager, instructional designer, programmer and evaluator) which assists with the organisation and management of the development process generally. While these roles are not mutually exclusive, the definition of them often assists with communication about the project's design.

The Role of Graphic Designers

The graphic designer or design team can contribute to the development of an educational multimedia project in three major areas: (i) developing a visual concept, (ii) developing effective visual communication, and (iii) developing conceptual ideas. Graphic designers can draw on techniques used in traditional graphic field in each of these areas.

Developing a Visual Concept

The development of visual concepts has always been a part of traditional print-based graphic design (Lawson, 1990). It involves the graphic designer or team coming up with screen designs that organise and clearly present content to maximise users' understanding. In addition the design team attempts to develop a visual concept that is stimulating and appealing to the specific target audience. As Phillips (1996) says "graphic design or screen design provides the visual communication necessary to transmit a message in an attractive way" (p. 66).

Traditional graphic design frameworks have changed to accommodate the unique requirements of designing educational multimedia (Zeldman, 2001). These new requirements include working with programmers and information technology delivery experts to determine technical considerations that may impact on the graphic design. Programmers help to define the technical boundaries of an educational multimedia project. For example, an Internet-based project may have bandwidth limitations that may affect choices regarding the use of graphics and embedded objects. The designer may be required to restrict their use of large file-size graphics and embedded objects such as QuickTime and Shockwave. Similarly, graphic designers must learn to work with instructional designers, a role not often found in traditional design studios but often found in educational multimedia production. The instructional designer is responsible for developing the macro structure of the program and also must work with the graphic designer to ensure the concept, as determined by the content provider, is effectively displayed on-screen.

One change, which is obvious when moving from print-based media to multimedia, is the option to incorporate dynamic elements in the design. The use of animation and interactive elements in educational multimedia provides an additional challenge for graphic designers. First and foremost graphic designers must make judgements about the appropriate use of animation; does animation improve the visual communication of the concept? Traditional graphic design principles must be used when designing the moving elements of animations, which is not always an easy task. Designers must pay attention to the speed of animation and ensure that the most important elements of the animation are always prominent. A final aspect of the visual concept is interactivity. At a basic level the designer must not only design a navigation bar so that it is clear, consistent and intuitive but also plan what happens to the buttons when a mouse rolls over and when a mouse clicks. This is important because it alerts users that their interaction with the interface has taken place.

Visual Communication

Visual communication refers to the use of universally recognised visual aids and other techniques used to improve the readability and comprehension of text (Hamilton, 1970). Designing educational multimedia creates further challenges for graphic designers particularly given the end users of the program will often be unassisted. This places a greater emphasis on the need for the visual communication to be clear and intuitive. For example, when designing on-screen navigation tools, the buttons themselves and their functionality should, as far as possible, be immediately recognisable. Information buttons (eg. help and glossary) should be clearly distinguished from navigation buttons (eg. forward, back and home). The navigation options given to the user should be consistent, concise and clear, rather than presenting the user with a confusing array of (too many) navigational choices. It is often helpful, depending on the nature of the program, to give users an indication of where they have been and how far through a section or the program they have come.

The visual communication choices of multimedia graphic designers are affected by the technical specifications of computer screens. Graphic designers must learn to create clear or “clean” layouts within the tight confines of a computer screen as well as contend with the low resolution of computer screens compared with printed media (Phillips, 1996; Boyle, 1997). One example in this area is the use of on-screen text by graphic designers. Researchers have reported that users find reading from a screen more difficult that reading from printed material (Zeldman, 2001). Improving the on-screen readability of text is one of the primary ways in which graphic designers can enhance a project. Techniques to assist users with readability include, using short lines of text (8-10 words), “chunking” text into blocks on the screen, presenting topical blocks of text over a number of screens and maximising the contrast between the background and the text.

Conceptual Design

The graphic design field has always placed great emphasis on providing creative solutions to practical and conceptual problems. In the design of educational multimedia, the client or content expert will often present a practical or conceptual problem to the development team. In an educational context, this may be a concept students traditionally have trouble understanding or a practical problem associated with simultaneously providing students with access to a wide array of information.

Part of a graphic designer's role is to work with other members of the development team (instructional designers and programmers) to provide creative solutions to problems such as these. In this way graphic designers bring a particular focus and expertise to the design and development of educational multimedia. Often the "craft" aspect of graphic design is emphasised in discussions of graphic designers' role (eg. page layout, typography, illustration and technical drawing) (Doordan, 1995). However, another crucial role of graphic designers in the development of educational multimedia is to focus on the concept or idea behind the design. When faced with conceptual or practical problems, skilled graphic designers are able to generate conceptual ideas and use their craft to make these ideas an on screen reality.

DNAexplorer: A Graphic Design Approach

DNAexplorer, a multimedia program on bioinformatics, provides an example of how graphic designers are able to add value to the design and development of educational technology. Bioinformatics is an area of investigation that integrates the disciplines of biology, mathematics and computer science. Related activities include searching for, accessing and analysing biologically relevant information using a variety of desktop applications and web sites. Typically, students find it difficult to coordinate and integrate the use of these applications while maintaining focus on the relevant bioinformatics principles and procedures. DNAexplorer was developed to address these problems and its design employs a case-based approach. One of the primary aims of DNAexplorer was to provide students with navigational support as they investigated bioinformatics principles and procedures. The design of DNAexplorer presented a number of challenges for graphic designers in the areas described in the previous sections of this paper. The graphic design goals for the project were to:

- develop a "virtual" theme for the package;
- organise the content to maximise the readability of information; and
- provide students with a clear way of linking web sites and desktop applications.

Figure 1: The virtual office and lab that formed the basis of the visual concept

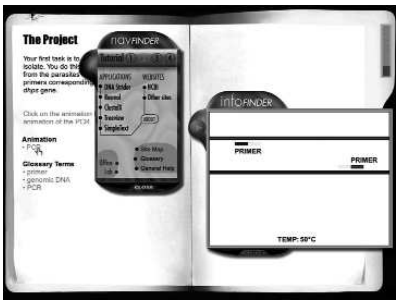

Figure 2: A screen from DNAexplorer showing the navFINDER and infoFINDER

With input from an instructional designer and a programmer, the graphic design team developed a virtual office and laboratory with the aim of creating a realistic environment for students (see also Kennedy, Judd, Keppell, Ginns, Crabb & Strugnell, 2001). This virtual office was developed as the home page for the program and formed the basis of the program's visual concept (see Figure 1). Students were able to access cases via manilla folders from the office. The manilla folder metaphor

was carried through and used as an interface thus providing a consistent graphical theme throughout the package. The design of each screen in the package adhered to traditional graphic design principles, with modifications to suit on-screen presentation. For example, to aid with on-screen readability, text was "chunked" into blocks and presented over a number of screens and lines were kept short (8-10 words). White space was used to create clear demarcation between text and images or diagrams.

The content experts recognised the difficulty students had organising a pathway through desktop applications and web sites when investigating bioinformatics procedures. This became a practical and conceptual problem for the development team. In order to resolve this problem the graphic design and development team developed two support tools named the nav*FINDER* and info*FINDER* (see Figure 2). The names of these support tools and their appearance alert the user to their functionality. The nav*FINDER* was designed using the metaphor of a remote control and, as its name suggests, is used to find locations or applications. The nav*FINDER* allows students to navigate easily between cases, the office, the lab, web sites and desktop applications. It also provides students with text-based instructions about bioinformatics procedures associated with their case. The design of the info*FINDER* was based on a palm pilot. Again the role of the tool matches its design as students use the info*FINDER* to access additional information as they need it (eg. quiz questions, animations, DNA and protein sequences, glossary terms).

Conclusion

This paper has described the three critical aspects to a graphic designer's role in the design and development of educational multimedia. When reinterpreted for multimedia, traditional graphic design skills can add educational value to the development of multimedia programs. The example of DNAexplorer was used to highlight how the graphic design team worked with other members of the development team to develop a visual concept (the virtual office, lab and the manilla folder metaphor). This, along with the screen design, assisted with the visual communication of content. Finally, the graphic design team contributed to the solution of a practical and conceptual problem through the design of the support tools nav*FINDER* and info*FINDER*.

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