Some Principles of Message Design for Teaching with Media and Multimedia

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Introduction

As schools acquire new media technologies such as computers, CD-ROMs and laserdiscs, educators are often unaware of some of the most fundamental techniques for using them in the classroom. By combining different media systems and computer programs to create *multimedia,* teachers have even more sophisticated tools to support student learning.

Although many applications and instructional systems have built-in help functions, tutorial programs and on-line guidance, they are often insufficient for enabling users to take full advantage of these powerful technologies. Additionally, the manuals that accompany most hardware usually focus on technical matters and operating procedures while ignoring presentation ideas and message design considerations. Furthermore, teachers are often so busy preparing materials and juggling various components of the learning environment that they may overlook many simple message design techniques that can enhance communication and contribute to effective instruction. This article presents a few simple message design principles, based upon research and practice, that can be ulilized when creating media and multimedia materials. *It is essential for educators to remember that the form and appearance of their teaching materials can help students succeed in their studies or, unfortunately, may contribute to their failure to learn.* Consequently, these materials should provide students with motivational stimulus, encourage meaningful associations and deliver clear, unambiguous messages.

Creating Effective Messages and Materials

Creating good materials involves a combination of many factors including subject matter expertise, audience awareness, experience in operating classroom media and an understanding of message design. Generally, classroom teachers know their subject areas well enough and are often guided by standardized, comprehensive, curriculum manuals. Moreover, teachers are familiar with their audiences and they usually have had some training or experience in operating media systems. However, while they usually have an intuitive grasp of message design, few teachers have had any systematic training in the subject.

Instructional message design involves "the process of manipulating ... a pattern of signs and symbols that may provide the conditions of learning (Fleming and Levie, 1978)." It is research-based and systematizes much of what we already have learned about the subject through intuition, experience and indirect learning. Instructional messages have a dual purpose of presenting information to students while serving as a model of communication for them to emulate. For example, overhead transparencies or projected computer screens illustrating steps for solving quadratic equations should not only be clearly visible, uncrowded and unconfusing, but should also contain correct spelling and grammar. A well-designed message reinforces the notion that clear and concise language is necessary for understanding sophisticated complex concepts. *The form and the content of the message are inseparable.*

The importance of designing good messages is often compared to eating a piece of cake. When we eat cake we taste the icing, the cake itself and perhaps the filling (yum, yum), while we do not taste ingredients such as floor, salt, spices and water, Similarly, when we present an instructional message we do not want students to spend time thinking about why we used four different colors in one sentence or why all the words on the screen are capitalized, underlined and difficult to read. The essence of the message should come across easily, with no ambiguity. The concept of quadratic equations may be hard enough for students to understand, why make it more difficult by presenting it poorly? Therefore, good messages

and good communication should be like eating cake, easy to taste the flavor with no thought about the ingredients.

A Few Principles of Message Design

Many commercial programs, textbooks and computer applications contain examples of good message design, although they can easily be overlooked. When messages are thoughtfully prepared the underlying design principles and strategies should be transparent.

1. Color

Although students are used to sophisticated color images in both print and electronic media, the use of color in presentations should be carefully considered. Color can enhance a message if it illustrates the colors of things found in the real world, or if it draws attention to important parts of a message. It can also heighten realism, illustrate similarities and differences or help to elicit emotional responses from the audience (Heinich, Molinda & Russell, 1993). However, color can also *inhibit* communication when it's use is unclear, when it overshadows the message or when there are too many colors used to illustrate too many points.

2. Text

Using computers to produce materials is an extension and improvement over earlier technologies such as typewriters or stencils. However, Williams (1990, 1991) and others point out that there are important differences between computer generated materials and those that are typewritten. *In fact, many of the conventions used in typing are inappropriate or counterproductive when applied to computer documents.* Underlining, for example is used with typewriters because there was no way to include italics in the early machines. In most cases using underlining makes text more difficult to read. Why do you think we seldom see underlining in any book or magazine? The reader might examine guideline number 8 in the *Notes for Contributors* on the back cover of this journal concerning the use of underlining. Nevertheless, many teachers still

insist on using underlining in their computer-generated materials, perhaps because of earlier training on a typewriter.

3.   Graphics

Graphics can be used to enhance almost any idea and concept but they must suitably complement the message rather than just being there to take up space or look attractive. Inappropriate graphics can cause confusion and hurt the effectiveness of the entire presentation. A full description of developing and placing graphics for projected media can be found in Heinich, Molinda and Russell (1993).

4.   Presentation

Teachers can learn a lot about good message design by examining some of the built-in features of commercial programs. For example, computer applications such as Microsoft PowerPoint or Harvard Graphics automatically start operation in the landscape view (the screen is wider than it is tall) instead of the portrait view (screen is taller than it is wide). This is because research demonstrates that a landscape orientation provides more visibility for projected messages. However, many teachers ignore this hint and continue to produce transparencies with a portrait view which contain too much information or may be difficult to read for students who are sitting on the sides of the classroom.

The presentation of text in print can also affect how a message is perceived. For example, at a normal reading distance of 15 inches, the optimum legibility for printed text occurs with 10 point type, lines of 19 pica (3.1 inches) and 2 to 4 points leading (space between lines). This journal uses 10 point type, 24.5 pica (4.1 inches) and 2 points leading. Most text books will have similar measurements although the lines will be longer. With more teachers using computers to create materials, measurements such as these gain new importance, especially for secondary schools.

Text on an OHT or computer projection should be larger than text on a printed page. Factors affecting the design of projected visuals include the dimensions of the display venue, the ambient light

and the distance between the projection device and the screen. Educators must evaluate the size of their projected materials from different points in the classroom to be confident that all students will be able to see the display clearly and can read the text comfortably.

Table 1 provides a summary of a few simple principles of message design that can be useful for educators. It is not a comprehensive list but rather focuses on some of the common design decisions that teachers make.

Table 1. Some General Principles of Message Design

Element	Message Design Decision	Principle
1. Color	a. When should color be used?	a. It should be used to enhance a message or draw attention to relevant information. It can also provide motivational cues. Color graphics are usually preferred over black and white (Heinich, Molinda & Russel, 1993; Fleming & Levie, 1993)
	b. When should color not be used?	b. Don't let color overpower or interfere with a message (Heinich, Molinda & Russel, 1993; Fleming & Levie, 1993)
2. Text	a. When should underlining be used in computer-generated materials?	a. Don't! Use *italics* or **bold** for emphasis (Williams, 1990).
	B. WHEN SHOULD ALL CAPITAL LETTERS BE USED?	b. **Almost never.** Text using lower case letters is easier to read (Williams, 1990). It is okay for short headings but headings of more than three words should be in the title case. (Heinich, Molinda & Russel, 1993)
	c. Which color combination is most legible for printed materials?	c. Black on white. (Fleming & Levie, 1993)

Table 1. Continued

Element	Message Design Decision	Principle
	d. What are the optimum measurements for the legibility of **printed** (computer-generated) text?	d. At a normal reading distance of 15 inches, the optimum legibility for printed text occurs with 10 point type, lines of 19 pica (3.1 inches) and 2 to 4 points leading (space between lines). This journal uses 10 point type, 24.5 pica (4.1 inches) and 2 points leading. (Tinker, 1963)
	e. How should text be placed on an OHT?	e. Use phrases, not whole sentences. Number phrases for reference instead of using bullets. (Wilder, 1990)
	f. What are the optimum measurements for text legibility in OHTs and computer projection devices?	f. Use a landscape orientation and adjust the text size to be comfortably visible from all points of the display venue (Heinich, Molinda & Russell, 1993)
3. Graphics	a. When should graphics be used?	a. Use graphics to enhance a message. Rarely, if ever, use of decoration (Fleming & Levie, 1993)
	b. What kind of graphs work best in OHTs?	b. Line graphs are best for showing trends while bar graphs are best at showing comparisons (Fleming & Levie, 1993)
	c. What size should graphics be on an OHT?	c. The relative size of graphics is important. The larger the graphics, the more important it is perceived to be (Fleming & Levie, 1993)
4. Presentation	a. How much information can be presented on an OHT at one time?	a. Don't put too much on a transparency. Try for a few words or phrases. Transparencies should support your talk (Wilder, 1990).

Table 1. Continued

Element	Message Design Decision	Principle
Presentation (continued)	b. Where should the screen be placed?	b. Angle the screen to the side if possible. If not possible then stand at the side and change sides so the entire audience can see. (Wilder, 1990).
	c. Should landscape or portrait view be used to project OHTs and computer screens?	c. Use the landscape view. (Heinich, Molinda & Russell, 1993; Wilder, 1990).

Evaluating Messages

As experienced information presenters teachers are usually able to pick out instructional materials that are meaningful and well designed. Indeed, in our introductory instructional technology courses at NIE we require students to evaluate a range of materials including OHTs, INTERNET pages and computer-based learning (CBL) programs. Students choose the ones which are the most effectively designed and then defend their choices by explaining why one 'works while others do not. We have found that with awareness and guided practice our student-teachers are able to increase their appreciation of good message design. Hopefully, they will transform this attitude into a systematic teaching strategy. Our elective courses in Computer-Assisted Instruction (CAI) and Message Design provide follow-up practice with hands-on multimedia design activities.

Conclusion

Creating materials for media and multimedia systems involves an awareness of message design principles. Because, we can never be sure how individuals will interpret the data or messages we send we should strive to make our communications as consistent, error-free and simple as possible, while providing motivational presentations that contain essential subject matter concepts and meaningful examples. This article has focused on a few principles that can help teachers to develop more effective instructional media.

References

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