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How will my screen look?

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Abstract

It is a fact that 83% of learning is through the sense of sight. Hence, teachers should capitalise on this and use it to the fullest advantage in helping their students learn more effectively. However, too often, visual media are not designed appropriately and learning does not materialise.

With the present emphasis of using IT in instruction, it is important for teachers to know how to design IT presentations appropriately so as to effect learning. There are certain basic principles and guidelines to follow if visuals of educationally sound quality are to emerge. The purpose of this paper is to provide teachers with these principles and explain how they can be applied to the designing of computer-generated presentations. The principles discussed will range from those dealing with the selection of graphic elements to those pertaining to the selection of lettering, the choice of colours and the layout of the verbal and visual elements.

1 Introduction

You are probably aware that we learn using all our five senses. However, do you know that we learn 83% through the sense of sight, 10% through the sense of hearing and the remainder via the senses of smell, touch and taste? Since so much learning is done involving the sense of sight, the teacher should capitalise on this fact and use it to the fullest advantage in helping students learn more effectively. However, too often, visual media are only used to show words. They must contain an appropriate balance of pictures and words so as to cater to both the visual learners and verbal learners.

Designing visuals is not a matter of putting some pictures and words together at random. There are certain basic principles and guidelines to follow if visuals of educationally sound quality are to emerge. The purpose of this paper is to provide teachers with some basic principles of good visual design that they can apply when designing computer generated presentations for their classroom use. We feel that it is timely at this stage of the IT Masterplan implementation to introduce teachers to the application of design principles to help them prepare more effective visuals for their computer presentations. These principles and guidelines are discussed in the following sections.

2 Aims of good visual design

All teachers know that it is crucial that their messages be communicated accurately to their students. To achieve this aim, Heinich et al. (1996) recommend that teachers keep in mind the following four basic aims of visual design when designing visuals for their classroom use:

- *Ensure legibility of words and pictures in your visual* - ensure that these can be easily seen by all your students from where they are seated.
- *Reduce the effort needed in interpreting message* - how the pictures and the words in your visual are arranged would either aid or impede understanding of the message that your visual is trying to convey. For example, grouping like things together and unlike things apart would help students learn to categorise things.
- *Increase active engagement of viewer with message* - make your visuals appealing so that the students' attention is captured, enticing them to think about your message.
- *Focus attention to most important parts of message* - direct the attention of your students to the most important parts of your visual so that they understand the 'flow' of the message.

3 Decisions for effective visual designs

When designing their visuals, teachers have to decide on how to arrange the pictures and words in order to achieve the goals of visual design. These include decisions related to the visual *elements* to be used, the underlying *pattern* for displaying the elements, and the *arrangement* of the elements within the pattern. This assumes that the teacher has already determined the students' needs and interests regarding the topic to be learnt, and the objectives to be achieved through the visual(s) being planned.

3.1 Elements

The elements to consider in designing visuals can be divided into three categories - visual elements, verbal elements and elements of appeal.

3.1.1 Visual elements

Visual elements comprises pictures, illustrations and graphics to be used. They can vary from realistic to graphic to even abstract representations of the actual object. The level of realism necessary will depend on the experience of the learner with that object. For example, a photograph rather than a drawing of a snow leopard could be a better way of introducing children to the animal if they have not seen one before. In some instances, a photograph may have too much distractions within it, and a simple line drawing may be a better choice. Other types of more abstract representations that could be used include analogic visuals (e.g., the solar system is often used as a visual analogy to explain the structure of an atom) and organizational charts (e.g., flowcharts, graphs, maps). When choosing your visual element, it is also important to ensure that it matches the text that goes with it. Do not use pictures just for decorative purposes as they may distract the learner from the main message. Hence, be judicious in your choice!

3.1.2 Verbal elements

Verbal elements refer to the text to be used in the visual. The choice of font, style and size are important considerations when selecting the appropriate lettering to be used. Some guidelines to help teachers with this task are as follows:

- *lettering style (font type)* - this should be consistent and harmonize with the other elements of the visual. There are two major types of font, *serif* and *sans-serif*. Figure 1 illustrates the serif and sans-serif types. For computer-based presentations, it may be a good idea to use the sans-serif type for the main text. This is because serif fonts may look crowded on a computer screen. However, you may consider the use of serif fonts for headings. When you use a special font type in your computer-based presentation, it may not be able to display in another computer if it was not installed into that system, or an 'unexpected' type of font may result.

TECHNOLOGY	A Sans-Serif font
TECHNOLOGY	A font with Serifs
TECHNOLOGY	A Script font
TECHNOLOGY	An Old English font
Some common lettering styles arranged according to their legibility (most legible at the top and decreasing downward)	

Figure 1: Style vs legibility of lettering

- *number of lettering styles* - keep this to no more than two in a series of related visuals in a computer presentation, and make sure that the two font types harmonize with each other. If variations of a particular font (i.e., bold, italics, underline, different sizes) are to be used, keep it to a maximum of four variations. Whatever you do, the rule of thumb would be 'less is better than more'!
- *use of capitals* - short headlines or titles of no more than six words may be written in all capitals (uppercase). However, for anything longer than that, best legibility is achieved by using lowercase lettering for all words, adding capitals only where normally required. Figure 2 illustrates this point.

<p>IT IS OFTEN LAMENTED THAT TEACHERS RELY TOO MUCH ON WORDS AS COMMUNICATION VEHICLES.</p>	<p>It is often lamented that teachers rely too much on words as communication vehicles.</p>
<p>Having all words in capitals (upper case) slows down reading speed. Any sentence longer than six words in length should be in 'sentence' case, adding capitals only when required.</p>	

Figure 2: Use of capital letters

- *lettering colour* - contrast lettering with the background. This makes the words easy to see and read. This contrasting technique is also useful when you want to emphasise certain information in your visual.
- *lettering size* - the default lettering size for Powerpoint presentations is usually large enough. However, if you need to adjust the font size, avoid using sizes below 24pts.
- *spacing between lines* - if lines of text are too close together, they tend to blur out at a distance, while lines too far apart will seem disjointed. A one and a half line spacing may be the best choice (Figure 3).

<p>It is often lamented that teachers rely too much on words as communication vehicles.</p>	<p>Too close</p>
<p>It is often lamented that teachers rely too much on words as communication vehicles.</p>	<p>Too far</p>
<p>It is often lamented that teachers rely too much on words as communication vehicles.</p>	<p>Just Right</p>

Figure 3: Spacing between lines

- *number of lines* - As a guideline, limit each slide to no more than 8 lines of text, concisely phrased and within the confines of one main idea.

3.1.3 Element of appeal

Besides ensuring an appropriate choice of graphics and text in your visual, an element of appeal should also be considered to ensure that your visual captures and holds the attention of your students. In Powerpoint, visual animations and transitional effects may be used for this purpose.

There are many text animation features available for users. Misuse of the features will confuse the audience, distract them from the main message, and/or make them uncomfortable in following the presentation. For example, if one sentence ‘flies’ into the screen from left while the following one ‘flies’ in from the right, the viewer may become distracted.

Inappropriate use of animations can do more harm than good to the learning process. It may end up diverting the learners’ attention to irrelevant information, or it may illustrate concepts incorrectly. Hence, animations should be used with extreme care and only with a specific purpose. The following are some suggestions as to when animations can be used in computer-based instructional presentations:

- getting attention
- focusing on a certain area
- stimulating curiosity
- providing clear feedback
- explaining some abstract concepts

A transitional effect may occur when the user clicks on the screen. Such an effect refers to the visual effect which occurs when moving from one screen display to another. The names for the transitional effects in different software packages varies. Table 1 provides some suggestions for using transitional effects in PowerPoint.

Effect	Situation
Box In	From detailed to general
Box Out	From general to detailed
Wipe left	To go to the next screen
Wipe right	To return to the previous screen

Table 1: Transitional effects

3.2 Pattern

After the teacher has tentatively decided on what elements to include in the visual, the next thing to consider is its overall ‘look’. The idea is to establish an underlying pattern to decide how the viewer’s eye will ‘flow’ across the visual. Consider the following factors as you decide on the overall look of the visual:

- *shape* - the visual and verbal elements can also be arranged in a shape that is familiar to the students. For example, geometric shapes like the circle, triangle and rectangle, or shapes that follow the shapes of certain letters in the alphabet. The circle is one of the most widely used shapes, as it is often used in depicting the life cycles of living things and the water cycle too.

- *balance* - A sense of balance is achieved when the 'weight' of the elements in a visual is equally distributed on each side of its vertical or horizontal axis. There are two kinds of balance, formal and informal. Formal balance occurs when the left half of the visual is a mirror image of the right half. Such a formal balance is static. On the other hand, informal balance is asymmetrical, and the elements create a balance without being static. The more interesting and dynamic layout achieved using informal balance is preferred in most cases. However, imbalance (i.e., using a obviously disproportionate weight distribution of elements) should be avoided because its effect tends to be too jarring.
- *background* - as far as possible, choose to use an uncluttered primary-colour background style rather than one filled with complex imagery.
- *colour scheme* - when choosing a colour scheme for a computer screen display, it may be helpful to think in terms of a background colour, a colour for the graphics/text, and a colour for highlights. Colours that work well together are given in Table 2.

Background	Foreground graphics/text	Highlights
white	dark blue	red, orange
light grey	blue, green, black	red
blue	light yellow, white	yellow, red
light blue	dark blue, dark green	red-orange
light yellow	violet, brown	red

Table 2 : Colour guidelines for computer screen displays*

*Adapted from Heinich, R., Molenda, M., Russell, J.D., & Smaldino, S.E. (1996). Instructional media and technologies for learning (5th ed.). New Jersey: Prentice-Hall Inc. Table 3.1, p. 83.

- *colour appeal* - consider the 'emotional' impact of colours in your choice. Blue, green and violet are considered 'cool' colours, while red and orange are termed 'warm' colours. Specifically, red generally means danger or action, orange - warmth or energy, blue - aloofness or clarity, green - freshness or restfulness, violet - depression, yellow - cheerfulness. Take advantage of this effect of different colours by choosing colours according to the impact you want to give. For example, highlight important information using red or orange.

3.3 Arrangement

Once you have established the underlying pattern of your visual, you will need to arrange the elements within the pattern. You can use the principle of *proximity* by placing related elements close together, and unrelated items far apart. In fact, the technique of overlapping is often used to group related items together.

Directionals such as arrows, are devices for directing the viewer's attention to a particular part of the visual, or to 'read' the visual in a particular sequence. Other examples for directing attention are bolding of text, use of bullets, a change of size, use of a contrasting colour or a special placement of an item.

It is always important to remember that important elements, especially text, should stand out in good contrast to the background. The rule of thumb for achieving good *figure-ground contrast* is to have dark figures on light background or vice versa.

The final factor to note in the arrangement decision is *consistency*. This factor is especially applicable when dealing with a series of slides for a computer presentation. You must be consistent in your arrangement of the elements within each slide. This can be achieved by using the same background or frame for the whole series or choosing the same lettering style and format for the titles.

4. Conclusion

Visuals containing an appropriate balance of pictures and words are an important form of media for all classroom teachers because they can help bring across the instructional message to their students more effectively. In order to help teachers design such visuals for computer presentations, this paper discussed some basic principles and guidelines that teachers could and should put into practice when designing such presentations for their classroom use. These principles ranged from those dealing with the selection of pictorial elements to those pertaining to the selection of lettering, the choice of colours and the layout of the verbal and visual elements. Bearing these guidelines in mind, teachers will be able to reach out to both the visual and verbal learners in their classrooms.

Reference

Heinich, R., Molenda, M., Russell, J.D. & Smaldino, S.E. (1996). *Instructional media and technologies for learning* (5th edn.). Englewood Cliffs, NJ: Prentice-Hall.