The design and application of effective written instructional material: a review of published work

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This review will consider the evidence base for the format of educational material drawing on academic papers and the practice of the design industry. The core issues identified from the review are drawn together in guidelines for educational posters, text and web based material. The review deals with the design of written material both for use in leaflets and books as well as the impact of factors such as font type and size as well as colour on poster design. It sets these aspects of educational material within a research framework, which looks at impact on learning and subsequent change in practice. These issues are examined through a practical example of a poster designed for a regional gastroenterology meeting.

The purpose of this essay is to consider the development of written instructional material in the context of education, and to review how much of current practice is evidence based. The approach taken will be to set investigative techniques¹ alongside the changes stimulated by the design industry in its attempts to promote the sale of products.² Of course there can be an overlap when the product that is being sold is an educational or public health message. Using the core issues identified from such a review and drawn together in guidelines for educational posters, text and web based material, a practical example of a brief educational and health message and its impact on an appropriate audience will then be considered. The benefits of this approach will be assessed in terms of Kirkpatrick's hierarchy of evaluation.³ It will attempt to include:

- learners' reactions
- learners' knowledge base
- use of new learning in the workplace
- impact of new learning on society in general—for example, better patient care or improved diet.

DESIGN OF INSTRUCTIONAL MATERIAL

Written instructional material can take many forms, ranging from booklets and pamphlets through to headline grabbing posters. All have in common the wish to communicate an idea and so "demand attention and action".⁴ Designers tend "to adapt quickly to changes in the social landscape" so that their means of communication remain "fresh and vital".⁴ Such an approach has seldom characterised the academic community.

For some time the lack of effectiveness of some preventative health material has been recognised and partly attributed to its boring nature.⁵ Some insight into these problems with educational material associated with health care professionals can be gained through a review of the growing body of work which has examined aspects of written materials such as font size, font type, paragraph and page layout. Its purpose has been to base the appearance of educational material on a sound evidence base, which has identified the most effective typology. However, aspects such as page size, distribution of margins, choice of page and font colour are more often based on design experience rather than analytical research. Ideally these choices also need a research basis, but can clearly be influenced by a range of cultural factors.⁶ In order to achieve any success with a document it is important that it encourages readers to consider its content seriously. This is not easily achieved as up to 46% of readers only scan documents and 35% simply use them as a source of reference.¹

Research on font type and size is well established. Through a range of publications it is clear that legibility can be improved by:

- linking the amount of space between lines to the size of font
- using larger font with longer lines
- having no more than 70 characters to a line
- using ragged right margins rather than justified text
- using bold rather than italics or capitals or for emphasis¹
- avoiding underlining.⁷

The debate about whether to use serif rather than sans serif font is probably now resolved. Neither font type leads to greater legibility, although there is a belief that sans serif is better used when "reading to do".¹ There is some evidence that when text is small or distant, serifs may, then, produce a tiny legibility increase due to the concomitant increase in spacing.⁸ The purpose of such devices is to reduce the frequency with which lines need to be reread and so increase reading speed and understanding of the text.

The distillation of academic research on choice of print and design of educational material into a booklet emphasised the difficulties of using evidence based material against a background of the anecdotal views of experienced designers. It also illustrates the fact that educational material and poster design can benefit from an artistic input which cannot be measured in objective

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terms. However, products such as the booklet (submitted for publication 2006) can be tested in randomised trials, although perhaps the best tests would be of its use by members of a peer group or its appeal to a publishing house.

The writing of the booklet confirmed the difficulties of designing and producing a text which would fulfil its own guidelines. More white space means more paper and more cost. Wide margins with subtitles add to the problem. Does Arial font look as attractive as Times New Roman? In practical terms the choice of font is affected by ownership of that particular type face—for example, Helvetica is owned by Linotype of Bad Homburg (<http://www.linotype.com/>) and needs to be purchased from them before it can be used. Although black print on white paper gives clarity, perhaps black on camel would be more attractive.⁶ However, the evidence base for such choices is very limited. In contrast the commercial reasons adopted by publishing houses are again based around cost. The design and layout of a medical journal is controlled by fixed templates and the need to place colour pages at certain positions in the journal rather than by their relevance to the text. The design of the page is therefore constrained but, even where choice is available, this is usually made by the production (typesetting) editor quite independently of the author. In contrast educational posters can be designed and produced by the author. Although this gives considerable freedom to that author it also means that the production may appear amateur.⁶ In contrast to the attitude of publishers, public relations companies appear more concerned about the impact of the product than about the accuracy of the text.

READABILITY

Another issue is that of readability. A piece is written for an academic audience, but does that mean the prose should be turgid and difficult to understand? A structured approach to the readability of text was first developed by Rudolf Flesch in the 1940s and 1950s. He was concerned about reading difficulties among young people and developed a system for scoring the ease or difficulty of a piece of text.⁹ The essence of the method depends upon word length and sentence length. In subsequent years various modifications of this approach were developed.¹⁰ They allow a piece of text to be modified so that it becomes easy to read. However, this may disturb the flow and style of the text. Style is an important aspect which is individualistic, but can be modified to reach audiences with different reading ages. The conversion of a piece of text into an easier to read format does not, however, result in text which is necessarily easier to understand. Does the use of readability formulae have any place in the production of educational texts and posters? How should doctors and scientists be considered in such an arrangement? Probably not among a group of 7 year olds, using short sentences with words of two or three syllables—yet this is not too different from the use of bullet points and allows for quick easy reading. Of course it is this style of writing that needs to be used in traditional commercial posters.

PRACTICAL EXAMPLE

In order to assess the value of data on font size and design together with the practical advice received from public relations companies and publishers we designed a poster to maximise impact at a regional gastroenterology meeting.¹¹ As identified by Biegeleisen¹² it had a specific purpose, which in this case was to educate doctors and nurses about barriers to communication with patients from ethnic minorities. In the marketing world posters must use messages which are short and simple. However, although their visibility is high their selectivity is low.¹³ This poster was based on a study of people with

inflammatory bowel disease who were members of the Gujarati community in Leicester. We wanted the poster to have a high impact and attract the attention of a number of people, although we recognised that it would not select out an entirely appropriate audience, which in this case would have been doctors and nurses working in areas with a high ethnic minority population. We believe the design of the poster utilised those features that had been identified in the review of published literature discussed earlier and reported in guidelines for educational posters, text and web based material (submitted for publication 2006). In essence there was a significant amount of white space⁶ and pictures related to text⁷ which amplified its meaning.¹ A detailed description of method was not presented but rather the practical and educational messages of the need for easy anonymous access, a website and use of plain English were made clear. The poster was one of around 30 presented at the Midlands Gastroenterology Society. Its appearance and content were distinct from the other traditionally designed posters. Although nurses appeared interested in the messages, many doctors appeared confused by its lack of traditional design. This was reflected in a questionnaire survey of 20 consultants who attended the meeting. This was conducted immediately after the meeting. Ten replied of whom only two felt it would change the way in which they cared for people with inflammatory bowel disease. About 50% were able to recall the main messages of the poster. A follow-up questionnaire one month later produced a response from only three consultants, but two recalled the importance of anonymity for the patients. Although none had changed their practice, one had discussed the results with a colleague. In terms of Kirkpatrick's hierarchy of evaluation, the poster would appear to have only influenced the practice of one in 20 consultants. This may confirm the importance of professional design.⁶ The impact of the poster might have been improved through:

- providing a detailed background paper for those interested in the poster
- distributing questionnaires about the poster and its impact at meetings so that the design of future presentations can be modified.¹

The introduction of these additional aspects to a poster presentation may increase its impact and lead to greater change in practice, so achieving the objectives identified by Kirkpatrick for effective teaching and learning.³ Interestingly there are now commercial companies which offer such a service to researchers (www.scienceposters.co.uk). However, their value and effectiveness awaits critical evaluation.

CONCLUSION

In an era when evidence based practice is demanded of clinicians, nurses and other paramedical disciplines, it is sensible to review the way in which these groups are educated and demand a comparable approach to the development of instructional material. Research has been done in this area, although more is needed. However, the most valuable forms of assessment will be those which consider whether these educational initiatives have led to changes in practice and better patient care.

Conflict of interest: None declared.

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