ENGINEERING TOPICS IN MULTIMODAL TEXTS

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Abstract

Audiences usually expect texts to be accompanied by graphics which meet requirements that influence comprehension and accessibility of technical texts, such as the use of special fonts, colors, types of graphics employed. Multimodal texts or documents are those that incorporate any combination of graphics, verbal text, animation and sound. In this paper we analyse some samples of discourse on engineering topics, published in scholarly articles and popular science magazines.

Keywords: **text, graphics, visual communication, visual rhetoric, accessibility, multimodal text**

Background

A complex analysis of discourse presupposes a close observation of its constitutive elements since they all contribute to the overall meaning of the text. The role of images and their power may even be greater than that of words, to attract and keep attention, to create emotions so that people move closer to a product, are better informed and eventually perhaps even buy it. According to literature "we can divide visual messages into two classes: orthographic (words) and iconographic, including elements like pictures and diagrams" (Darian 2003:187).

Graphic illustrations are found in every medium – newspapers, television and most technical communication media, in a variety of contexts all over the world. Persuasion, achieved by using powerful visual rhetoric has been studied by discourse analysts all over the world. Visual rhetoric focuses on the way papers are organised, including the use of print and color. It investigates the relationship between images and writing. Scholars have coined the term visual literacy as a matter of being able to read multimodal texts.

People have been communicating through drawings and paintings in addition to verbal language. It is therefore no wonder that pictures or signs are used in texts for the purpose of informing and persuading. Research has shown that the human brain processes the information transmitted through visual images much faster than through words and this information is remembered for a longer period of time. Moreover, pictures attract attention. Visual images can be recognised much faster than a text and they can create fictional realities more easily. This phenomenon is known as the 'picture superiority effect' (Nelson et all.:1976:523-528).

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Purpose of the study

Images can create multiple meanings that need to be decoded in order to be understood. However, pictures are seldom used without words as it is the words that anchor the picture in time or help avoid ambiguities. The relationship between images and words is quite complex. Visual communication has been the object of study for many scientific fields such as psychology, brain physiology or semiotics. Researchers have agreed that language is the product of both hemispheres of the brain while picture processing is the result of the activity in the right hemisphere only, which processes information received from the left side of an image. Moreover, a picture needs to be closely correlated with the text and logically positioned within the information flow. In the volume *Discourse and Technology, Multimodal Discourse Analysis*, edited by Scollon and LeVine (2004), Theo van Leeuwen drew attention to the fact that visual communication should not escape the attention of linguists.

In the following we will try to illustrate how visual aids influence the (re)creation of meaning in articles from the field of engineering. Generally, engineering texts contain imagery that is used to explain concepts, enhance the meaning of chunks of text and even suggest realities beyond graspable ones.

Sources of evidence

In the general sense, we understand the term graphics as a generic name for non-textual parts of documents. In technical discourses we frequently encounter tables, figures, charts and graphs as well as pieces of technical drawing. They are used according to what the purpose of the graphic is in the spot that best suits this purpose, for example on the same page as text reference in the case of a simple visual such as a table, especially if it is a small one. Technical drawing pieces will most frequently appear in such papers as scholarly articles, as they are illustrative of research that involves basic engineering disciplines and use of graphic signals to describe specific information, such as the following examples, Fig. 1 and Fig. 2 taken from research articles that were submitted to us for translation into English in the year 2010:

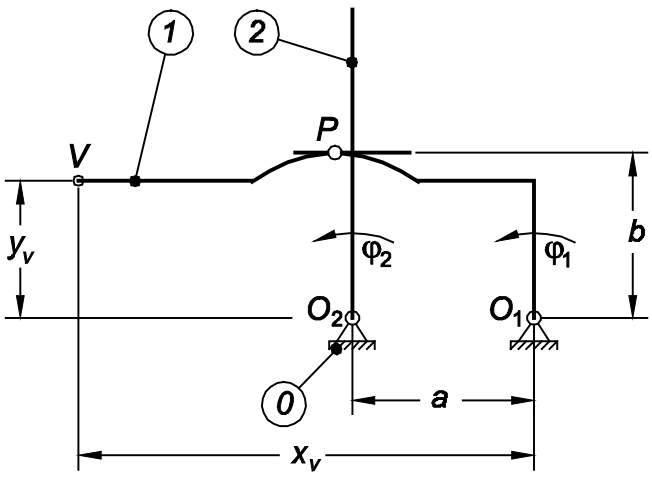

Fig.1. Sketch of a clamp mechanism

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This drawing is a sketch of a clamp mechanism, with letters that stand for the parameters of description of its function: coordinates, distances and contact elements. In order for a lay reader to understand this he must have an accompanying text with definitions and explanations, whereas an engineering graduate or a skilled technician could understand this drawing by merely seeing it as a visual.

This illustration of a mechanism is closer to the way the object looks like in reality, showing the major influence of Computer Aided Design in representing objects in more than two dimensions:

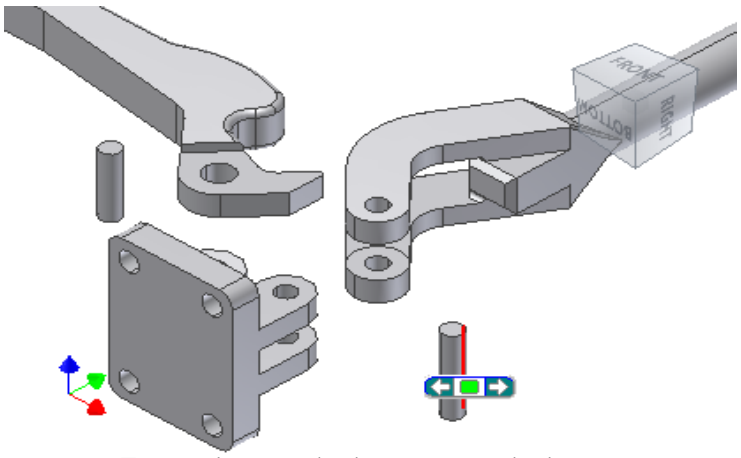

Fig. 2. Clamp mechanism represented using CAD

Visual rhetoric stresses on the fact that images express cultural meanings. Wikipedia mentions the textbook, "Designing Visual Language: Strategies for Professional Communicators", whose authors list "six canons about the rhetorical impact of a document: arrangement, emphasis, clarity, conciseness, tone and ethos. They deal with the organization of visual elements to make clear some structures, highlighting certain parts, appropriating content to context, suggesting attitudes, earning trust of message receivers. Such visual cognates can be used to analyze images rhetorically" (www.wikipedia.org).

Let us study some some examples:

a. Making clear some structures – using numbers to make the steps explicit as well as explanations in figures and words. The use of different colours also aids in understanding that there are different components in the process described

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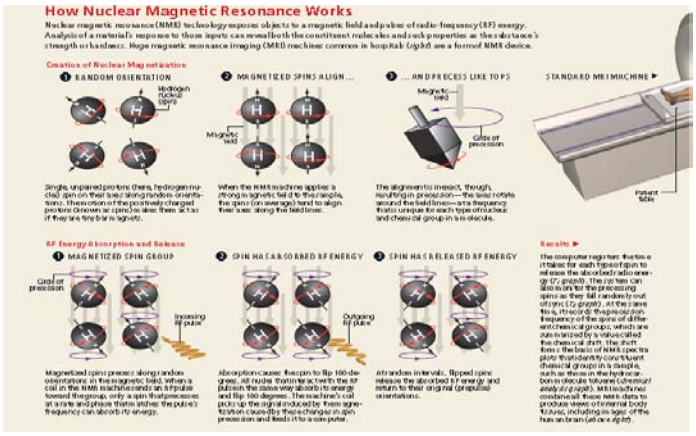
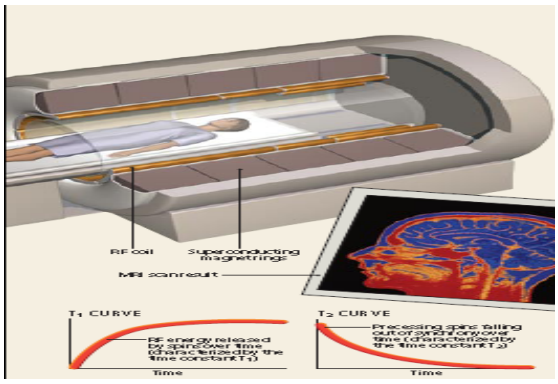
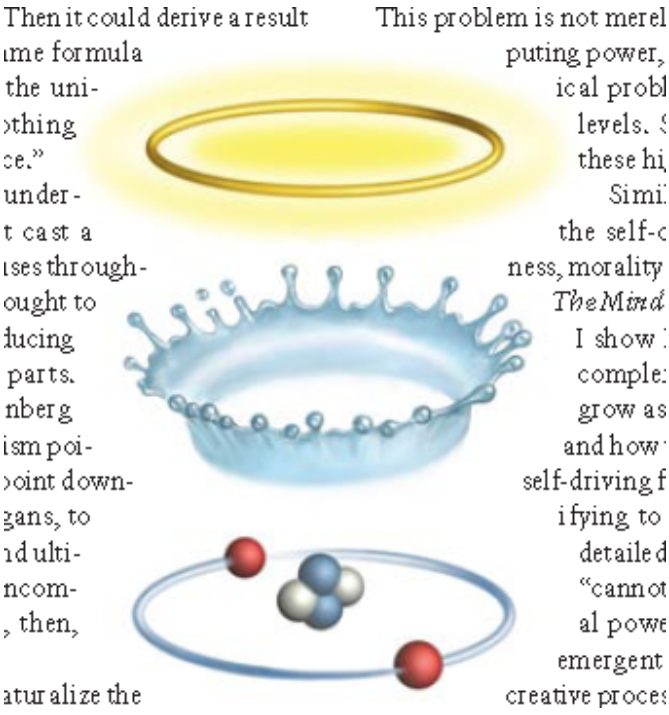


b. Highlighting certain parts – a close up of the machine described in the article, with short explanations in words, as well as a graph plotted on two axes to explain the timescale.



c. Appropriating content to context – with metaphorical implications.



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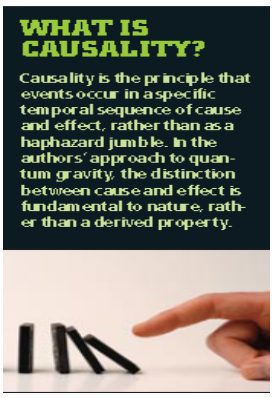
Sacred Science, the title of the article where the previous image was taken from, beautifully illustrates what could perhaps be understood as levels of communication, from the basic facts of science, dealing with matter and concrete reality, governed by elements symbolized by the splash of water in the shape of a crown, which leads towards the angelic circle above. All these elements describe the importance that should be assigned to science and its discoveries, giving it a powerful status of an entity which governs our lives. At the same time, it could be regarded as an analogy to lexical, pragmatic and semantic levels of language:

d. Suggesting attitudes – usually images that contain pictures or caricatures of people, as inanimate entities will not convey psychological messages, but mostly information.



In the image above, a simple gesture illustrates what the text explains. Without the written text, the interpretation would have been open to a number of possibilities. However, words suggest a type of responsibility as attitude of humans when using scientific facts.

e. Earning trust of message receivers – this persuasive function is usually achieved through the use of short, catchy phrases, or a blend of image and text. It is usually employed in case of advertisements, whose main purpose is to persuade users to buy what is claimed to be a reliable product, as in the following BMW advertisement.

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It may be argued that in some cases, previous knowledge of the visual – in this case the logo – that exists in the conscience of the audience establishes a familiarity on basis of re-call and boosts the power of the message through few words, including the modal verb 'should', which functions both as recommendation and statement of excellence (through the acknowledged tradition of the car maker).

Factors such as perspective, modality, and spatiality are factors included in an analysis of multimodal texts. The angles from which the work can be viewed depend greatly on the audience. How real the image of an object is and how much it portrays also depend on the viewer, while composition and spatiality blend the authors' intentions and the audiences' perceptions in a realm of persuasion. Composition is how the elements of an image are arranged within the frame.

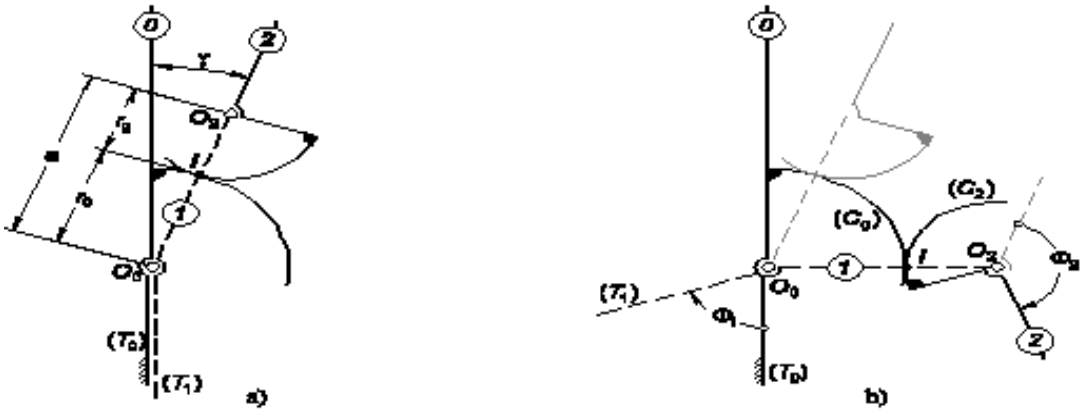

Fig. 3a. The mechanism of a scissor and its geometrical parameters

How an image takes up space directs our eyes and gives it meaning. The third dimension is something that needs to be explored because it is highly persuasive, as we can see when comparing the figures describing a mechanism. Here is another example:

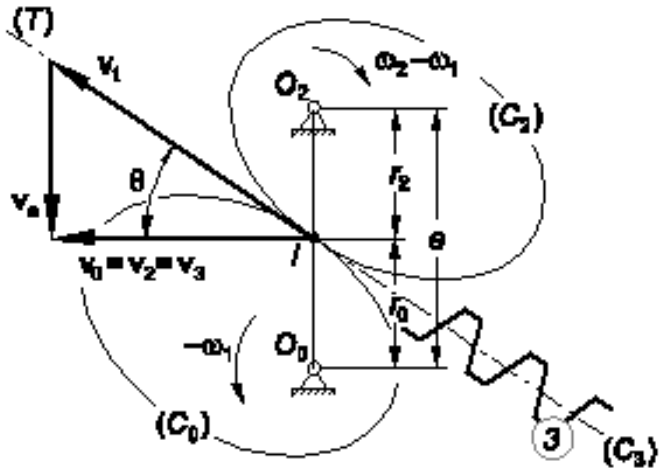

Fig. 3b. General principle of generation of noncircular gears

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Even if figures 3 *a* and *b* contain only black and white elements with special notations that should be understandable to professionals, it is clear from the drawings and the accompanying text what kind of information they contain. These are very good examples of how a combination of graphic and linguistic elements is needed for a clear and unequivocal understanding of the messages conveyed.

Conclusions

We started our investigation of visual elements in popular science magazine by looking at elements that belong to a different type of discourse, but this comes to show how types of discourses blend in social practices. It is not only images that catch the eye of the reader in popular science magazines but also the way in which images blend with text in presentations about different scientific findings and applications. These relationships need to be further explored.

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