

The Anatomy of Effective Visual Communication



Introduction:

The University Health Network (UHN), located in Toronto, Canada consists of three sites - Toronto General Hospital (TGH), Toronto Western Hospital (TWH) and Princess Margaret Hospital (PMH). UHN is a large academic health science centre and a teaching hospital of the University of Toronto.

The Graphic Artist role was implemented to create and design graphic arts projects for the purpose of delivering effective patient education and support patient education initiatives at all 3 sites. Specifically, the role develops graphics for new materials and updates existing ones. This has included the development of signs and tools for patient education and standards for effective illustration and design. The Graphic Artist also manages graphic design projects, maintains a database of anatomical and clinical procedure drawings and enhances the branding and marketing of the department.

The Graphic Artist was an addition to an existing Patient Education Team at TG/ TWH who consists of:

- 2 Managers (TWH & TGH)
- Patient Education Specialist
- Administrative Assistant
- Consumer Health Information Specialist
- Librarian
- Community Health Educator

Toronto is a culturally diverse city where more than 100 languages and dialects are spoken. Within this cultural context, effective graphic design and illustration has the ability to break down language barriers and improve patients' understanding of disease and disease management, procedures, instructions, discharge information and patient safety issues. The use of visual presentations and graphics are vital when communicating health messages. However, not every kind of visual representation will be effective. When graphics take into account the needs of the patient, they can enhance a patient education initiative. Learning tools (i.e. diagrams of anatomy, exercise illustrations etc) can be more appealing to the visual learner, reinforce learning and make tools more accessible to people of various cultural backgrounds, ages, and literacy levels. Clear and meaningful communication allows patients to take part in their care, make informed decisions, and ultimately improve their health through education.

Evidence-based Visual Communication Methods:

Although one-on-one verbal interactions between patient and health care professional are essential to the patients' learning process, healthcare professionals tend to use technical terminology because it is familiar or equivalent non-technical words may not be suitable (Houts, P., Doak, C., Doak, L. and Loscalzo, M., 2006). In addition, spoken instructions by health professionals are not always attended to by patients and families because they are stressed, distracted or confused (Houts et al., 2006). Presenting health information in clear, plain language and supplementing text with graphics and photos are steps to improving health literacy (Byrd & Thompson, 2008; Kripalani, S., Robertson, R., Love-Ghaffari, M., Henderson, L., Praska, J., Strawder, A., Katz, M. and Jacobson, T., 2007). In addition, people with limited literacy skills need help understanding written information and may require more reliance on verbal information followed by help in remembering what they hear (Houts et al., 2006).

Houts et al. (2006) used McGuire's information processing theory as a conceptual framework for a literature review on assessing the effects of pictures on health communication. The following summary conceptualized that pictures closely linked to written and spoken text can:

- 1.) draw attention to materials or the message
- 2.) help people comprehend the information being presented
- 3.) increase recall of the message and
- 4.) increase the likelihood that people will act in accordance with the message

Simple drawings are most effective in facilitating comprehension and may do so by minimizing distracting details compared to more complex pictures (Moll, 1986) especially for people with low literacy (Moore, 1986).

Guidelines and Examples of Effective Illustration and Design:

Layout & Illustration

Simplicity has been found to be one of the most important principles for creating effective teaching tools for patients. "Simplicity" means that educational messages must be delivered so the client can readily understand them (Medscape, 2004).

While illustration refers to how a drawing is constructed, layout refers to the arrangement of text and visuals on the page (Doak, Doak, & Root, 2007). Many characteristics of layout and illustration can be used to give prominence to key messages and simplify complex information. Below is an overview of these important tips and tools.

Simplicity

If the area of focus is the stomach and liver, exclude other organs. This creates clarity and does not overwhelm the patient with unneeded information.

Use simple line drawings

Use simple lines and minimal textures, colour, and background elements. (Doak et al., 2007; Moll, 1986)

Contrast

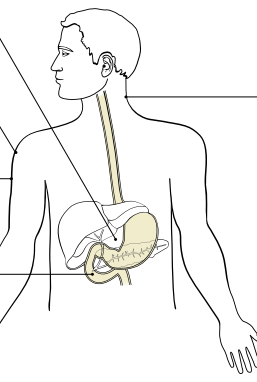
Dark ink on a white or light-coloured background creates high contrast. This increases legibility and readability. (Doak et al., 2007)

Use colour sparingly

Colour should be used minimally to give focus to important areas. Colour can also be used to group objects such as headings or highlight an area as we have done here with the stomach. (Doak et al., 2007)

Use captions and labels

Captions and labels help to further describe the content and direct the eye where to focus. (Doak et al., 2007)



Use white space

White space gives the layout structure and helps to lead the eye around the page. (Doak et al., 2007; Baines & Haslam, 2005)

Use one or two angles for pointing devices

Arrange pointing devices and lines at one or two different angles if possible to avoid distracting from the focus of the illustration. (University Health Network, 2007)

Align elements

Align your labels, captions and other layout elements along the left or right side, top and bottom to keep the layout clean and tidy. (University Health Network, 2007)

Showcase the area of focus within the context of the human body

The outline of the body gives the patient a sense of familiarity with the drawing and indicates where the area of focus is located.

Use bold type, arrows, and boxes to emphasize important points
Keep these key points to a minimum as too many can become distracting.

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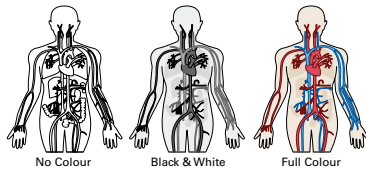
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Manager, Patient Education, Toronto Western Hospital

Elke Ruthig, RN, BScN
Manager, Patient Education, Toronto General Hospital

Colour & Contrast

The use of colour gives visual contrast to the elements of an illustration. Use colour minimally but strategically to add contrast between each of the elements and the background. If colour cannot be used, use tones of grey.

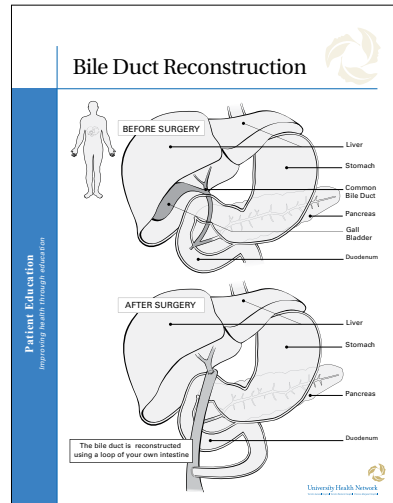


Blood Circulation Illustration and the Use of Colour

Above, 3 versions of the same drawing show the impact colour can have. While the full colour and black and white drawings show an effective use of contrast, the colourless version is difficult to understand because none of the veins, arteries and organs stand out from the body or the background.

Context & Consistency

Several decades ago, Adult Educator Malcolm Knowles developed the "Adult Learning Principles" which continue to be used today for creating effective patient education. Principle 3 explains that teaching of adults should progress from simpler concepts to more complex topics (Medscape, 2004). This principle can be carried into the use of graphics. Working with UHN's Surgeon-in-Chief, Dr. Bryce Taylor, Patient Education has developed drawings for patients to understand the surgery they will be undergoing. Below is one such illustration, the Common Bile Duct Reconstruction Surgery. By showcasing the area of focus within the context of the human body, a patient becomes familiar with the drawing by first visualizing the area of focus within the familiarity of their own body.



Mobility signs: An Effective Use of Colour

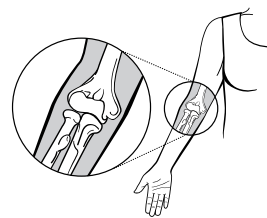
A series of 16 signs were created to identify the mobility status of patients to staff and visitors. The signs have been coloured in green, yellow and red to show the 3 levels of caution that should be used when allowing or restricting patients' mobility. Green indicates the ability for the patient to move independently; yellow indicates caution, supervision and minimal assistance; and red communicates that special care is needed.



Cecilia C. Doak, Leonard G. Doak and Jane H. Root have found that consistent position of elements promotes faster identification of changes (2007). Below, the "before" and "after" drawings for this surgery are identical in size, proportion and alignment allowing changes to be easily viewed. The surgery involves removing the gall bladder and bile duct and replacing this with a new duct constructed from the patients' intestine. The changes are highlighted to give even greater focus and clarity of this change.

"Every patient has to have enough information to be comfortable with the surgery and what's happening"

Dr. Bryce Taylor, Surgeon-in-Chief, UHN
(UHN News, 2008)



Drawing of elbow joint, showcased within the arm

To give patients a greater understanding of the location and position of the elbow joint, we've showcased it within the arm. This gives a familiar context with which to understand the joint and how it works.

Drawing of bile duct reconstruction surgery

Developed with Dr. Bryce Taylor, Surgeon-in-Chief, UHN, and Toronto General Hospital's General Surgery Clinic, this drawing is one of many designed to give patients a greater understanding of the surgery they will be undergoing.

Legibility & Readability

Legibility and readability are often confused with one another, however each have a distinct definition. Legibility refers to the typeform of a font: how easily an alphabet is to read and recognize. Readability involves both typeform and arrangement: how easily a text can be read (Baines & Haslam, 2005). Characteristics of the font, size, use of space, colour, contrast, arrangement and structure of text are all important to consider for patient education materials.

Legible Fonts

Choose fonts that are easy to read. They should be 12 points or larger (Doak et al., 2007).

Avoid ALL CAPS, and italic as they can be difficult to read.

(Doak et al., 2007)

Effective Instructions

In the field of instructional design, it has been found that using text alongside pictures increases readers' understanding. When presented alone, text has been found to need more mental processing than pictures because the actions described have to be constructed into a mental model first (Kools, van de Wiel, Ruiters, Kok, 2005). Pictures, on the other hand, describe actions visually, show concepts that are difficult to put into words, and help patients to anticipate the experience (Doak et al., 2007).

Instructions for Entering and Exiting Isolation Rooms

Instructions were developed with Toronto Western Hospital's General Internal Medicine team to help patients, visitors and staff enter and exit isolation rooms correctly.

To Create Effective Instructions:

- Split the procedure into several bite-sized steps (Doak et al., 2007).
- Use simple, high-contrast line drawings to show the actions (Doak et al., 2007).
- Keep wording short and concise and use plain language (Doak et al., 2007).
- Place the visual and corresponding text together so the reader understands them as one step within the procedure (Doak et al., 2007).
- Number each step to help the reader stay in sequence (Doak et al., 2007).

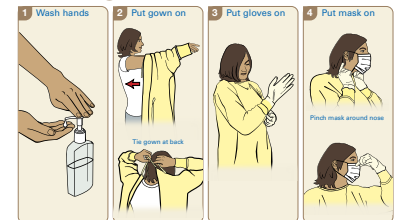
Readable Layouts

Typographical Hierarchy: The purpose of hierarchies in a layout is to help readers find their way around the page easily (Baines & Haslam, 2005). Headings and titles will need to be the most prominent and the top of the hierarchy, while subheadings will need to be less prominent. The body text should be the smallest and least prominent (Doak et al., 2007; Baines & Haslam, 2005).

Use left justification: Left-justified paragraphs flow from the left side of the page. They are easiest to read because there are no uneven spaces between words. Do not use right-justified text or centered text in patient education materials (Doak et al., 2007).

Character Per Line (or CPL) should be 60 - 70 Characters: In paragraphs, using lines of text with greater characters than 70 will require readers to strain their eyes across the page (Doak et al., 2007). Following from line to line also becomes more difficult (Lynch & Horton, 2002).

Entering Isolation Rooms



Exiting Isolation Rooms



Conclusion:

As the Toronto Western and Toronto General Hospitals move forward with the implementation of a graphic artist role in their respective programs, a need for research and formal evaluation is necessary to validate the success and impact of the role. Evaluation of graphics are ideal in a clinical setting with follow up to assess attention, understanding, remembering and adherence. In addition, evaluating effects by comparing response to materials with and without pictures is effective (Houts et al. 2006).

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