



RE-VISUALIZING CYBOK: NEXT PHASE IMAGERY

Dr Miriam Sturdee *Lancaster University*
Dr Makayla Lewis *Kingston University*

Visual Guidelines for Cybok Projects

Coherent visual communication is essential to provide confidence in academic understanding and outputs. By developing well-designed, intelligent and accessible imagery, alongside textual content, the potential reach of your work will increase, and invite new audiences. We have put together guidelines for the creation and use of imagery in your cybersecurity projects and reports. The guidelines are divided into the following sections: Photography, Illustration, and Diagrams; Iconology; Accessibility; and Use of AI Agents.

Photography, Illustration, and Diagrams

Created and stock photographs, illustrations and diagrams should:

1. Be simple and clear
2. Have relevancy to the content to which it is portraying (clear purpose)
3. Tell a story, illustrate events in a sequence
4. Make consideration of future use (timely)
5. Have a clear hierarchy of ideas and concepts
6. Include the presence of people
7. Be inclusive, diverse, and representative
8. Not reinforce stereotypes (analogies)
9. Include technology only when necessary
10. Use complimentary colour schemes and good colour contrast
11. Use adequate lighting (all relevant areas should be clearly viewable)
12. (Where possible) use real work experiences instead of stock imagery.
13. (Where possible) be informative, succinct, diagrammatic
14. (Where possible) have a good use of metaphors and symbolism
15. (Where possible) be less formal and serious
16. Have clear labeling (caption) with appropriate attribution
17. Use high resolution in a common format (e.g. PNG) and use the correct aspect ratio
18. Be accessible (always use AltText)!

Colour Schemes

Colour cohesion and consistency should be of vital importance for iconology, diagrams, and visualisation generation as part of the Cyber Security Body of Knowledge. There are a number of colour generation tools available, for example, Adobe's colour palette generator (a tool based on Adobe Illustrator) and outputs can be tweaked manually according to the design experience and needs of the researchers. To make your own palettes, there are a number of online resources, but we suggest you start with your own branding or group's main colours, and carefully think through colour-matching, using either online tools or objects around you. Get several opinions, and make sure the colours you use are distinct from each other.

Iconology

Icon use on websites varies, and we often find that many icons can be 'deceptive' or not in keeping with a set style. For example, having issues with clickability – such as looking clickable but being static, and websites are often inconsistent internally with icon styles. This creates confusion and frustration for users. Of course, icons are also used in printed reports, and in PDFs, so almost all of these comments are relevant. Therefore, we recommend that all created or stock icons should:

- Be clear, logical and understandable for lay users/visitors
- Use metaphors or have memorable meaning
- Be predictable and consistent styling and states
- Clickable
- Be simple and clean (not illustrations or photographs)
- Be of good colour contrast (important for accessibility)
- Be high resolution in standard format
- Include accessible labels
- Maintain meaning across content / website

For an easy to use and low cost way of finding icons, we recommend engaging with the Noun Project to identify new iconology. The Noun Project allows for free use of icons and images (with attribution) or you can pay for a reasonably priced educational account and use without attribution (www.thenounproject.com). If you wish to design your own, this can be done, with care and attention. The process of icon design is extremely complex, iterative, and requires both design skill and a clear brief of the concept. We hope that this guide will encourage you to think about creating your own icons. If you do not have the relevant skills you can always make some preliminary sketches, create a brief, and pass these on to a professional.

Accessibility

What does this mean?

- **Blind people** - Images, colours, and multimedia are not perceived; Visual relationships and structure are not perceived; Information/content is accessed linearly.
- **Visually impaired people** - May be able to distinguish between colours; May require content to enlarge and zoom.
- **Cognitive disabilities** - May become confused when interacting with complex or inconsistent content or navigation; May experience difficulties processing large quantities of information (text); May experience problems interacting with multimedia.

Always consider if your imagery is decorative or informative, and write appropriate altText. Most websites need to improve their accessibility to ensure they are accessible for all; due to this, we recommend the following for all website outputs:

1. Use of Alt Text: Alt-text is essential for users to engage with website content in non-visual ways. Using a screen reader enables a user to engage fully with content:

- **Be accurate and equivalent:** Presenting the same *content* and *function* of the image.
- **Be succinct:** Correct content (if there is content) and function (if there is a function) of the image should be presented succinctly as appropriate.
- **Do not be redundant.** Do not provide the same information as text within the context of the image.
- **Do not use "image of ..." or "graphic of ..." to describe the image.**
- **Ask yourself...**
 - What are the content and the purpose of the image?
 - What is the main focus of the picture?
 - Who is the target audience, novice or expert?
- **Ensure your Alt text...**
 - Describes images using basic 5Ws (Who, What, Where, When, and Why).
 - When the general concept is more important, use a narrative to tell a story.
 - Written clearly, concisely, and accurately.
 - Describe ideas depicted from general to specific.

- Describe thoughts depicted from general to specific.
- Use words rather than symbols.
- Present information consistently and in its logical order
- Use bulleted lists to organise the steps.
- **Remember...**
 - If the image contains much information, present data separately from the description of the overall image.
 - Focus on critical information rather than extraneous visual elements.
 - Describe the arrow's function, e.g., "leads to," "points to," and "changes into," and use a solid triangle as an arrowhead and thicker links to aid clarity of flow.

2. Appropriate Colour contrast:

- Ensure that colour is **not the only means of conveying information**.
- Use **sufficient contrast** for text and background colours.
- Ensure your **image has a high level of contrast** between text and background.
- Use **straightforward, weighted, and accessible typography**

3. Use of language:

- Make sure you have written **with the reader in mind** and with the right tone of voice that is clear and concise.
- **Avoid extended, overly complex language.**
- **Complex language can be complicated for some people**, especially when English is not their first language or for those with learning difficulties or reduced cognitive abilities, e.g., Jargon, unexplained acronyms, and long words.
- **Check that the language used makes sense** and is clear to understand. Read it out loud or to someone else.
- **Notice differences** – unique elements should be easily distinguishable from one another.
- **Embrace cohesion** - establish a style and use it on similar elements.
- **Consider alignment** – visually connect elements using appropriate alignment, e.g., along paths, arrows, or speech bubbles.
- **Be aware of proximity** – Grouping related elements aids comprehension, e.g., placing related elements close to each other, e.g., containers, separators, and clusters of info.

4. Image resolution:

- Aim for at least 300 DPI when scanning to support greater clarity when the viewer zooms in.

These accessibility recommendations have been adapted for CyBOK from a taught course designed and developed by Dr Makayla Lewis.

Use of AI agents

One observation by participants is that existing imagery is limited, often poorly lit or constructed, and has little in common with the topic to be represented. One approach for generating novel imagery for use within the CyBOK site might be to engage with AI generators such as *Midjourney* and *Open AI DALL-E* which can produce either aesthetic or practical imagery to use alongside materials - for example - the news stories, where repeating generic images are currently used. The limitation of this is that there may be copyright issues, depending on the way the agent was trained, and as such, a

competent designer may still be needed to examine and edit any such imagery. There are also issues with replacing human illustrators with 'free' resources, which may or may not be usable.

Summary

It is intended that these guidelines be used both by those responsible for presenting the work of the Cybersecurity Body of Knowledge to its user base, but also those creating imagery to use within their own project outputs to be hosted on the CyBOK website. Overreliance on poorly generated, generic stock photography, or diagrams and visuals created by untrained researchers can muddy the messages that the body of knowledge works hard to promote. By utilising the guidelines in this report we can ensure better visual communications - and in turn - increased engagement with the website and its user-generated materials.

Recommended resources:

- *Complex Images for All Learners - A Guide to Make Visual Content Accessible* (Designed and developed by Supada Amornchat) to support AltText creation: www.pcc.edu/instructional-support/wp-content/uploads/sites/17/2017/11/complex-images.pdf
- Free Adobe Accessibility Tool: www.color.adobe.com/create/color-accessibility
- Rob Dimeo's '*Consistency of imagery*' to support imagery creation or selection (www.nvlpubs.nist.gov/nistpubs/SpecialPublications/NIST.SP.1265.pdf)
- The Noun Project for free use of icons and images (with attribution) or paid for to use without attribution: www.thenounproject.com