Accessibility:
Matching
Image Description
to the Content

Whitepaper

Introduction

The need to provide a text-based description of images to those who are unable to see the images is one of the most important principles of accessibility. In fact, it is the very first guideline listed in WCAG 2.1 (Web Content Accessibility Guidelines)—Guideline 1.1.1.

"All **non-text content** [e.g. images, animations, and video images] that is presented to the user has **a text alternative** that serves the equivalent purpose."

Many authors and developers understand the purpose of providing alternative text or "**ALT text,**" but determining what to write as the ALT text can be a little confusing at first. A single image could have many descriptions of varying lengths—hence the traditional saying "A picture is worth a 1,000 words."

Fortunately, most ALT text descriptions, particularly in general interest publications, are much shorter, usually 1−2 sentences at the most. However, if an image is present for visual interest only, then the image is treated as decorative—a "null" ALT text is used in the <img> tag in this case.

In other cases, a more extensive "**long description,**" of up to 600 words (or more) might be needed. Long descriptions are particularly needed for graphs, charts, diagrams, and maps to define data points and relationships shown in the image. The ALT text is still present but can point to the long description. Because of the complexity of such types of images, these long descriptions are also useful for many sighted users.

The key to writing high-quality ALT texts and other image descriptions is to determine how the image contributes to the content of the document. Does the image provide additional information or critical information? Or does it just add visual interest? If the image is not decorative, then how does it relate specifically to the information in the document? The answer to these questions serves as guide in providing a usable image description. The scenarios below show how to analyze the combination of document purpose and existing text to decide on an appropriate description.

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What Is ALT text?

The term ALT text (short for "alternative text") refers to chunks of text that are **invisible to sighted users** but are read aloud to someone using text-to-speech screen reader tools such as JAWS (Freedom Scientific), NVDA (NV Access), or VoiceOver (Apple). These are hidden from sighted users because the information might be redundant to this audience. As we will see with long descriptions though, it is possible to provide image descriptions which are available to sighted readers as well as to those using a screen reader. In these cases, the ALT text might point the reader to where the additional information could be found.

ALT text is supported in multiple document types and platforms including HTML (via the alt="" attribute within the <img> tag), WordPress, Drupal, Microsoft Office, Open Office, PDF Figure Tags, InDesign, Apple Pages/Keynote, Facebook, Twitter, and others.

When to Write ALT text?

On the development side, there are multiple approaches that can be taken into consideration while writing an ALT text or image descriptions. One is to add ALT text **when an image is inserted into a document** or web template. This is particularly suited to cases when there is a solo author, such as a blog article submitted for publication or a file used in a presentation. Alternatively, when complex editorial workflows are involved, **a draft of an ALT text** can be written near the image which is then approved by a client or a subject matter expert and then inserted into the ALT text field at the end.

In both the processes, the **initial creation of the ALT text occurs** when **both the image and the text** are in place. This allows the authors or editors to think about the role of the image in the content which is critical for writing a usable description. It is also much quicker to add the ALT text at this stage when an author can review one image at a time rather than writing them all at once at the end when the text must be reread.

What should be avoided is the workflow in which ALT text is written for isolated images. When an image is viewed without the surrounding text, it is easier to be mistaken and write an ALT text which focuses on the wrong aspect of the image. It is also important that at least one person familiar with the content should be involved in reviewing the image descriptions. Otherwise, very basic misidentifications could occur when the writer misinterprets the content.[1]

Example of ALT Text in HTML

The logo below (Figure 1) is for a hypothetical website "Color Veg.com."

Figure 1 Logo

Source: Image by Elizabeth J. Pyatt. Used with permission.

Assuming that the logo is used to indicate the brand on a document, an ALT text of "`Color Veg dot Com`" would be sufficient.

Note: A less usable ALT text would be a "`Company logo`" because it would not indicate the name of the company.

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[1] An example of this kind of error could be mislabeling the flag of Puerto Rico as the flag of Cuba. Both flags use the same shapes and colors, but the Puerto Rican flag has red stripes and the Cuban flag has blue stripes.

HTML Code

In HTML code, the ALT text is placed within the `alt=""` attribute within an `img` tag. See the code sample below.

```
<img src="logo.gif" alt="Color Vegdot com">
```

Caption vs. ALT Text

When an image has a visible caption that appears above or below the image (e.g. "Image by Elizabeth J. Pyatt. Used with Permission."), the same should **NOT** be replicated in the ALT text. The caption is used to provide information for all viewers. In this case, the caption does not describe the image at all, but only gives the image credits and would therefore be useless to someone who is not able to see the image. If the caption happens to provide an adequate description, the ALT text can refer to the caption.

ALT Text Length

There is no official length restriction, but 100 (as set in the CidiLabs UDOIT Accessibility Checker for Canvas) or 125 characters (University of Rochester, n.d.) is a common recommendation; however, there are no restrictions on the long description. The 125 character limit is tied to the allowed length of ALT text in the JAWS 6.0 screen reader. In this version, when the ALT text is longer, it is read out in increments of 125 characters (Thompson, n.d.).[2] Although the length restriction might be a bit artificial, it does correspond to the idea that ALT text should be concise since it will need to be read out (Göransson 2017).

Basic Guidelines

Other basic guidelines include:

- Avoid starting an ALT text with "Image of"—this is redundant because a screen reader will tell the user if there is an image present.
  Note: Identifying the visual element (like photo, cartoon, or diagram) could be helpful (WebAIM 2010).

- End all ALT texts with a period (Göransson 2017). This triggers a pause in a screen reader.

- Pretend that you are reading a document over the phone. Which parts of the image would you describe? This can help provide a better idea of an appropriate ALT text.

Description Strategies

Depending on the purpose and complexity of the image, different image descriptions can be used. A simple classification divides the images into simple (or functional), decorative, and complex and is based on how much description is needed (WebAIM 2019).

Taxonomy of Image Description Strategy Based on ALT Text Length

1. **Concise ALT Text** for Simple "Functional" Images (up to 125 characters)—A short ALT text is used to describe the image or, if the image/link is clickable, what the clicking action will do.

2. **Null ALT Text** for Decorative Images (0 characters)—An ALT text equivalent to alt="" or alt=" " is implemented so that a screen reader does not indicate that there is an image at all.
   Note: In some platforms, this is implemented by clicking an option for "Decorative."

3. **Long Description** for Complex Images (over 125 characters)—A long description which is paired with a shorter ALT text pointing to the more detailed description.

The first two types can be implemented with ALT text, even when it is of zero characters. The third type also requires a short ALT text pointing to a longer description. Therefore, **all images should have an ALT text**, even if an image is skipped or if there is a longer description elsewhere. The scenarios below show how to choose an appropriate strategy and what to write for descriptions.

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[2] Dan Arbello (n.d.) does note that the test results have not been updated, and that Freedom Scientific does not itself mention a 125 character limit.

Scenario 1: Concise ALT Text

Scenario 1A: Nutrition of Colored Carrots

In the next few examples, we will use the USDA.gov image of different colored carrots arranged into a ring (see Figure 2). In the first example, the caption below the photo is taken from the USDA website which has a focus on nutrition.

Source: Photo by Steve Ausmus, USDA/ARS. Copyright free, public domain image.[3]

Figure 2 Photo

Caption [USDA]: "ARS researchers have selectively bred carrots with pigments that reflect almost all colors of the rainbow. More importantly, though, they're very good for your health."

Note that the caption indicates there are multiple colors of carrots, but does not specify the colors. Therefore, the ALT text recommended here specifically lists the colors and refers to its length and shape.

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[3] This caption was taken from the USDA ARS site which hosts the photo. It refers to a metaphorical rainbow even though there are both black and white carrots. Other captions were created for demonstration purposes. Accuracy of content is not fully guaranteed.

Possible ALT Text

Carrots of varying lengths and colors, including yellow, orange, black, red, white, and brown are shown in the image. Due to length considerations and context, the ALT text does not mention that the carrots are arranged artistically in a circle because it is not necessarily relevant to the information about nutrition or pigmentation.

Scenario 1B: Marketing Course

Suppose the same photo is used in a course about marketing or promoting nutrition to the general public. Now the fact that the photographer arranged the carrots in a geometric shape, in a rainbow-like pattern, is what is important. It is likely that the geometry and color placement were done in order to entice the sighted viewers to learn more.

Figure 3 Photo

Caption: The photographer uses a geometric layout and color changes to provide an appealing image to viewers.
Source: Photo by Steve Ausmus, USDA/ARS. Copyright free, public domain image.

Possible ALT Text

Carrots of different colors arranged to form a circle with their roots inward.

Decorative vs. Content

When should you tell a screen reader to skip an image? This again depends on the context, but some guidelines include:

- When an image is repeated in a document or website—If an ALT text is needed for the first instance, then that should be done. But you may be able to skip the rest.

- If the text replicates an image content (W3C 2019)—This often happens when text is paired with a photo or an icon representing the text. Of course, if the icon is alone, then the actual ALT text is needed to identify the icon.

- Tool lines—Decorative elements added to a page such as tool lines or end of document images (Penn State n.d.) are often rendered as graphic elements. The ALT text for these should be empty.

One time **NOT to skip ALT text** is when an image is paired with a caption as shown in Figures 2 and 3. In this case, you could indicate in the ALT text that the image is a repeat.

Not sure? When in doubt, an ALT text with content should be provided. A 2010 WebAIM survey indicated that descriptions for marketing images of "smiling people" may be preferred even if they do not add directly to the content.

Scenario 2A: Color Carrot Recipes

Imagine that in this site, there are carrot recipes featuring different varieties of carrots and that the carrot photo is repeated in each recipe page as shown in Figure 4.

Figure 4 Two Sample Recipe Pages
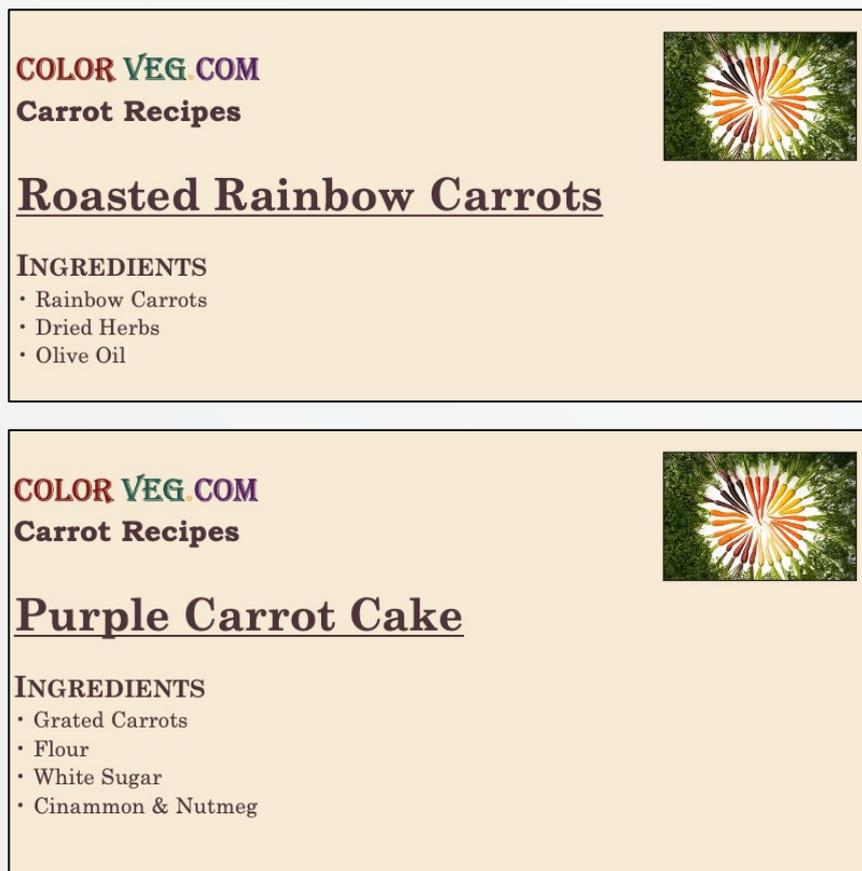
**Caption: In the sample pages above, the USDA carrot image is primarily decorative.
The surrounding text indicates that these are recipes with colored carrots**

Here, the carrot photo is an example of a repeated image where an empty ALT text (i.e. `alt=""`) could be a solution. This avoids a screen reader reciting the same image ALT text for each recipe page. On the other hand, the logo for Color Veg.com still needs the ALT text of "`Color Veg.com`" on every page because that image is the only indication of which website the user is on.

Scenario 2B: Carrot Section Link

Using the same colored-carrot image, the scenario now is that it is paired with a button link text "Carrots" on the hypothetical Color Veg.com site as shown in Figure 5.

Figure 5 Photo with Link Button Below

Caption: All photos are from the USDA ARS Featured Image repository and are public domain.
Source: Composite image by Elizabeth J. Pyatt. Used with permission.

Possible ALT Text for Carrot Image

Empty ALT Text - `alt=""`

Clickable Image HTML Code

To make both the photos and text clickable on a web page, the HTML would need to embed both the image and the text into the same <a> tag as in

```
<a href="carrots.html"><img src="usda-carrots.jpg" alt=""
style="border:none"><br>Carrots</a>
```

However, if there wasn't a separate text or if the text was embedded in an image as shown in Figure 6, ALT text would be needed, and it should **describe the destination** as in `alt="Carrots".`

Figure 6 Carrot Link Image Only

Caption: All photos are from the USDA ARS Featured Image repository and are public domain.
Source: Composite image by Elizabeth J. Pyatt. Used with permission.

Assuming that the links are actually images with embedded text, the ALT text replicating the link text should be provided.

### Possible ALT Text for Carrot Image

`Carrots` or `Carrots Page.`
Both ALT texts indicate the destination, but adding "`Page`" makes that even clearer.
Note that when an image is clickable, the screen reader says either "Link" or "Button," then reads the ALT text. Therefore, it is not necessary to begin ALT text with "`Link to...`"

Long Description

A long description is needed when an ALT text is longer than 1–3 sentences. For instance, the carrot image in Figure 7 now includes annotations of the nutritional value for each color pigment.

Figure 7 Carrot Infographic
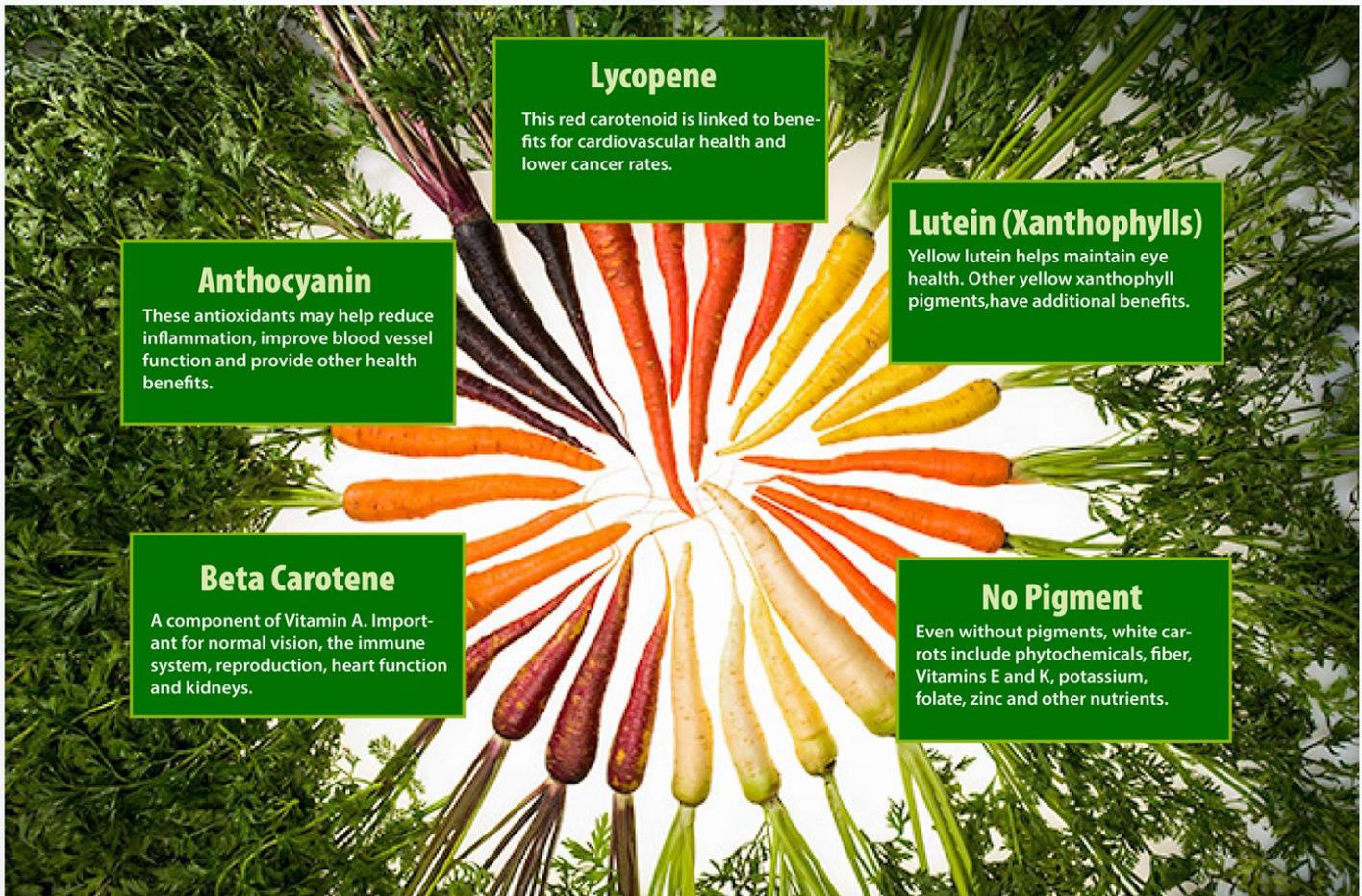
Caption: The pigments of the different colored carrots provide important nutritional benefits.
Sources: Data compiled from Healthline.com, NIH, MedlinePlus.gov, the online World Carrot Museum, and other sources. Composite image by Elizabeth J. Pyatt. Used with permission. The infographic is for demonstration purposes only and accuracy is not guaranteed.

Notice how the caption does not directly refer to any of the information in the infographic about the different carrot pigments and their health benefits. If this picture were part of a textbook, then a long description of some sort would be needed to supplement the short ALT text. For one thing, the image contains large portions of embedded text that may be needed to understand the course content.

Multiple Audiences for Long Description

The main audience for image ALT text are screen reader users. By design, an ALT text is normally not visible to sighted users and is read out on screen reader software. However, the audience for long descriptions can include **sighted users**, depending on the quality or complexity of the image.

Why sighted viewers may need long descriptions?

Some scenarios include:

- The **embedded text is too small or distorted** to be easily read, particularly for some with low vision conditions. Even if a person is able to zoom in to read the text boxes, they would likely be forced to scroll to different portions of the image which is cognitively more difficult to process.[4]

- Some elements in a text, graph, or other icons **do not meet contrast or color usage guidelines.** When an image is not able to be adjusted, a long description can be a way to provide the same information accessibly.

- **A graphic is not understood by all sighted users.** A classic example is a map used for driving instructions. Although some users are able to use just maps with appropriate road labels, others may need step-by-step text instructions. Providing both a map and the equivalent text instructions serves more to the audience.

- A **long description can also provide supplemental information** for items such as a bar graph where not all numerical values of the graph are shown. A long description with a data table can provide exact values as needed.

ALT Text Referring to Long Description

An ALT text is still needed, but it should refer to a long description. The ALT text can also provide some basic information before referring to the additional information. This paper will provide a sample description and some methods for including it along with some recommendations.

The ALT text below is of 120 characters and is only able to list the pigments. Information about colors and health benefits cannot be fit in. Therefore, a long description is needed.

```
alt="Infographic on the benefits of the carrot pigments beta-carotene,
lycopene, lutein, and anthocyanin. See long description."
```

Long Description Format and Sample

One temptation of a long description is to treat it like a very long ALT text as shown in Figure 8. The result of this, though, is something that both sighted and screen reader users find hard to parse.

Instead, appropriate structure such as **lists, tables, and headings** should be used to add the support structures both sighted viewers and screen readers rely on. For this reason, formatted long descriptions are recommended by the Benetech Diagram Center and Penn State, particularly for items such as flowcharts and graphs. In addition to making long descriptions easier for readers, they can also make it easier for writers to edit and proofread since the content will be visible. Figure 9 shows how a long description is formatted as a list.

Figure 8: Long Description with No Formatting (Not Recommended)

Five pigments and the health benefits are listed. Red is "Lycopene—This red carotenoid is linked to benefits for cardiovascular health and lower cancer rates." Orange is "Beta Carotene—A component of Vitamin A. Important for normal vision, the immune system, reproduction, heart function, and kidneys." Yellow is "Lutein—Yellow lutein helps maintain eye health. Other yellow xanthophyll pigments have additional benefits." Purple/black is "Anthocyanin—These dark purple antioxidants may help reduce inflammation, improve blood vessel function, and provide other health benefits." White is labeled "No Pigment—Even without pigments, white carrots include phytochemicals, fiber, Vitamins E and K, potassium, folate, zinc, and other nutrients."

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[4] Some infographics may be adaptations of large posters. In these cases, text from these posters can become quite small when squeezed into a single printable page.

Figure 9: Formatted Long Description (Recommended)

Five pigments and their health benefits are described in multiple textboxes which are listed below.

- Red = Lycopene—"This red carotenoid is linked to benefits for cardiovascular health and lower cancer rates."

- Orange = Beta Carotene—"A component of Vitamin A. Important for normal vision, the immune system, reproduction, heart function, and kidneys."

- Yellow = Lutein/Xanthophylls—"Yellow lutein helps maintain eye health. Other yellow xanthophyll pigments have additional benefits."

- Purple/black = Anthocyanin—"These dark purple antioxidants may help reduce inflammation, improve blood vessel function, and provide other health benefits."

- White = No Pigment—"Even without pigments, white carrots include phytochemicals, fiber, Vitamins E and K, potassium, folate, zinc, and other nutrients."

Long Description Implementation

Strategy 1—Hidden long description for screen readers

This strategy provides "invisible" text that is only read out to someone on a screen reader. One of the more modern methods for HTML and EPUB is using the "`described by`" attribute. In this scenario, an image includes a "`described by`" attribute which includes a link to where the description resides (W3C Consortium 2016).

Cascading Style Sheets (CSS) can be optionally used to hide the description from sighted users. WebAIM's Invisible Content Just for Screen Readers has some potential solutions for this issue that include positioning items off screen, but still detectable by a screen reader.

Although this can be implemented, there are several issues to consider when selecting this option.

1. CSS must be carefully crafted so that it does read out on a screen reader. If a CSS attribute such as `visibility:hidden` or `display:none` is used then the description is hidden from everyone, including users on a screen reader.
   Note: These attributes are meant to hide disabled items not currently needed in the interface.

2. If a long description is located in a separate document or section of the document (e.g. in an appendix), then a **second link** must be provided to allow the readers to return back to where they started.

3. **Only users on a screen reader** would be able to access hidden long descriptions, even though some sighted users might need them.

4. Anything not displayed is **harder for sighted editors to find and edit**. Any alternates that provide accessible information which is visible to sighted editors should be considered.

5. This strategy is really only available in some formats such as HTML or EPUB. In other platforms, a link could point to a separate part of the document, but the information would be available to all users who had navigated to that area.

As was noted earlier, some sighted users may need a long description as well as users on a screen reader. Strategies 2 and 3 allow for both the screen reader users and the sighted users to access the information.

Strategy 2—Embed the description in the text

In this strategy, the document is written so that the same information included in the image is **incorporated into the main text.** When that happens, the image becomes a supplemental source of information useful for sighted users not necessary for all users.

In some cases, if the main text presents **exactly the same information** as the image, an empty ALT text could be used. But again, when in doubt, a short description with a reference to the text section will also work.

Some considerations for these strategies include.

1. An embedded description reduces the need to add a complex description for an image.

2. All audiences have access to the description.

3. In some cases, having an embedded description of an image (e.g. an image of a sign followed by a transcript) could be distracting to sighted audiences. The next strategy is a compromise solution.

Strategy 3—Clickable link to open a long description

Many experts recommend providing a link, button, or other clickable objects which allow any user to open up long description and then close it when they are finished. This allows any user needing the information to access it. When done correctly, it is also convenient for screen reader users as they are also given the option to skip a long description if they want to. In an informal survey done by David MacDonald (n.d.), 20 out of 26 users selected this as their preferred option.

As with the other methods mentioned, some planning is needed to ensure that the link is keyboard accessible and that there is a mechanism to close out the description and allow the user to return to the main content.

DETAILS/SUMMARY HTML 5 Tags

Two of the new HTML 5 tags—`<details>` and `<summary>`—can be used to create a clickable object which is visible, accessible on a screen reader, and usable with a keyboard. The DETAILS tag provides a block element which can contain extensive HTML code. The SUMMARY tag is the first child element appearing immediately under DETAILS and provides a clickable object. Unlike some other solutions no additional scripting is needed since they are supported in most modern browsers.

See Figure 10 as an example using the carrot infographic. The `<img>` tag with the ALT text is listed first, then the long description code.

Figure 10 Long Description Using <details> and <summary>

```
<img src="carrot-infographic.jpg" alt="Infographic on the benefits of
the carrot pigments beta-carotene, lycopene, lutein and anthocyanin.
See details below.">
<details>
<summary>Infographic Text</summary>
<p>Five pigments and the health benefits are listed. </p>
<ul>...</ul>
</details>
```

Examples of the DETAILS and SUMMARY tag can be found at <u>Penn State's Accessibility Web site</u>, <u>Can Adapt WCAG Training</u>, and other locations. It is the coding for the preferred long description method cited in MacDonald's survey.

Some advantages and considerations for DETAILS/SUMMARY strategy include:

1. The long description is in the same document. It is easy for all users to find the description, read the description then return to the main text.

2. The button/link is available to all users, both sighted and those on a screen reader.

3. It is also possible to open and close the description with just a keyboard.

4. No extra scripting is needed.

5. This option is restricted to HTML and EPUB (assuming an EPUB reader supports the tags). For other documents, a more traditional link to a long description may be needed as discussed below.

Link to Long Description

Note that another commonly used method is a traditional link to a separate document placed below the image. This has some of the same advantages as the DETAILS/SUMMARY strategy, but it can place the long description in a separate document or separate section of the document. However, for platforms such as PDF, Word or PowerPoint, this can be a viable option.

Conclusion

Some have described writing accessibility ALT text as an "art," but not one that is especially mysterious. Understanding how an image functions within a document is the key to writing usable image descriptions. Some core questions to ask are:

• **Why** an image is being used?

• **What** information (if any) is the image uniquely conveying that is not in the text?

• **How** does the image relate to the goals of the document? Is it providing information, enhancing a brand or mood or both?

• **Must** the image be an image? If the image replicates a data table or stylized text, maybe recreating properly formatted text would be just as efficient.

This decision model is the basis not only for this document but also for flowchart guidance used by the <u>Diagram Center</u>, WebAIM, the <u>University of Minnesota Duluth (2021)</u>, and others. These are excellent references, and hopefully it will inspire publishers to consider how their ALT text strategies are implemented.

Ultimately, most accessibility professionals hope publishers understand the need to consider accessibility along with other design elements such as typography, color use, and clear writing in the initial design phases. Creating accessible content is easier at the early stages and provides a richer experience for all audiences when it is implemented early in the process. Having a process which helps editors pick the most appropriate images thoughtfully along with appropriate annotations for all users is something worth pursuing.

About the Author

Elizabeth J. Pyatt is an ALT media and accessibility specialist at Penn State and has developed alternative text descriptions in a wide variety of subjects and document types for the past two decades.

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Screen Readers

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NVDA (Non-Visual Desktop Access), NV Access

https://www.nvaccess.org/download/

VoiceOver, Apple

https://www.apple.com/accessibility/vision/

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