The Attention-Comprehension Gap:

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A Framework for Rethinking Information Design

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LONG-HELD BELIEFS in document and Web design—what we'll refer to as *information design*—include creating visuals or structuring a document to attract the attention of users to specific content. The overarching idea is if you can draw an individual's attention, it follows that he or she will use the content you've provided. This emphasis on attention, however, can be problematic. Just because your information has caught or held a user's attention does not necessarily mean that the user understands the ideas you wish to convey. In fact, it could be that an aesthetically attractive design—even an attention-grabbing one—might be masking usability problems.

Why? The fact that the information design attracts the user's attention does not inherently mean the individual understands the idea being conveyed. Thus, attention-grabbing information design does not automatically equate to readily understandable displays of content.

This difference between the ability to attract user attention and the ability for users to understand and make use of that content is one technical communicators cannot ignore. As displays of content—particularly those associated with online delivery—are becoming increasingly visual in nature, we need to find mechanisms that examine aspects of attention and comprehension in information design. We propose such a mechanism.

We want to introduce the theory of the *attention-comprehension gap*. This theory is defined as the gap between information design drawing the user's attention to specific content and the users' comprehension of that content. In a well-designed artifact, the gap between attracting a user's attention and the ability of the user to comprehend the ideas conveyed is small to non-existent. The bigger the gap, the bigger user experience problems you have. Here, we overview the idea of the attention-comprehension gap and provide strategies technical communicators can use to minimize the attention-comprehension gap in information design.

Attention ≠ Comprehension

Consider this situation: You are visiting a nation and you don't speak the language. As you are walking down the street, an aesthetically stunning sign catches your attention. In fact, that sign is so impressive that you spend several minutes studying its design. So the sign has done an effective job of catching and holding your attention, but here's the problem: You have no idea what the sign says. In effect, you don't comprehend the message it is meant to convey. In this way, the purpose of gaining your attention—to better convey content to you—has failed. Thus attention does not equal comprehension.

While this example may seem obvious, it's important to think about attention versus comprehension. This distinction is becoming increasingly relevant with the speed of information delivery (via online media) and the ongoing need to differentiate your market share.

Consider much of the research that examines how individuals read or review a document or some other form of communication product (e.g., a website). Often, this research involves technologies such as eye-tracking software that can provide highly accurate data on what parts of a given document or website an individual looks, for how long, and how that individual's eyes move across the page/site when using such materials. In this context, the ability to gather data on attention is very good. Why? Because the resulting data tells us just what catches someone's attention, when, as well as how long a given design feature or text holds an individual's attention. And, in many cases, the results of this attention-based research are used as the foundation for revising existing texts or interfaces or to create an approach for developing new materials.

Let's consider another example. Your company has been asked to create a Web-based annual report complete with numerous graphical representations of key financial data. The information design team decides that it's important to draw the users' attention to these visuals because:

- This sort of report is not the most interesting of reads
- The next quarter's decision making depends on readers understanding key financial information

Preliminary testing of the site shows users are impressed with its design and the visuals it contains. In fact, several users comment specifically on the interactive data displays. However, when your team presents the information to the client a few weeks before launch, the client is completely dissatisfied. You explain and present the results of your preliminary testing. The client responds by immediately pointing out that while the site and visuals are aesthetically pleasing, the way the information is displayed is misleading and inaccurate.

What happened? The user test did not account for the attention-comprehension gap. In this case, there was a considerable gap between the users' attention and their comprehension. Technical communicators want to strive to minimize this gap in information design. Instances where the attention-comprehension gap is small or non-existent represent a condition we call the *stop sign effect.*

Stop Signs, Attention, and Comprehension

The average stop sign is designed in such a way that it does two things quite well. The design of the stop sign—a large, bright red, octagon shape (in the United States)—means it easily gains the attention of most drivers. (In fact, one could argue that such signs are hard to miss.) At the same time, the text on the sign does an effective job of conveying a very specific message: "Stop here!" Even if one is not conditioned by years of driving, the ability of a stop sign to gain attention and convey information in a way that is easy to comprehend is quite effective. Such signs represent an example of a very small (almost zero) attention-comprehension gap (see Figure 1).

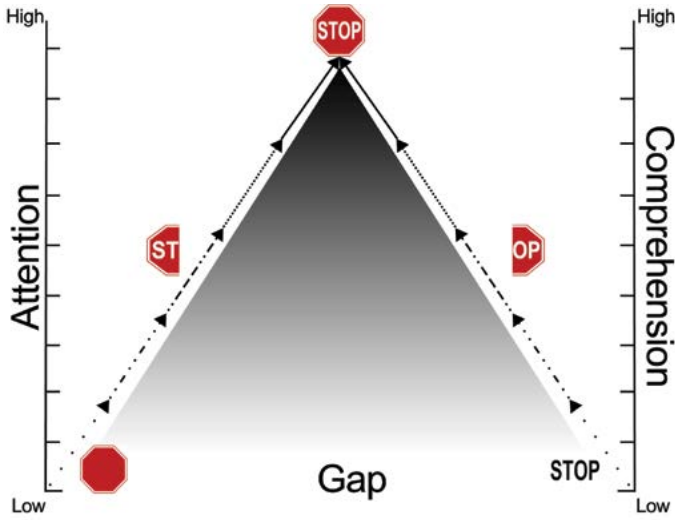

Figure 1. The stop sign effect in relation to the attention-comprehension gap

In Figure 1, when the sign is separate from the text, the attention comprehension gap is the largest. As you move up the scale and the stop sign starts to take the form that we know, the attention-comprehension gap disappears. Ideally, technical communicators can develop materials that minimize this gap and achieve the stop sign effect.

The question then becomes: What steps can technical communicators take to keep this attention-comprehension gap as small as possible when developing different kinds of informational or instructional materials? The answer lies in updating the use of mixed research methods to focus on both attention *and* comprehension.

It's relatively easy to quantify how well a given item catches and holds attention. As noted earlier, technical communicators have long used eye-tracking technology in user tests, and these tests can provide precise data on the aspects of a page that catch an individual's attention by noting what users look at first. Likewise, such technologies can also time how long a user's eyes/attention remains fixed on a given item.

Are eye-tracking devices too expensive? Then one can use a talk-aloud protocol. This is a research approach in which users review a display and speak/say what they are doing/looking at as they review a display and note how they are reading the display. (For example: "My attention is immediately drawn to this item. Now I'm shifting my focus to look at this item.") By timing how long users view visuals based on what they are saying, one can get an idea of the attractiveness of certain design elements.

Both approaches (eye-tracking software and talk-aloud protocols) provide hard numbers—or quantitative

information—that can provide excellent insights in terms of what design features seem most effective at attention getting and holding and what items are not. Using this information, technical communicators can revise the design of "less interesting" features to improve the frequency with which users are drawn to and continue to focus on a particular item. Technical communicators can also continue to refine the design of a given item until it generates successful results (i.e., high numbers) in terms of its ability to attract and hold users.

At the same time they are testing attention, technical communicators also need to test comprehension. In this case, the question becomes: "Do readers understand/comprehend the ideas being conveyed?" To assess comprehension, a different approach is needed—a qualitative one. Qualitative research focuses on observing human behavior to determine why or how well individuals are engaging in a given activity.

In terms of comprehension and information design, we need to ask questions designed to determine if an individual comprehends the information. Such data can be collected through interviews that ask users to explain what they are seeing or reading in order to determine if, or how well, they understand the information being displayed. If qualitative data suggest user comprehension is low, then the related item can be revised and re-tested to see if comprehension improves. And if quantitative research can be used to identify specific items that were confusing or difficult to understand, then these particular aspects can be revised and re-tested through a follow-up round of qualitative research.

In some cases, these two forms of research can be done sequentially, with qualitative data collection (e.g., interviews) taking place after quantitative research data (e.g., the results of an eye-tracking study) are collected. In such cases, the technical communicator could use quantitative data related to attention to shape follow-up questions designed to gather qualitative information on comprehension. For example, after quantitative data indicates an individual spent a lot of time on design aspect X, the technical communicator could ask the individual, "Tell me about/explain X." How accurately the individual is able to answer such questions could be used to determine how well that person understood the information conveyed by that item.

In other cases, technical communicators could collect quantitative and qualitative data in a more simultaneous process—one that allows them to quickly assess both the attention getting and the comprehension efficacy associated with a given product. In such cases, as quantitative data is being generated (such as results from an eye tracker noting where someone is looking), technical communicators can ask immediate questions to gather real-time qualitative data associated with comprehension. If, for example, an eye tracker notes an individual's eyes are instantly drawn to a particular part of a page or interface, the technical communicator can immediately ask a question designed to test user comprehension associated with that eye-catching item, for example, "What is the visual you are looking at asking you to do?" or "Your eyes have just moved to/have remained on X; tell me what idea the text there is conveying." In other cases, such data could be gathered via talk aloud protocols that ask users not only to note what they are looking at but also to explain what they see. Again, this mix of collecting quantitative data on attention and qualitative data on comprehension allows technical communicators to revise a given product. They can then re-test it with the goal of increasing both the success with which the item attracts and holds a user's attention and how well the user comprehends the information conveyed through the related item.

The central idea is that technical communicators need to collect both quantitative data on attention and qualitative data on comprehension at roughly the same time and for the same item. That way, they can test both the ability of an item to attract the user's attention *and* how well users comprehend the information being presented. If preliminary tests result in an attention-comprehension gap, adjustments to the aesthetics of the content's information design can be made. The goal is to use both kinds of data to assess and revise the design of information to attract attention and convey information in an easy-to-comprehend way. Through this approach, technical communicators can identify and (ideally) shrink any attention-comprehension gap. In so doing, they are striving to achieve the stop sign effect of high attention getting and high comprehension rates for all the materials they create.

Minding (and Mitigating) the Gap

By understanding the need to balance attention getting with comprehension, technical communicators can design information that achieves both successfully. The key is to measure both the attention getting properties and the comprehensibility of an item to identify and then reduce or mitigate the attention-comprehension gap. By using a mixed methods (i.e., quantitative and qualitative) approach to data gathering, technical communicators can identify seemingly large attention-comprehension gaps. They can then take steps to modify products to address both factors and thus shrink this gap. Ideally, such approaches allow technical communicators to design information that is effective both at attention getting and at achieving high levels of user comprehension.

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