The colors are vibrant and the images graphic and emotion-filled. Within moments the unfolding story captivates the beholder.

The Bayeux tapestry, located in Northern France, is a stunning work of art and a masterpiece of communicating a complex issue to an overwhelmed and distracted audience. The tapestry, 231 feet long and 20 inches high, was stitched in 1077 and depicts the Battle of Hastings, fought 11 years earlier.

The victors needed to communicate the battle’s political outcomes to an illiterate population. The tapestry designers did not show data on the number of soldiers or create detailed graphs of the battle plan. Instead, they crafted a story line that unfolds in vivid colors. A viewer can feel the pain of the men and the horses. The effect is memorable. The designers of the Bayeux tapestry knew the importance of communicating with interest, emotion, and fact.

A presenter today does not have to stitch a tapestry or engage an illiterate audience. Typically, a presenter collects the data, does the analysis, and develops a well-thought-out recommendation. Nevertheless, the public is disgruntled and will not listen, and the boss makes a politically driven decision that runs counter to the analysis.

How can a presenter make the audience understand the inherent logic? The lessons from the ancient tapestry advise the tactic of communicating with—not presenting to—the audience.

Advice on successful communication and presentation skills is readily available; the focus here, however, is on applying insights from neuroscience to understand how to make a presentation brain-friendly. Before a discussion of the five elements of an effective presentation, consider two fundamental brain principles that establish a background.

**Reward and Threat**

The brain has a reward center, the *nucleus accumbens*, and a threat center, the amygdala. Activating the reward center is preferable in most situations that involve informing or persuading. In contrast, activating the threat center causes people to behave emotionally, illogically, and even to lash out.

Several conditions activate either the reward or the threat center—particularly control, certainty, connection, and clout:

- The perception of control activates the reward center. Conversely, the perception of a loss of control activates the threat center.
- The same applies to certainty, a reward, and uncertainty, a threat.
- Connection is a sense of relatedness to others, a reward; the sense of disconnection from others creates a threat.
- Clout is a feeling of status, a reward, or of the loss of status, a threat.

The skillful use of these conditions can have a positive or a detrimental impact on a presentation.
Cognitive Load
The brain has an extensive memory capacity in its long-term storage. In contrast, working memory, which includes the executive control function in the prefrontal cortex, is powerful but much more limited. This part of the brain contains logic and reasoning, and helps a person think through a problem.

Research shows that working memory holds only four to seven items of information at a time. Moreover, working memory is an energy hog in the brain and quickly tires. Because of this, a person often feels fatigued after extensive focus—for example, after a packed day of Transportation Research Board (TRB) Annual Meeting committee meetings, sessions, or training. Making skillful use of this limited brain energy is important for both a communicator and the audience.

Five Elements
Mindful of this background, a communicator should consider five elements when creating a presentation, whether for a nontechnical audience or a technical audience:

1. Clear purpose,
2. Knowledge of the audience,
3. Structured content,
4. Powerful materials, and
5. Skillful delivery.

Clear Purpose
The creators of the tapestry knew their goal: Communicate the history and the political outcome of the Battle of Hastings to citizens. Today’s communicator should have similar clarity, whether informing a group, seeking specific action, persuading to a viewpoint, guiding a decision, or simply listening.

Be clear about the purpose of the presentation. This may seem obvious but is an often underappreciated step, missed frequently. The meeting ends, and the participants are left wondering, “What was the point?”

Before walking in the door, a presenter should know the purpose and state it up front. What is the ideal outcome? What does success look like? What is the “ask”? State the purpose up front. This reassures the audience and confirms expectations. Ask for confirmation from the audience or from key players that they understand and agree with the expressed purpose.

Neuroscience tip: Clarity of purpose creates certainty for the audience. Asking for confirmation of the purpose creates a perceived sense of control. Both certainty and control activate the brain’s reward center—this makes for a good start to the presentation.

In addition, clarity of purpose reduces the cognitive load. The audience does not need to use precious brain energy to figure out the point. Make it easy—tell them. Preserve their brain power for more important tasks.

Know the Audience
The citizens of 11th-century France were illiterate, poor, and spent their days eking out a living. To care about a distant battle and its outcome, they needed to be engaged and intrigued. The tapestry creators knew that a story would capture their attention.
Analytical and scientific work focuses on facts, methodology, and analysis. For an important meeting, particularly involving a nontechnical audience, however, a communicator should make the effort to understand the audience and its needs. Create a connection. Apply the following practical tips:

- **What’s in it for me?** Each audience member is asking, “What’s in it for me?” A communicator should consider this perspective and answer the question. Some audiences already have opted in, as at a public meeting, a community association event, or a TRB session—the audience has chosen to be there. Why did they take time to walk in the door? Know what’s in it for them when preparing the program.

- **Character sketch.** Create a character sketch of the decision maker or of the group. The more a presenter knows about the audience’s interests and motivations, the better the presentation can be tailored, with examples added to create a connection and to appeal to the reward center. Consider the following factors:
  - The group’s interests, concerns, and history;
  - The political climate and the career trajectory and risk profile of the decision maker; and
  - The consequences of the decisions: Are credibility, embarrassment, power, or an election at stake?

- **Cultivate a connection in advance.** The messenger matters. People respond more readily to someone they like and who is similar to them. A communicator should learn about the group and its concerns and reflect that understanding in the presentation. The audience will respond.

Of course, the presenter sometimes may not be the most welcome person at a meeting—for example, when representing a project opposed by the community. When the “high-powered consultant” credential is not viable, a presenter may be able to find a respected community leader to accompany or to make introductions. Persuasion is a social, not a logical, act.

**Neuroscience tip:** The brain is designed for personal connection. When a person feels part of an in-group, the reward center is activated; empathy and collaboration are enabled. The greater the connection with the audience and decision makers, the more likely they are to listen.

When a communicator comes across as representing the “out-group” and exhibits little understanding of the audience, an audience member’s brain registers distrust and alarm. As a result, each member of the audience has to overcome this resistance before even starting to listen.

The brain’s threat center is highly sensitive to anything that jeopardizes clout or status. If the decision that is sought puts the decision maker in a dilemma, the decision maker’s threat center is activated. The communicator should find a way to reframe the recommendation to build status.

A presenter only armed with data comes across as tone deaf. Decision makers shake their heads and say, “They just don’t get it.” That assessment is correct, unless the presenter knows as much about the people as about the topic.

**Content Structure**

Benjamin Franklin said, “I have already made this paper too long, for which I must crave pardon, not having now time to make it shorter.” Ben was right—whittling a topic down to its essence takes time and effort. For example, a briefing to the Secretary or Deputy Secretary of Transportation is allotted only one half-hour, often less. In such constraints, be crystal clear on the ask, know the what’s-in-it-for-me, and have a concise, organized structure—these are essentials. Following are the basics for an organizing structure.

**Opening**

Research shows that analytically inclined and highly engaged people respond positively to facts and data. People who are less engaged respond to emotion-based information. Nonetheless, all people need an initial reason to pay attention; a compelling opening that connects at an emotional level accomplishes this most effectively.

Yet 95 percent of TRB sessions open with the statement, “Thank you for the opportunity to be here. I’m honored to be with my colleagues today.”
This is polite but boring. An opening subliminally tells the audience whether this presentation is the same old thing or something worthy of their brain's energy.

A communicator should be thoughtful about the first sentences. Try a quotation, an attention-getting statistic, or a story that connects the topic with the interests of an audience wondering “What's in it for me?”

For example, several years ago, a TRB session on the state of the U.S. DOT Intelligent Transportation Systems (ITS) program highlighted advances since the first ITS Strategic Plan. The presentation opened: “The year is 1992. The Washington Redskins just won the Super Bowl, and ‘ Achy Breaky Heart ’ was a Billboard hit. And the first ITS Strategic Plan was just released.”

Within seconds, the predominantly hometown crowd of Redskins fans was hooked, and music hummed in their heads. But what was most important was that their attention was focused on the presentation. Create an interesting, attention-getting opening that connects with the audience and captures their attention early, and they will be more likely to stay focused on the presentation.

**The One Thing**

What is the one thing that the audience should remember? Can that one thing be explained easily and simply to anyone? If not, try again. A presenter should be clear about what the audience should remember. State the one thing, repeat it, repeat it, and repeat it. Repetition is a key way of telling the brain to store the information into memory.

**Neuroscience tip:** Information has to compete for space in the working memory, which can hold only four items of active information at once. A presenter should be clear about what an audience member’s brain should store, by stating the one thing clearly and succinctly to place it into short-term memory and reinforcing it frequently enough to embed in the long-term storage—a process known as long-term potentiation.

**Use of Time**

Research confirms that people remember the first and last points they hear. Use those prime-time slots for the one thing and for the conclusions, which may be the same as the one thing. Time and again, a TRB presentation starts with a detailed explanation of data collection, methodology, and analysis. But before the results can be explained, the speaker says, “I am out of time and will flip quickly through the last slides.” Methodology, data collection, and analysis are not likely to be the most important points for a nontechnical audience—the conclusions will.

**Key Points**

A clear organizing structure gives the audience a road map for the presentation and creates a sense of certainty, activating a sense of reward. After a compelling opening that highlights the one thing, state the presentation’s structure, including three to five key points.

A presenter should think about how to commu-
nicate each point effectively. Not everyone consumes information in the same way, complicating the presenter’s task. Highly motivated people will listen to facts and analysis, but others need examples, a story, or an analogy.

The best option is to provide both for each point—state the point succinctly and include a fact-based statement and an analogy. This approach increases the likelihood that each point will be memorable from the analogy or story and will have credibility through the facts.

Closing
Questions do not have to wait until the end. The presenter can use questions throughout to engage interest and to track the audience’s understanding. If the questions are deferred to the end, the presenter should leave time after the questions for a summary and a memorable closing. The last words the audience hears should be a compelling comment from the presenter that reiterates the what’s-in-it-for-me and the one thing.

Powerful Materials
Like the color and artistry of the Bayeux tapestry, the design of presentation slides makes a difference in the attention and retention levels of the audience. A communicator should pay careful attention to the following elements.

Visual Images
PowerPoint or Keynote slides do not constitute a script. Slides should not display complete sentences or texts. Text-filled slides serve no one—the audience least of all. PowerPoint is a powerful tool for visual communication. For retention, replace text with images.

Words that convey visual metaphors also can be powerful. For example, in a recent presentation, U.S Transportation Secretary Anthony Foxx discussed moving 14 billion tons of freight and likened the amount to a “small mountain of freight”—an excellent use of visual language. Marrying the words to an image of a small mountain makes a memorable point.

Neuroscience tip: The brain’s language center activates when a person is reading or listening to speech. The language center, however, does not multitask and cannot focus on reading and listening simultaneously, only on one task or the other. Filling the screen with text invites the audience to switch from listening to reading the text. Should the audience be listening or reading? They can do only one.

Neuroscience tip: Images activate the visual center in the brain. The visual center and the language center work well together. When both are active, memory is heightened. Highly skilled presenters therefore use images that visually reinforce the spoken points.

Charts and Graphs
Not everyone can read a graph or chart quickly. Do not make the audience feel lost. Instead, design a chart or graph that communicates one key point. For example, allow the graph to become background
and highlight the key point in the foreground. Clearly and visually identify the point for the audience to grasp—they should not have to work to figure it out.

**Bullet Slides**

Do not use slides with bulleted points. If bullet slides are necessary, make them interesting—but not by changing the bullet from a black dot to a check mark. At a minimum, use color for the key words. The PowerPoint SmartArt tool offers a handy and simple way to convert bullets into colorful graphics.

**Handouts**

A PowerPoint deck should not serve as the handout for the presentation. An effective visual presentation loses its effectiveness as a slide-by-slide handout. Instead, design a companion handout that includes more detailed information for the analytically oriented, plus references, website addresses, complete graphs and charts, and other details. A handout should be a value-added complement to the program, providing additional relevant information and improving retention.

**Skilled Delivery**

Communication is a two-way process. The communicator is not presenting to an audience but communicating with them. Even in a formal presentation, as at a TRB Annual Meeting session, a speaker can communicate interest through eye contact and engagement. Think of the presentation as a one-on-one conversation, with one in the front, one in the back, one on the right and one on the left.

Engage the audience throughout the program. Ask for input by raised hands responding to questions. Attendees who are actively engaged pay attention and are not distracted. Multitasking decreases the accuracy of each of the multiple tasks by 20 to 50 percent. A multitasking audience therefore absorbs even less of what is being communicated.

In contrast, learning and retention soar with active engagement. The more the communicator invites the audience to consider and apply the points to their own situations, the more learning takes place.

**Neuroscience tip:** No matter how skilled the presenter, the audience will forget most of what was said. Studies show that retention improves dramatically with interaction and follow-up reminders. Optimally, allow for interaction every 10 minutes or so. Raising a hand, responding to questions, or sharing an observation with a neighbor or with the speaker enhances an audience member’s learning and retention.

For follow-up, e-mail a summary to participants a few days after the program, as a reinforcement. For example, after a community association meeting, e-mail a summary to the organizers to share in the community newsletter or website. The follow-up may include the main points and a summary of the input for the attendees.

**Neuroscience tip:** Working memory captures information in the moment, but the information is not embedded in long-term memory until later. Memory consolidation happens best during periods of deep sleep. Consequently, follow-up reminders work best when delivered the next day or a few days later.

**Effort and Time**

Embroidery may not be needed for a TRB presentation or for a city council briefing, but the communication lessons from an 11th-century fabric version of a PowerPoint deck still apply: Be clear about the purpose, know the audience, organize the content, develop powerful materials, and skillfully deliver the information.

Presenters invest time in understanding the material but generally spend less time in understanding the audience and the audience’s needs. Developing a brain-friendly program requires effort and time, but a presenter owes it to the audience to make that effort. What is all that research and analysis for, if the audience does not understand and apply it?

By the way, the French won the Battle of Hastings. *Vive la France!*