Motivating Visitors to Read Labels

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This paper examines some functions of interpretive labels/graphics and relates these functions to the informal, voluntary conditions in which labels must perform. It examines the often poor results seen when label design does not match the needs and expectations of voluntary, unguided audiences in informal settings. Some common reasons that contribute to the inability to create effective labels are discussed. Methods for improving the quality of attention to labels and some steps for label preparation are summarized.

Most visitors read some labels occasionally. Some read nothing at all. But many visitors will read labels if the conditions are right (Borun and Miller, 1980; McManus, 1987, 1990). What are these conditions? Some of the factors that affect whether casual visitors will or will not read labels will be considered here.

First, let's be clear how the term "label" will be used. Normally, the term has referred to the familiar name-date-identification label. As used here, "label" refers to all types of media—print, audio, and graphics and their presentation formats—used to help visitors interpret and relate to exhibit content, have an emotive impact, or motivate attention and effort. Interpretive labels have at least four components that affect their impact on visitors:

- **Content**: text and message components (conceptual level, cause/effect, comparisons, questions, instructions, headings, emotional components).
- **Structure**: legibility, organization, size, typeface, density of information, colors.
- **Presentation Format**: interactivity, sound, graphics, video, computers.
- **Context**: The physical and environmental context in which labels are placed: noise, lighting, sight-lines, competing exhibits, relation of text to exhibit content, entrances/exits.
Most impressions about label effectiveness are based on watching people in museums, zoos, and botanical gardens in which the design and content of the labels mostly reflect the values and needs of their preparers—not the values and needs of users. Those responsible for labels usually are concerned with label aesthetics, maintenance, accuracy of content, and their appeal to expert viewers. Too little attention is given to the reactions (or lack of reactions) of ordinary visitors. Effective labels deal directly with what visitors are looking at in the exhibit because exhibit objects are starting points for many visitors. Also, the information provided by labels should contain information visitors want to know. The common practice of asking script writers to prepare labels before specific objects and other content have been established makes this difficult if not impossible.

Functions of Labels

As noted by Loomis (1983), the need for interpretive materials to help the general visitor understand exhibit objects—“bridging the knowledge gap” between visitors and objects—is very important. Indeed, surveys by Klein (1978) and others have indicated that a major reason given by visitors for not visiting museums is the difficulty they encounter in finding out why specific objects are there, why they are important, or their connections to the visitor’s world. To attract new visitors and encourage repeat visits, museum managers need to become “visitor literate.” They should get into the habit of pretesting label effectiveness in the early stages of development. Ineffective label designs, language, and placement usually reflect incorrect assumptions by exhibit managers, label writers and curators about the backgrounds and interests of those to whom they are trying to communicate.

What is an effective label?

It’s probably a waste of time planning a label or worrying about which format (print, slides, interactives, etc.) is best for delivering label information before considering the function a given label serves. Any label should have a clearly defined function, or it may not be necessary in the first place. Functions for labels include: to attract attention, provide choices, connect unfamiliar objects or topics to familiar experiences, provide a framework for an exhibition theme, provide examples, focus attention to objects, elicit curiosity, answer questions, or communicate messages.
The "message" that labels deliver can include a wide range of functions. For example:

- Facts and definitions: *Not all dinosaurs are meat eaters,*
- Analogies: *Paleontology is like detective work,*
- Motivational impact: *A rain forest is an interesting topic; Biology is easier to understand than expected,*
- Self-esteem role: *Maybe I'm smart enough to learn things like this after all.*

Typography, layout, interactivity, or other formats serve some purposes better than others: for example, attracting and holding attention. The particular content of a label (e.g., its vocabulary, Socratic questions, graphics) serves other purposes; for example, helping a visitor to compare things or interrelate elements. Some purposes depend on both the medium and the message.

Without a clear purpose, there is little basis for choosing among alternative formats. Different features serve different purposes. Animation illustrates how an ear works better than a printed diagram or text because the dynamics of the hearing process are lost by the flatness of diagrams and of written language. A large printed sign may work as well or better than an expensive electronic sign to identify a theme area. Arguments over how many words should be allotted, size of type, terminology, colors, or aesthetics often reflect inadequate attention to what a print label is supposed to do and for whom.

Thus, labels serve different functions (for visitors as well as exhibitors) for different circumstances. Some important functions of labels include the following (adapted from Screven, 1986):

1. Provide *information* on the visual content of exhibits—names, dates, uses, relationships, why an object is there, what it does.
2. *Instruct* visitors on what to do, look for.
3. *Personalize* topics—connect the new and unfamiliar to familiar experiences and questions.
4. *Interpret* the content of the exhibit—its sensory impressions, its meanings, its causes and effects.
5. *Orient* visitors on what to expect, how things are organized, and how they might relate to exhibit content.
Table 1. Text Examples Serving Different Foals for Using Labels. 
(Examples marked "•" are from Rand, 1990)

| GOALS | EXAMPLES | \  
|-------|----------|---|
| **1. Attract visitors toward labels or to exhibit content.** | • Squids have orgies, but octopuses have close encounters.  
• Why Do Otters Scratch So Much?  
Otters aren't scratching because they itch! They're grooming. This keeps their fur clean and waterproof. | Why are there so many different kinds of living things?  
• Do you think this thing is a plant? Look more carefully!  
• They may look empty, but mudflats crawl with life!  
• Can you find the animal that looks like a stone? This map shows the continents as they are today. Where were they 200 million years ago? Choose one. Which beaks would crush a hazelnut?  
• Why Do These Rocks Look Alive? |
| **2. Focus attention to particular ideas or features of exhibit content.** | \  
|  
| \  
| **6. Make ideas more familiar.** | • Flatfishes are quick-change artists!  
• Like vultures, scavenging hagfish keep order on the floor! | \  
| **7. Encourage visitors to draw analogies.** | • Sea Stars Use Suction to Pry Open Their Prey!  
Pulling on a shell for hours with its small hydraulic tube feet, a sea star will exhaust even the most clammed-up clams!  
A Story Told By Bones. (For exhibit on anatomy) | Think of the generator in a coal-electric plant that turns by steam like your bicycle generator that is turned by your leg muscles. |
### Table 1. Text Examples Serving Different Foals for Using Labels. 
(Examples marked "•" are from Rand, 1990)

<table>
<thead>
<tr>
<th>3. Correct misconceptions.</th>
<th>4. Connect explanations to familiar experiences, phrases, or terms.</th>
<th>5. Encourage active attention to exhibit content.</th>
</tr>
</thead>
<tbody>
<tr>
<td>• This plantlike creature is actually an animal!</td>
<td>- Why is a hyena’s laugh music to a lion’s ears?</td>
<td>• Odds are you won’t find this cleverly camouflaged fish. Try looking for a blade of kelp that has two round eyes!</td>
</tr>
<tr>
<td>What good is a rain forest if it prevents economic development?</td>
<td>- Reach Out and Taste Someone! An octopus explores with its tenacles. The suckers can taste the difference between sweet, sour and bitter, and can tell if something’s rough or smooth.</td>
<td>• Watch the small silvery fish pass in a school and you’ll catch some yawning!</td>
</tr>
<tr>
<td>Hate this painting? Who said you had to like it?</td>
<td>• These dune plants fight for a foothold in shifting sands.</td>
<td>• That’s the hornmouth, one of our more ornamental snails.</td>
</tr>
<tr>
<td>Which of these paintings of a green faun do you like best? Is yours the same as Picasso’s?</td>
<td>• Like vultures, scavenging hagfish keep order on the floor!</td>
<td>• They may look empty, but mudflats crawl with life!</td>
</tr>
<tr>
<td>How do we know the glacier was here? (Heading over entrance to glacier exhibition.)</td>
<td>• Why are there so many kinds of living things?</td>
<td></td>
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<tr>
<th>8. Articulate questions visitors commonly have about exhibit content.</th>
<th>9. Encourage visitors to fantasize or project themselves into an exhibit situation. Sensitize them to another viewpoint.</th>
<th>10. Challenge visitors to attack a specific problem (not too easy, not too hard).</th>
</tr>
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<tbody>
<tr>
<td>What’s the lady doing among all those men? (From Rembrandt’s “Night Watch”)</td>
<td>If you were here, what would YOU do? (How would YOU feel?)</td>
<td>Think of a coal electric plant as a bicycle that turns a generator by coal-fired steam instead of by you.</td>
</tr>
<tr>
<td>What is this painting worth? (From Rembrandt’s “Night Watch”)</td>
<td>Which of these four versions of The Green Faun do you like best? Is yours the same as Picasso’s?</td>
<td>Which beaks could eat from this passion flower?</td>
</tr>
<tr>
<td>Is this bone real? Is the diamond in this elephant real?</td>
<td></td>
<td>• Can you find the animal that looks like a stone?</td>
</tr>
<tr>
<td>Why do some of these figures have blue skin? (from Egyptian Temple diorama)</td>
<td></td>
<td>• What’s out there under all that water?</td>
</tr>
<tr>
<td></td>
<td>• Odds are you won’t find this cleverly camouflaged fish. Try looking for a blade of kelp that has two round eyes!</td>
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In her efforts to help museum professionals improve labels at Monterey Bay Aquarium and other places, Rand (1990) also has emphasized the importance of identifying the objectives (functions) that labels have and how objectives guide decisions about language and presentation. Her examples of objectives include: focusing attention, correcting misconceptions, connecting the unfamiliar with the familiar, challenging visitors to answer a question or solve a problem, expressing the unknown, and drawing analogies.

Additional examples of label headings or text applicable for different label objectives and conditions are listed in Table 1.

**Conditions in Which Museum Labels Function**

The characteristics of museums as teaching-learning environments form the context in which effective interpretive labels must function. The chances a label will be approached, read, and understood is affected not only by a visitor's interest in an exhibit's topic and the quality of its organization, but by design details that affect the visitor's expectations of the amount of effort, time, and value of its content, their control over the type and amount of available information and its sensory modes, and the possibilities for action and problem solving. Over the years, the author has described these characteristics in various articles (Screven, 1969, 1974, 1986, 1990a) and these have been reiterated by Bitgood (1987), Loomis (1987); Shettel (1973), and others. Only a summary is needed here:

1) The majority of museum visitors are unguided people who are exploring museums and zoos on a *voluntary* basis on their own time and on their own terms. What they do or pay attention to, how carefully they attend, and how they interpret what they see, hear and read are based on *their* needs, expectations, preconceptions—not those of the museum. This means that learning in museums is a byproduct of "fun" oriented activities that are self-directed, self-paced, nonlinear, exploratory, and often social/family motivated.

2) Approaching and attending to exhibits depends on having *positive* experiences when doing so—not, as happens in schools, where maintaining attention often depends on avoiding the consequences of *not* attending (e.g., poor grades). Therefore, the content, structure and presentation modes of museum labels must (a) provide *positive* reasons for visitors to approach and attend to them (require minimum time, are sharable, easy to see, personal, provide challenge, concrete goals, action) and (b) minimize the *negative* reasons for not attending to them (crowded text, too much information, abstract, impersonal, difficult to see, hear or read).
3) When visitors *do* approach an interpretive label, the "quality" of visitor effort and attention can range from relatively passive ("mindless") involvement not directed to relevant content, to *active* involvement, also termed "mindfulness" by Langer (1989a) and Moscardo (1992), in which visitors compare things, ask or answer questions, make choices, notice relationships, make personal connections, and alter existing cognitive structures (Moscardo, 1992), all essential prerequisites for learning. Evidence suggests that much complex daily behavior, including social behavior, occurs with only minimal information processing; i.e., in a "mindless" manner (Grünig, 1979; Langer, 1989a; Moscardo, 1986,1992). Mindfulness, or high involvement, is more likely in unfamiliar, diverse, unexpected situations, with varied/multisensory media, questions and attention directing devices, visitor control over the type and amount of information, and personally relevant, emotionally charged materials. Active involvement has been associated with better judgement, learning, higher self-esteem, and higher satisfaction (Langer, 1989b).

4) Interpretive text and graphics usually are essential if visitors are to understand the larger context of exhibitions. But, in traditional exhibits, many self-directed visitors do not read print labels. One reason is that the *visual, sensory, action, emotional*, and *social* aspects of exhibits (colors, shapes, movements, buttons, touch, smell, texture) usually are intrinsically more interesting than text. While direct sensory-motor-affective experiences sometimes can communicate exhibit's messages, usually some kind of text is necessary. If so, this text must be approachable, readable, enjoyable, informative, involving, and pertinent to exhibit content.

5) In most museums, visitor time is limited by fatigue, hunger, appointments, parking, and other practical problems. For many visitors, time is a commodity that is invested at various points between entry and the point when the visit is terminated by fatigue, hunger, etc. Thus, attending to an exhibit and/or reading a label depends on the visitor's perception of the time and effort (cost) required and its expected "value" (Saloman & Globerson, 1987). From a visitor's standpoint, the question is: How much time will the label require compared with alternatives and will this time be worth it? Reading an interpretive label has a "value-added" factor as well as a "cost." This Value/Cost Ratio affects how likely a label will be read. "Value" is the likelihood that the label will make an exhibit more fun, personal, or understandable and "Cost" is the time and effort required to process its content. If the V/C-Ratio >1.0, the label
is read. Estimates of "value" may reflect prior experiences, a challenging headline, photo, question, a goal to achieve. (Simple, short paragraphs; familiar language; good illustrations will be perceived to require less time.) “Cost” not only depends on time estimates, but effort factors such as poor lighting, bad placement, too much information, unfamiliar language, and poor organization.

Motivating Label Usage

Given the open, voluntary, time-sensitive, and social conditions of museums, visitor perceptions about time, effort, and value of given actions probably are important influences on their use of text/graphic structures and delivery modes. Learning that takes place under such conditions is not unlike learning a sport or a musical instrument. These require effort and active involvement over time and are motivated by various intrinsic rewards along the way such as personal control over the process, discovery, sharing, surprise, competition, emotional excitement, and progress toward a goal.

In museums, effort and active involvement with exhibits and labels are similarly motivated. As described earlier, creating effective labels is not just a matter of generating lots of attention and effort, but depends on making mindful attention more fun than random or casual manipulations. The "fun" from interacting with exhibits must not be available whether or not focused attention is given to the exhibit's intended content or message.

At all educational levels, visitors are more likely to approach exhibit objects, visuals, headlines or text that are personally meaningful (Alt and Shaw, 1984; Samuels, 1988). Personalized writing styles, provocative headlines, leading questions, humor, and challenge increase involvement and focused attention (What's wrong with this picture? How do we know the glacier was here? Find the animal that looks like a stone. Which of these 4 versions of Picasso's “Green Faun” do you like best? Is yours the same as Picasso's?). Open ended interviews and focus groups centering around prospective exhibit objects and topics offer rich sources of ideas for potential wording and questions that can be used to create these attributes in labels.

Before discussing more specific formats that encourage label usage, some words about motivation itself may be helpful.

Rewarding Mindful Reading and Attention

Most “rewards” or incentives that can serve as a basis for attracting and sustaining mindful attention and effort are intrinsic incentives that are a part of natural explorations of museum environments. Sometimes, however, external (physical) rewards may be necessary to obtain the extra time and effort from visitors that more complex tasks or concepts may require.
Intrinsic Motivators

"Intrinsic motivators" are "rewarding" experiences that are natural outcomes from interaction or exploration of environments. Examples would include the excitement of progressing toward or achieving a goal, exploring exhibits with a friend, completing a task, acquiring a skill, solving a problem, or controlling or predicting events. Intrinsic motivators are responsible for many familiar human behaviors that persist without apparent external consequences. Common behaviors that are motivated by intrinsic incentives include playing chess, climbing a mountain, or learning to play a musical instrument (Csikszentmihalyi, 1988, 1990; Screven, 1986, pp.113-15). Common intrinsic motivators that are operative in museums include curiosity (e.g., pursuing questions), engaging in a challenging goal directed task, uncertainty, novel experiences, and fantasizing. Reading labels also can be intrinsically rewarding if this leads to better understanding of exhibit objects or to new, sharable knowledge. Table 1 and Figure 2 show examples of wording and formats directed to such ends. Intrinsic motivators like discovery and problem-solving probably are contributors to the sustained interest and involvement in label reading seen with interactive (flip) label formats (see below).

External Motivators

"External motivators" are things like money, privileges, or symbols given in recognition of an achievement that are under the control of someone or some thing (e.g., computer) that are contingent on some action, achievement, etc. While intrinsic motivators generate much of the attention and learning activities seen in museums, some exhibit goals require more time and effort than can be expected with intrinsic motivators alone. Examples would include exhibits which attempt to teach about food chains, plate-tectonics, biological interdependence, or other complex concepts that visitors know little about.

What if you wanted to create the excitement of discovery or increase the self-confidence associated with succeeding at a challenging task? The difficulty here is that such goals assume that visitors will persist long enough to succeed. But, given their limited time and perhaps uncertainty about their ability to succeed, many visitors will not invest the time needed to find out. Teaching goals of this kind often require more powerful external motivators to entice visitors to try—for example, by providing the opportunity to earn a lapel pin or other take-home prize.

To entice visitors to carefully attend to nearby energy exhibits, the author (Screven, 1990b, pp.120-21) provided take-home prizes to visitors who could answer criterion questions at self-test computers. The questions could be answered by most visitors, but only if key exhibit topics had been carefully attended to and understood. Visitors first had
to find out that the questions could not be answered without careful attention to the exhibits. The method produced striking increases in time, effort and mindful involvement, compared with the attention given to the exhibits without self-test computers and take-home prizes.

Exhibit planners often resist external incentives because they believe that the activities they generate will become dependent on the external rewards. Indeed, this may be correct unless care is taken in controlling exactly how the external incentives are applied. External incentives, indeed, can be counterproductive; for example, when visitors focus on the reward at the expense of reading a label or studying exhibit content. But external incentives need not have negative effects if care is taken to design the "reward system" so visitors cannot earn the reward unless they mindfully use (and learn from) the target exhibits and its labels (Screven, 1986).

Because it is so easy to produce negative side effects, it is important to pretest (formatively evaluate) the impact of extrinsic reward systems and make adjustments that avoid the mindless, reward-driven behavior that, otherwise, may accompany the use of external incentives. Formative testing assures that the "end result" (i.e., involvement, learning, interest, self-esteem) justifies the "means" (use of an external reward). In the application described above, the self-test system was adjusted several times before results were acceptable.

The Structure of Text

The structure of text includes such things as:

- **Legibility**: typeface, point size, line length; word length, white space, print density, background contrast;

- **Style**: distance between pronouns and their antecedents; specific versus general nouns ("A robin would..." "A bird would...");

- **Reader consideration**: signal words to alert important follow-up information or to anticipate expected information, anticipate causes;

- **Syntactic complexity**: sentence length, number of sentences starting with phrases in which no new information is being added ("In other words...","In summary...");

- **Semantic complexity**: number and level of propositions, causal structures, vague, abstract language, concept density (ratio of concrete to abstract concepts).

Such variables can directly affect the readability of text, as well as a reader's perception, effort, memory, and comprehension (Rayner & Pollatsek, 1989; Rothkopf, 1970; Samuels, 1988; Kintsch & VanDijk, 1978; Kintsch & Vipond,
If so, then they also can influence the visitor’s motivation to read (or not to read) by affecting the $\text{Value}/\text{Cost}$ Ratio, or their perception of the effort that reading the text is likely to have, and the likelihood they will “understand” a point, perceive a connection, answer a question, take an action, and so on. Examples of some research results:

- The distance between pronouns and their antecedents should not exceed more than a few sentences.
- Concepts should be kept specific whenever possible. A robin would sometimes wander around the house is easier to read than a bird would sometimes wander around the house. General concepts need to be repeated more than specific concepts.
- More attention usually is given to segments of text that give reader something to do (look for, apply, carry out).
- Cues need to be provided in text to signal a change in topic (paragraphs, italics, indexing, listing, and phrases, such as The third conclusion about radiation impact is...).
- Many readers expect that each sentence will add something new. When a sentence rephrases the same information, reading effort is decreased by devices such as “In summary...”
- Average word length and the frequency of words in the general language are good predictors of readability.
- Higher level propositions are remembered better than lower level propositions.
- Chunking text (grouping like information together in nested paragraphs) expands the amount of information persons can "remember" in short-term memory.

**Formats and Context**

Presentation formats include the delivery medium a label uses (print, film, audio, computers), type styles and sizes, text layout, and attributes such as animation, language style, and interactivity. Presentation formats affect readability, visibility, attraction, holding power, the ability to focus attention, and how visitors are likely to use or misuse labels. As with label content, the purpose or function of a label’s presentation format should also be carefully defined before selecting among alternative formats.

The first and easiest step to encourage the reading of print labels is to reduce the "Cost" in the $\text{Value}/\text{Cost}$ Ratio by avoiding features that discourage reading.
The following suggestions should avoid the most common problems: (adapted from Screven, 1986)

1. Locate print labels near the objects they are about—preferably on them, but at least near them and visually "connected" to them (Bitgood, 1987; Screven, 1986; Serrell, 1983);

2. Select typography that is easy to read. Generally, serif type is easier to read than sans serif. Avoid type that is too small, colors that reduce contrast, and poor lighting (Bitgood, 1991; Layton, 1991; Samuels, 1988; Serrell, 1983). There also is the possibility of connotative effects of typefaces on feelings about the message.

3. Distribution and use of white space makes text appear easier to read and more interesting. In general, the more white space the better.

4. As visitors approach text, the text should require only a little time to find the wanted information or to sample short portions of the text. For example, long text can be divided into smaller paragraphs, called chunking, so visitors can decide what to read and how much as they go along. Different sizes and weights for primary and secondary text is another possibility.

5. Headlines and thematic signs should be short and use large type with simple, eye catching designs and familiar, descriptive language because, from a distance, visitors use headings and thematic signs to help them make a decision.

6. Label language should focus on specific descriptive attributes of exhibit objects—colors, smells, movements, functions (Bitgood, 1987; Layton, 1991; Rayner & Pollatsek, 1989; Screven, 1986). Tap existing visitor interests, naive questions, and personal experiences that can be used in headlines, subheads, cartoons, and other text. Begin where the visitor is (How much is the painting worth?) and proceed to where you want the visitor to be (Money is not useful for evaluating paintings). Avoid abstract language in headings and lead paragraphs (Life’s Meaning in the Sands).

7. Use personal language in active voice (we, you, folks) and avoid jargon (Bitgood, 1987; Layton, 1991; Rand, 1990; Screven, 1986).

Some educational and psychologically oriented publications provide research and theoretical models on readability, memory, and comprehension of text applicable to writing and formatting interpretive labels in museums. These include Frase (1968); Hartley (1982); Kintsch & VanDijk (1978); Kintsch & Vipond (1979); Rayner & Pollatsek, 1989; Rothkopf (1970).
Encouraging and Sustaining Focused Reading (Mindfulness)

In addition to avoiding formats that discourage reading, some formats take a more direct approach. For example,

- Using visual cues (diagrams, photos) that visitors can use to find desired information in the clutter of other text (Hartley, 1982);
- Inviting visitors to act by asking them to touch, smell, compare, sort, predict what will happen if... (Rothkopf, 1970);
- Challenging visitors to solve a problem or pursue a goal (What's Missing in This Picture?). (Csikszentmihalyi, 1990).

Visitors must perceive challenges posed by an exhibition to be within their interpretive skills—e.g., the "meaning" of an art work should appear within their reach. Csikszentmihalyi (1988) suggests it is the balance between this challenge and the visitor's view of their interpretive skills that determine the likelihood they will approach an exhibit (or text) and become involved.

Questions

Questions in headings and labels can focus attention and provide a context as well as intrinsic incentives for reading. Questions have been a recommended educational technique for years (Rothkopf, 1970). Some exhibit experiences (and objects) stimulate visitor questions about them (Is that real? Why do bats hang upside down?). However, visitors often need help in articulating such questions. One technique for encouraging greater involvement with exhibit content and its text is to incorporate the questions visitors have about exhibit objects into headlines, subheads, and interactive formats. These can be obtained from open-end, informal interviews and focus group sessions during the front-end evaluation stage. Objects, photos, reprints of art, etc. often serve as effective catalysts that can bring out such questions from visitors (Hood, 1986; Screven, 1990a; Shettel, 1989).

The questions visitors have about exhibit content are more predictable than one might expect. A few of the common questions visitors "ask" are the following: (Items marked "*" are from Rand, 1990.)

- How much is this painting worth?
- Is this real?
- Where is that from?
- Can that toxic plant be distinguished from nontoxic varieties?
- Why does the leaf have such a funny shape?
- What's out there under all that water?
- How did they paint inside that bottle?
- Why are the skins of some figures blue?
- Are all of those things mushrooms?
- *Why do otters scratch so much?
- Could I grow that?
- Which berries are poisonous?
- That painting is ugly. Why is it here?
- "Rembrandt got the equivalent of $35 for Nightwatch";
- * "Otter's aren't scratching because they itch! They're grooming. This keeps their fur clean and waterproof"

If questions are introduced into headings and text, immediate and concrete answers need to be provided. Thus,
As described earlier, prominently displayed lead questions reduce random observation by encouraging visitors to explore, compare, notice, look for relationships and other "mindful" behavior (see p. 189).

Four Presentation Formats
The following four presentation formats, which vary in complexity, are examples of some more direct ways to attract and/or sustain quality attention to labels and to exhibit content. The first three formats generally depend on intrinsic motivators. While computer formats also depend on intrinsic motivators, computers can adapt label content and delivery modes to much wider differences in visitor interests, background and learning style than other presentation modes.

1. **INFORMATION MAPS** are print labels that are visually coded to identify different categories of information and their logical structure. Finding information in expository text may require considerable time and effort. Visually coding categories of text makes it easier to find particular kinds of information in crowded text. Information maps assume that, as the time needed to access desired label information is reduced, visitors are more likely to use the labels. Figure 1 illustrates one approach to the text you are now reading about information maps. To identify categories of text visually, information maps may *italicize* definitions, *boldface* overviews, *underline* tasks and practice questions, *capitalize* topic headings, indent examples, box technical terms that are defined in margin, and use color, flow charts, or other visual devices (Hartley, 1978, 1980, Horn, 1974, 1976). There are many possibilities for breaking down text content, as well as ways to visually code text.

Table 2a lists additional examples of text categories. Table 2b shows ways of visually cueing text. To use information maps, visitors must be informed about the infomap system—for example, a lapel card or other device illustrating text codes and their meanings.

Text categories should be aimed at serving a broad range of visitor backgrounds, interests, and knowledge on any given topic. Interviewing visitors will help identify categories that meet varied needs. Like other interpretive components, information maps benefit from formative evaluation.
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INFORMATION MAPS:

Text which has been visually coded to identify different categories of information and its logical structure.

VISUAL CODING METHODS

Finding information in text can require considerable time and effort. Information maps visually code categories of text information to make them easy to find in crowded text. Information maps assume that, as the time needed to access desired information is reduced, visitors are more likely to use the text. To visually identify categories of text, information mapping may:

- Indent and list examples.
- Box technical terms within text that are defined and boxed in margins.
- *Italicize* definitions.
- **Boldface** introductory overviews and concept summaries.
- Place references, definitions, topic headings, questions, and question feedback in margins.
- Underline practice tasks and leading questions in margin.
- Place rules, instructions in parentheses in margin.
- **CAPITALIZE** topic headings in margin.
- Put feedback to questions in a distinctive "Answer Box" in a consistent place in each exhibit (or in electronic box).
- Use **flow charts** to depict sequential events, time, etc.

Some method must be used to alert visitor to the **visual codes** used to represent information categories.

Visitors might receive a lapel card that illustrates text codes and their meaning to use when encountering a museum's infomaps.

Categories depend on the messages to be conveyed and the needs and interests of visitor groups. Museum visitors vary widely in backgrounds, interests and knowledge on any topic so categories should aim at a broad range of visitors. Interviewing visitors will help identify appropriate categories for different visitors.

This infomap illustrates only one approach to mapping the original text. There are many possibilities for **visually coding** text. Like other interpretive components of exhibits, infomaps benefit from formative evaluation.

Figure 1. Information Map.
2. **LEADING QUESTIONS**: Table 1 includes examples of leading questions. Leading questions can *lead* visitors to notice or become sensitized to important features in an exhibition. They can focus attention to the shape of a leaf, the hoofs of a tundra animal, or to brush strokes (Hirshi and Screven, 1988). Incorporated into headlines, subheads, text, or placed among objects, they also can alert visitors to underlying issues in thematic exhibits (*How do we know glaciers were here?*). The information visitors need to "answer" leading questions may or may not be immediately obvious in the exhibit, but the "answers" should become apparent when the visitor examines the exhibit, or carries out a suggested "action" (examine a leaf, read a label, make a comparison). Leading questions are intended to motivate and direct the attention of visitors—they usually are *not* intended to measure what visitors have "learned" from an exhibit.
3. **FLIPPER LABELS:** Flippers present text in overlapping layers. The term “flip labels” or “flippers” refers to hiding text and graphics under one or more layers in some way (Screven, 1986). The visitor lifts up a hinged panel, slides a door, or pulls out a paddle to gain access to “hidden” information under or behind the top layer. Because most visitors can use these either to apply or to obtain information, flippers are a form of a “low-tech” interactive device. Two types of flippers can be distinguished:

**Layered Labels** consist of two to four hinged overlapping layers that contain questions, statements, or elaborations. The top layer contains a brief statement, *Three Types of Ferns* or a leading question *Are These Berries Edible?* or *Why Do Some of These Figures Have Blue Skin?* Each layer (Figure 2) takes visitors through a linear sequence of points, actions, questions, answers, or graphics.

![Figure 2. Three-layer Label.](image)
Figure 2 illustrates an enlarged version of a three-layer label installed on an information rail at an Egyptian Temple Diorama. Layered labels allow visitors to explore a topic, one layer at a time. As they learn one thing, visitors are more likely to seek a little more information (in next layer). Layered labels can be used to do a number of things: direct attention to key features of objects, or encourage visitors to do something, notice something, confront a misconception, or in other ways, to encourage them to become more actively involved with objects.

**Multiple-Choice Flippers** (MC-flips) consist of a lead question (*What Material can be Mixed with Coal to Reduce Acid Rain?*) attached to two or more hinged panels with alternative choices, as seen in Figure 3. When lifted, each panel provides feedback. MC-flip questions provide more precise control than layered labels over exactly how visitors use exhibit content to answer questions. MC-flips are particularly useful for concept learning because they can focus attention to differences or similarities among visual elements and teach discriminations between conceptual elements. Better learning (retention) seems to occur when the visitor examines exhibit content before choosing an answer, rather than simply guessing. Surprisingly, experience has indicated that visitors over 10 years old usually do not guess if the needed exhibit information is easy to locate and does not appear time-consuming. If so, visitors tend to look for answers in the exhibit before choosing. Information found under a flip after a random guess appears to have less retention than when the information is
obtained before making a choice. MC-flips were first tested in the '70s at a visitor center (Screven, 1986) to provide an interactive print format.

While MC-flips are now found in many exhibitions, they are often ineffective. Reasons vary. Sometimes the information needed to respond to the choices is not in the exhibit or in nearby labels, or it is not easily found. Note that using questions on MC-flips does not guarantee good results. In fact, some questions can be counterproductive. For example, abstract or trivia questions on MC-flips may discourage visitor use or encourage guessing.

To be successful, layered labels and MC-flips, like conventional labels, not only must connect to familiar experience, but also direct attention to appropriate exhibit content, some of which may be unfamiliar. In spite of their simplicity, layered labels and MC-flips can often dramatically reduce random looking and increase focused, active attention (mindfulness).

Some persons argue that the learning that occurs with layered and MC-flips is due to their manipulability, not to the layered or MC formats. While this hypothesis needs to be experimentally tested, the author's experience indicates that these formats are simply a framework for setting up the conditions for learning—i.e., behaviors such as searching, comparing, relating, and applying label and exhibit information. The format might be seen simply as a way to manage the steps involved:

| Question | Examine exhibit | Find information | Choose answer | Confirm |

On the other hand, what specifically is learned depends on the information given, not the manipulable or interactive format itself.

4. COMPUTER LABELS: Label information is presented on computer screens via laser disks or other electronic technology. Computer screens become "pages in a book" through which visitors explore alternative pathways of information according to their needs, learning styles and time available (Screven, 1986, 1991; Whitney, 1990; Worts, 1990). Viewers decide what information to pursue and when to pursue it. Computers serve purposes similar to flippers, but have the potential for almost infinite branching and adaptability. They also are useful for managing external motivators, animation, and sound when these are needed. However, those
interested in using computers as educational aids in museums should beware! By themselves, computers do not necessarily produce quality attention, reading, or learning (Screven, 1991). Like labels and other interpretive materials, the effective use of computers depends on front-end audience analysis, text analysis, well-defined linkages to exhibit content, and the formative evaluation of the teaching and motivational effectiveness of programs during their development.

Levels of Interactive Labels

What has been said should not be interpreted to mean that labels need to involve interactive formats like flippers or computers. Even "passive" text can successfully generate active and mindful involvement under some conditions if writers use formative evaluation to make relatively simple adjustments during the label's development.

It may be helpful to distinguish between levels of label "interactivity." Unless there are strong reasons to employ higher levels, this author recommends starting with conventional formats, rather than interactive text. If formative testing indicates that these do not work, one proceeds first to "covert" interactive versions (level 2), then to "secondary" interaction formats (level 3), then on to "direct" formats (level 4) and finally to adaptive interaction that usually require friendly computers and video disks (level 5).

**Level 1: Conventional labels** are two-dimensional text panels. These can produce considerable involvement when the "Value" part of the Value/Cost Ratio (see pp.189-90) is high—which may be the case, for example, with famous artworks, exotic animals, or fantasies generated by gory historical scenes. Even hard-to-read text placed next to the Mona Lisa, a famous Picasso, a mummy, or a Panda, are likely to be read. Visitors seek information about high-interest objects from whatever resources are available. But, even for high-interest objects, it is important that the labels include information that refers directly to them. With less exotic exhibit content, conventional text often can be made effective by careful placement, chunking, provocative headings, and readable typefaces.

**Level 2: Covert interaction** involves conventional text formats, but uses questions, challenges, instructions, and/or information maps that encourage covert interaction with the exhibit. They may do this by encouraging visitors to search the exhibit for clues, for "answers" to questions, etc. But again, the specific learning that results depends on the questions, the challenge, and the exhibit's content, not simply on the interactive activity.

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1 The levels of interaction used here are different than levels of interaction employed in the audiovisual field, which defines four levels: (1) straight linear, (2) branching, (3) computer control, and (4) on disk.
Level 3: **Secondary interaction** involves conventional labels that contain information needed to carry out a second, more motivating task—e.g., when information provided in a conventional label can be used to answer an MC-flip question or pursue a problem task. While the conventional label has no push buttons or manipulatives, the motivation to read it is the visitor’s interest in pursuing the second task. Pre-recorded audio scripts (*via* handheld players, head phones, speakers) also can serve as secondary interactive devices if they ask leading questions about exhibit objects/relationships, describe what to notice, do, or where to go. Audio scripts allow visitors to look at the exhibit and listen to the audio information *at the same time* (see Screven, 1975). Visitors can look *and* listen instead of read *then* look. Applications have shown that voice instructions on what to do or notice is easier for most visitors (i.e., involves lower “cost”) than bouncing between reading about objects and then looking at them. However, there are limits. Abstract voice scripts that go beyond immediate exhibit content may be difficult to follow for visitors who do not have good listening skills. When more abstract elaborations are needed, the author has found it better to direct visitor attention to printed text and graphics for these elaborations (Screven, 1975); for example: *You know why that happens? Read text in green frame, then I’ve got a question for you!*

Level 4: **Direct interaction** is exemplified by layered labels (Figure 2) and MC-flip question labels (Figure 3) that provide more precision in focusing visitor attention and establishing discriminations than do lower levels of label interactivity.

Level 5: **Adaptive interaction** involves electronic labels that, with the help of computers, are able to adapt their responses to different individual interests and needs. This is the highest level of interactive label, best suited when there is a need to adjust the kinds and modes of information available to visitors over a wide range of interests, abilities and learning styles, e.g., in wayfinding, providing overviews, making choices at museum entrances, and adjusting the branching, sequencing, modes, feedback, and depth of information to individual needs. The vast storage and interactive capabilities of computers make it possible for visitors to choose what they wish to see, schedule their time, browse, set goals, ask questions and have 2-way conversations that would be impossible with less powerful devices. For discussions about such computer applications, see Screven, 1986, 1991.
Preparing Labels

The Role of Formative Evaluation

Those who believe they can prepare labels that will attract, involve and communicate to unguided visitors should beware! The variables that contribute to label effectiveness vary with different individuals and situations and, therefore, almost always require adjustments of one kind or another.

Formative evaluation (FE) is a process which allows early pretesting of mockups of labels, graphics, formats, and their placement. Formative testing of prospective labels spots deficiencies in their ability to attract, hold attention, generate involvement, and communicate before it is too expensive to make adjustments. Low-cost, quickly made versions of label copy, diagrams, photos, and instructions, are tested with small samples of 5 to 20 target visitors. Because mockups can be quickly modified and retested, it is possible to identify problems, make adjustments, and retest them at low cost. FE also provides writers, curators and exhibit staff with more direct knowledge about visitors that will improve their planning decisions and correct or confirm pre-conceptions about what visitors will do and not do with labels. After initial training, observations and testing usually can be carried out by label writers in conjunction with curators and staff (Screven, 1990a). Hands-on staff training workshops on FE methods are strongly recommended to assure that staff will be able to efficiently conduct FE procedures by themselves. After one to four weeks of training, only periodic help from a specialist is needed. However, other evaluation activities (front-end, summative, and interview questionnaire planning) often require regular input from experts.


Stages of Label Evaluation

The features and formats of labels must be adapted to the characteristics of target audiences, the label’s message, and to the functions (Table 1) or impact they are supposed to perform. Integrating the planning and writing of labels with overall exhibit planning is of great practical importance if real progress is to be made. Currently, there is much discussion about how to organize and manage the planning, design, and production stages of exhibitions efficiently and harmoniously. The different approaches to managing the planning and development of visitor-oriented exhibitions over
the years, including label preparation, have been compared in a recent paper by Roger Miles (1993, in press) in which he outlines a promising framework currently in use at the Natural History Museum in London.

A host of "management solutions" currently are circulating and being tried by visitor oriented museums. In the hope of contributing to this dialog the following five steps for label preparation focus on label planning within the larger context of exhibit planning.

STEP 1: Front-end Evaluation (Before exhibit content has been specified). The design team (writer, curator, educator, designer, and perhaps director) discuss exhibit ideas and messages over a series of meetings: Who is the audience? What are the two or three most important things to say about the topic? About the objects? What guidelines can be used to organize and deliver the exhibit's messages (e.g., layered, interactive, electronic)? (See Shettel, p279-84 in this issue of the ILVS Review..)

STEP 2: Preparing Preliminary Labels for Team Review
The person(s) responsible for labels and other interpretive components prepares preliminary statements that describe his/her understanding of the main ideas and supporting materials previously agreed upon by the design team. Rough mockup versions that might be used for testing labels' effectiveness may also be presented.

STEP 3: Coordination with Exhibit Team
Results from stage 2 are shared with the design team over several sessions until agreement is reached at least on basic ideas and how the labels and exhibit content will be coordinated. At Stage 3, agreement is limited mainly to key ideas, concepts, potential linkages to exhibit content, and identifying some of the specific functions that given labels are needed to serve.

STEP 4: Formative Evaluation of Teaching Effectiveness
The writer tests quickly made "soft" mockups of prospective labels/graphics with "cued" visitors for their teaching effectiveness. ("Cued" visitors know beforehand that they will be questioned or observed.) These are tested with visitors using the objects, pictures or their renditions that are planned for the exhibit, (important because labels must refer to these). Actual testing may be conducted with the help of one or two other persons on the exhibit team. The writer(s) prepare(s) and tests 5 to 20 cued visitors for readability, comprehension, recall or other learning outcomes (for details, see Screven, 1990a; McNamara, 1990). Usually, only one or two panels are tested at a time. Communication problems are corrected as needed and results reported to the exhibit team with recommendations. For scheduling purposes
and budget control, time-limits need to be established for mockup testing, based on the number and complexity of label messages and the budget. Only the most important labels (and messages) are tested.

Budgeting and scheduling does not allow formative testing of labels/graphics to be “tested to perfection.” Testing must be limited to identifying and correcting only potentially serious problems with readability, layout, illustrations, sequencing, and organization of content. Also, stage 4 normally tests the teaching efficiency of labels, not their motivational impact (Screven, 1990a).

STEP 5: Testing Motivational Impact
Observations are made of noncued visitors (who are unaware of being observed) to see if prospective labels or their components attract attention, generate involvement, and produce proper usage of label systems. Photographs, objects, reproductions and other prospective display elements should be present during observation. Observations may include proportion of stops at the target label(s), time spent, holding time, active/passive involvement, social interaction, label or exhibit usage (Do they “play” with it? Guess? Follow instructions?). Noncued observations usually are made on the open floor of the museum (Screven, 1990a, p50-51, 57-59).

There are early and late stages of testing for motivational impact. During early stages, the behavior of passing visitors to mockups is observed; in later stages, visitor responses are observed at more advanced mockups that simulate the final installation (prototypes). As in stage 4, time limits need to be established.

Institutional Obstacles to Effective Labels
Along with label design and content, there are built-in institutional procedures and staff attitudes that often prevent label writers from applying even modest versions of the design guidelines described above. How is it possible that so many competent and dedicated museum staff around the world consistently produce labels that do not work? One likely explanation is that the accepted routines found in many medium-to large-size museums more or less guarantee that most visitors will not use their interpretive text and graphics, or if they do, will not understand them.
Chief among these counterproductive routines and attitudes are the following:

a) **Label preparation does not require planners to define and assign priority to the purposes (functions) of given text, graphics, headlines, or signage.** Only cursory attention is given to specific functions of exhibit labels, usually in terms that are too general to be useful (e.g., "Explains a food chain"). Instead of checking labels and formats with real visitors, editing labels mainly consists of copy editing for grammar, spelling, accuracy, length, and other such details.

b) **Many planners are biased toward formal teaching-learning methods that underestimate the voluntary and informal nature of museum settings.** Museums and exhibits are viewed as dramatic, three-dimensional classrooms. But, unlike schools, museums cannot use grades or "top-down" controls to capture attention. Thus, planners tend to overlook or underestimate the role of associating positive (rewarding) outcomes to visitors who give time and effort voluntarily.

c) **Label preparation routines are not coordinated with other exhibit elements.** Label content must include direct connections to the exhibit objects on display because proper interpretation of objects often depends on information provided in labels. The label formats that encourage (or discourage) attention to and comprehension of these messages varies with the individual needs and learning styles of target audiences. Many museum professionals already recognize this. Yet, in many institutions, label planning and preparation seldom are properly integrated with other exhibit planning. Examples abound, including the practice of preparing exhibits and then turning them over to a third party to prepare interpretive text, or requiring label writers to prepare labels before other exhibit content and organization have been decided.

The educational-motivational-informational aspects of exhibits operate as a **total system.** Creating an effective whole is impossible unless scientists-scholars, designers-fabricators, and labels-graphics specialists work together at every stage of planning. Clearly, better management strategies to facilitate the work of "exhibit teams" seems crucial.
d) **Label and exhibition planners have serious misconceptions and inadequate knowledge about the visitors they serve** (Miles, 1986). Misconceptions about visitors distort decisions about label content and format because they lead to invalid expectations about what visitors will or will not do, need, feel, think, or learn. Inadequate information about the public held by exhibit planners is understandable, partly because their work does not normally bring them into contact with real audiences. Also, normal exhibit and label preparation procedures provide few opportunities to find out what the abilities and limitations of their visitors are like (Miles, 1986). Audiences are viewed as persons with more knowledge, interest, time, and energy than they have—views that may underlay many of the nonproductive arguments in staff conferences over label language, label length, how to present it, where to place it, and what media to use.

**A Final Word**

While there is much to learn about the complex process by which labels communicate in open environments, more research on the psychology of reading and language media (e.g., Rayner & Pollatsek, 1989) and in cognitive science (Gardner, 1992; Langer, 1989a; and Moscardo, 1992) are being synthesized and made available. But, one need not wait for more extensive research to “tell you how to do it.” As we have seen, there already are lots of possibilities for improving the attention of visitors to different kinds of labels and what they learn from them. Also, current experience indicates that the use of "remedial evaluation" (Screven, 1990a, pp.53-59) can further improve label functioning and productive (mindful) exhibit usage in the post-occupancy environment. To do this, however, planners (and writers) must be better informed about the agendas and learning styles that influence visitor use or non-use of labels within the context of given exhibitions, as well as ways to improve the routines by which labels are prepared.

The facts are mounting that visitors do read labels if they perceive that labels will meaningfully help relate exhibit content to them, or will provide feedback and follow-up to exhibit experiences. It is time to become serious about the needs and interests of unguided visitors for meaningful interpretation. The good news is that new tools (e.g., see Layton, 1991) and exciting new strategies are becoming available for the effective design and delivery of interpretive information in open environments. These await only for museum professionals to explore their educational potentials in museum settings.
References


