

LabelPatterns.Org: A Comprehensive Pattern Library for Consumer-Decision Labels

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Abstract - Consumer-decision labels are relatively small panels of information, placed where consumers make decisions, that help those consumers make informed choices and, at times, motivate desired behaviors. They provide information about environmental impact/sustainability, nutrition, health, safety, the quality and suitability of consumer goods, and other domains. Design patterns are expanded guidelines that follow a problem-solution structure, provide more context than standard guidelines, and are supported when possible by citations to relevant research and professional literature. Pattern libraries are sets of coordinated patterns that strive to comprehensively support the design process in a particular domain. Pattern libraries have proven successful and are now used in such domains as urban planning, object-oriented programming, software user interface design, and web design. LabelPatterns.org is a newly launched website currently hosting over 75 design patterns that support the design of consumer-decision labels. It also offers other kinds of information about these labels and related messaging. The patterns and the website were begun as student projects in the Department of Human Centered Design & Engineering at the University of Washington, USA. It is now being managed and expanded by a volunteer project team.

Index Terms – Design patterns, environmental labels, consumer-decision labels, pattern libraries

INTRODUCTION

In the United States and worldwide there are numerous programs that issue or authorize consumer-decision labels. These labels are relatively small panels of information, placed where consumers make decisions, that help those consumers make informed choices and, at times, motivate desired behaviors. Consumer-decision labels provide information pertaining to many domains.

Chief among these are environmental impact/sustainability, nutrition, health, safety, and the quality and suitability of consumer goods. These labels are often affixed directly to products—for example, the energy consumption labels on household appliances and product safety warning labels. Often they are incorporated into product packaging—for example, the nutrition labels on packaged food products. But they can take other forms as well. The “markers” that municipalities often stencil or affix to storm-sewer catch basins to inform citizens that pollutants will go directly into local streams and rivers [e.g., 1] can be considered consumer-decision labels.

Consumer-decision labels are generally part of broader public information programs managed by government agencies such as the U.S. Environmental Protection Agency (EPA), non-governmental organizations such as Fair Trade USA, individual corporations such as P&G, or industry trade groups such as the Carpet and Rug Institute. There are various motivations for these labeling programs. They often stem from regulatory legislation. For example, in the US the EPA requires automobile manufacturers to affix labels that communicate fuel economy and related information to the vehicles they offer in the marketplace, and the EPA (together with the Department of Transportation) specifies the design and placement of the labels. In other cases, industry groups establish labeling programs voluntarily, very often to promote consistent product categories within the industry (e.g., different grades of carpeting) and to educate consumers about their choices. In still other cases, an individual manufacturer will create its own consumer label. For example, P&G recently launched its Future Friendly labeling program to spotlight what it believes are positive, environmentally oriented aspects of its products.

Consumer-decision labels can be regarded as a genre, and this genre can be divided into various subgenres on the basis of what kinds of information the labels communicate and how they do so. Wiel & McMahon and Larson, looking specifically at the environmental domain, identify and carefully describe these three subgenres: endorsement labels, information-only labels, and

comparative labels [2], [3]. Endorsement labels are seals of approval given to products that meet specified criteria. Information-only labels simply provide data on a product's performance on one or more measures. Comparative labels allow consumers to compare performance among similar products, either by categorizing related products into classes based on relative performance or by positioning products on a scale that features the upper and lower limits of performance of related products. Hybrids are possible. Looking at other domains as well, the list of subgenres expands to include safety warnings, product guarantees, and more.

In general, to be effective in regard to communication, consumer-decision labels must meet these criteria:

- They must communicate clearly and quickly—often to diverse audiences—in the context of the decision-making task at hand.
- They must provide appropriate kinds of information, information consumers can incorporate into their decision-making.
- They must be credible and, in certain instances, strongly persuasive. Consumers, for example, must trust information about the environmental impact of products on environmental labels and should be motivated to comply with safety and health warnings.

Although labels are small in their physical dimensions, successful label design is not easy. The design space for consumer-decision labels is quite broad and presents significant complexity. The reasons for this complexity include the following:

- Labels often need to accommodate different kinds of information within one design.
- Complex technical issues such as energy consumption and the appropriate administration of medications must be communicated very succinctly to a lay audience.
- The rhetorical dimension of labels varies from the positive messaging of an endorsement to the negative messaging of warnings.

In large part because of the design challenges they present, poorly designed, ineffective labels are not rare [2], [4] [5], [6]. To help address this problem, a new resource has been developed and is being introduced here. LabelPatterns.org is a web-hosted collection of design patterns for consumer-decision labels with an emphasis on environmental impact and sustainability. The patterns and the website were begun as student projects in the Department of Human Centered Design & Engineering at the University of Washington, USA. The website offers

valuable guidance for those who design consumer-decision labels and who plan and assess labeling programs. We believe that no comparable resource exists.

WHAT ARE DESIGN PATTERNS?

Patterns are design guidelines. As such, they are solutions to recurring design issues that are sufficiently general and robust to be applied to each new instance of the problem [7], [8]. Patterns, however, are expanded guidelines that follow a problem-solution structure, provide more context than standard guidelines, and are generally supported by citations to relevant research and professional literature. A pattern from LabelPatterns.org is shown in Figure 1. Later we explain this pattern in detail.

While one can certainly write a single pattern, patterns almost always appear in collections, or “libraries,” that address issues in a particular domain. The patterns within a library should be relatively comprehensive and well coordinated with one another so as to support the design process from beginning to end.

The most important benefit of a design pattern over a standard guideline is its greater context. In the case of standard guidelines, the designer must ponder the applicability of a guideline to his or her particular situation. If a web design guideline says to avoid horizontal scrolling, a designer who has created a web-based timeline or complex process diagram must decide if the authors of the guideline would consider the timeline or diagram to be an exception to the general rule. But a design pattern about horizontal scrolling should both discourage horizontal scrolling as a general practice *and* make clear when horizontal scrolling might be acceptable or desirable.

The idea of patterns and pattern libraries originated with the architect and urban planning theorist Christopher Alexander and his collaborators [7], [9]. This idea was later embraced by leaders in the area of object-oriented programming [10] and has since been applied to numerous areas of design, among them interaction design [11], [12] and web design [13]. Indeed, the theory and literature on patterns has grown large, and this review is just a very brief treatment of the topic and one that omits issues not directly relevant to this project.

Patterns are highly structured and employ components that are reflected in their headings. The components used in LabelPatterns.org are similar to those used in most other pattern libraries.

Consider the stoplight metaphor when making 3-category comparisons

Problem

A designer may need an easy-to-process 3-category rating system with a positive, a negative, and a cautionary category.

Solution

Categories can be established using stoplight color-coding:

- Green = No problem, Situation is good, Proceed
- Red = Big problem, Situation is not good, Stop
- Yellow = Incipient or potential problem

Example

The figure shows a comparative nutrition label proposed by FoodWatch, a German NGO. The nutritional items categorized by the stoplight color-coding are fat, saturated fat, sugar, salt, and calories. Numerical values are also given. The connotations of the colors are further interpreted by the text (interpretive aids) "Gering" for low, "Mittel" for moderate, and "Hoch" for high.



A comparative nutrition label that employs stoplight color-coding.

Considerations

- The interpretive aids "gering," "mittel," and "hoch" not only add specificity to the color coding but ensure that the labels will be meaningful to color-blind consumers.

Rationale

- Stoplight color-coding can be processed pre-attentively and spans many cultures.

See also

[Choosing color coding](#)

FIGURE 1. A DESIGN PATTERN FROM LABELPATTERNS.ORG.

While we tend to think of patterns in relation to the design of artifacts—whether labels, websites, software code, or buildings—patterns can address processes, such as how to run a meeting. For example, there might be a pattern on choosing who should be invited, a pattern on calling the meeting to order, etc. If there is a recurring problem with a possible solution that addresses multiple instances of this problem, a pattern can be written.

Patterns are normally written as stand-alone modules. You do not have to consult one to understand another. Modular design makes it easier to expand a pattern library. Indeed, many pattern libraries—especially web-hosted libraries—are expanded through contributions by members of an interested community of practice. Having reviewed design patterns, we move now to our pattern library: LabelPatterns.org.

THE ORIGIN AND DEVELOPMENT OF LABELPATTERNS.ORG

This project stems in large part from Larson's 2009 doctoral dissertation, *Indicating Impact: The Design of an Environmental Impact Labeling System for Consumer Goods* [3]. This dissertation featured extensive design work and consideration of design issues regarding the environmental-impact labeling of consumer goods.

The Development of the Patterns

The dissertation suggested to Farkas the value of providing practical design guidance in the form of a web-hosted pattern library. Because both design patterns and consumer-decision graphics are appropriate topics for students studying information design, Farkas decided that consumer-decision label patterns could be written as part of the Fall 2009 offering of his graduate level course Information Design (HCDE 510) at the University of Washington. The students read portions of Larson's dissertation to gain the necessary background. Then they were asked to think of appropriate pattern topics and submit them to Farkas for approval.

After their pattern topics were approved, students researched and wrote the patterns using Microsoft Word and then converted them to PDF files. We made this choice because Word is a highly familiar authoring environment and because PDF files can be readily downloaded by site visitors who want a permanent copy of a design pattern. The students also contributed metadata for each of their patterns to a spreadsheet that ultimately became the basis of the website's Sort feature.

Because the patterns were written relatively quickly as just one part of a wide-ranging 10-week course on information design, there was less top-down planning and editorial control than we would have liked. But a large and useful library, representing hundreds of hours of work, came into being, and the library is being expanded and refined.

The Development of the Website

After the patterns were developed, the next step was to develop the website. As part of the winter quarter 2010 offering of Farkas' undergraduate course Web Design & Web Publishing (HCDE 437), six teams consisting of either four or five students worked independently to create a site of their own design. They worked on their site's information architecture, page layout, text and graphical content, and back-end scripting. During the design process, Larson worked with Farkas to guide the work of the teams in a series of design critiques. After conducting user testing on their prototypes, the groups produced their finished websites.

Naranjo, a key member of one of the most successful teams, took a strong interest in the project and designed and built the current version of LabelPatterns.org, incorporating many of the best ideas of the six teams. Naranjo also scripted the MySQL database that underlies the Search and Sort features and created a user-friendly back-end user interface for adding patterns and assigning and editing metadata. He continues as designer, programmer, and webmaster for the project.

AN OVERVIEW OF LABELPATTERNS.ORG

LabelPatterns.org was launched during the summer of 2011. The home page is shown in Figure 2. It currently hosts over 75 design patterns. The intended audience of LabelPatterns.org consists primarily of three groups: (1) communication professionals, (2) managers and policy planners, and (3) consumer activists. Communication professionals in graphic design, information design, or a similar area should be included in any significant label design effort. Ideally, these individuals will have extensive experience with consumer-information communication and labels, but very likely many will not. Whether or not a communication professional has this kind of experience, LabelPatterns.org should prove a useful resource.

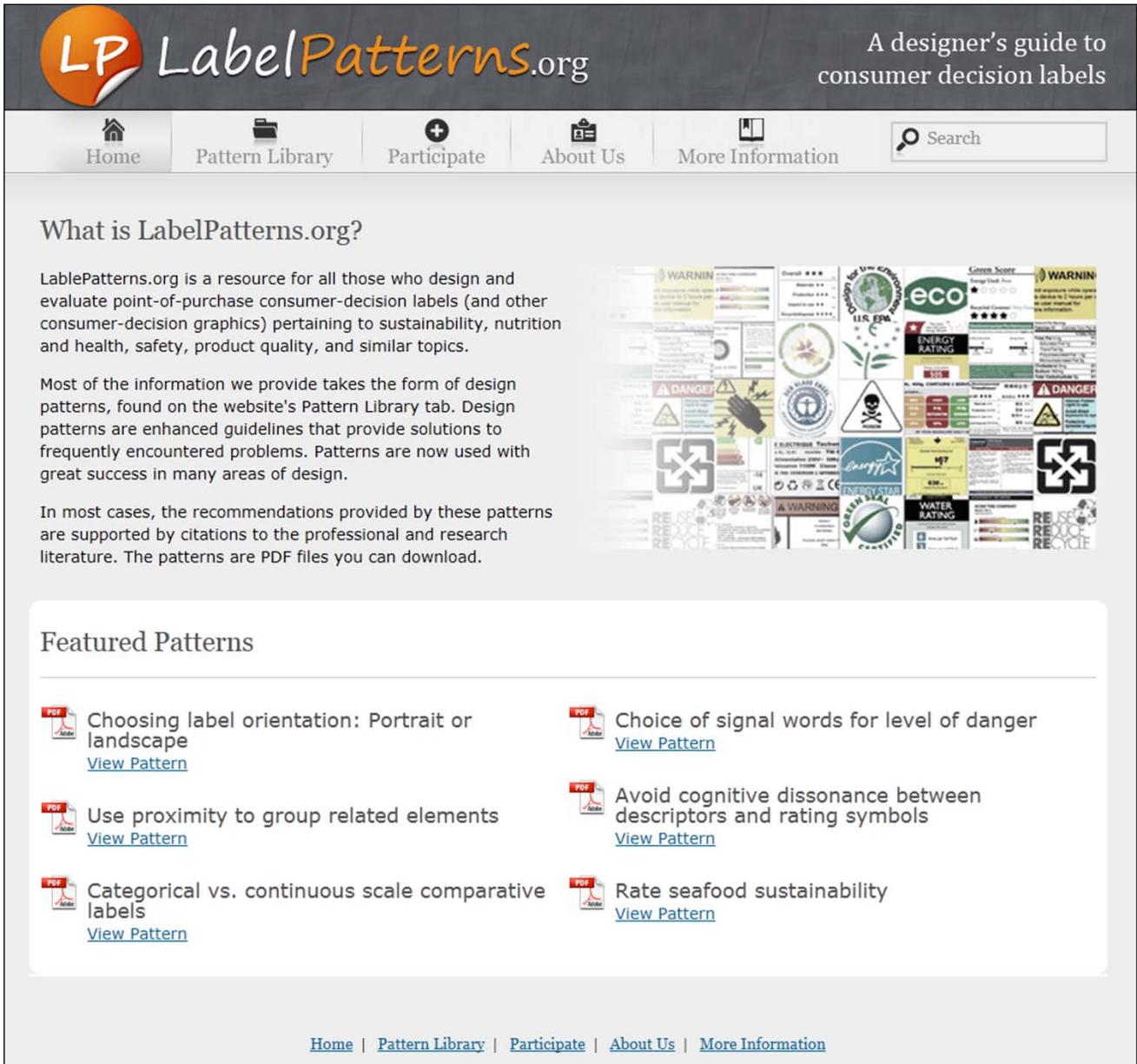


FIGURE 2. CURRENT HOME PAGE OF LABELPATTERNS.ORG.

To underscore the importance of skillful design, consider the previous and present versions of the Australian Energy Rating Label, shown in Figure 3. Because the earlier design does not show unfilled star shapes, the maximum number of (star) symbols in the rating scale is not easy to determine (although the tick marks do provide a cue). A consumer might therefore conclude that a water heater rated 4-½ stars is a very good performer if that consumer believed it scored 4-½ on a 5-star scale. In fact, the water heater scored 4-½ stars on a 6-star scale. Furthermore, such a confusing design might cause some consumers to turn their attention away from

the label and the information it offers. Somewhere in the redesign process, greater design expertise was brought to bear, and the Australian Energy Rating label now clearly shows, via the use of unfilled stars, that it employs a 6-star scale. This is the kind of design guidance that LabelPatterns.org provides. In fact, this specific design issue is directly addressed in the pattern “Number of categories to use on a categorical rating scale.”



FIGURE 3. AN EXAMPLE OF THE AUSTRALIAN ENERGY RATING LABEL USED PRIOR TO OCTOBER 2000 AND THE PRESENT DESIGN [14].

The second group comprising our audience consists of managers and planners of new labeling programs and programs that are being re-evaluated. For example, when Walmart decided to devise a labeling program to rate large numbers of products on environmental and social sustainability over the course of the products' lifecycles, Walmart turned to several organizations, including the Environmental Defense Fund and the Applied Sustainability Center at the University of Arkansas School of Business [15]. In projects such as this non-designers almost certainly collaborate with designers in various ways and, in particular, are apt to have the final say over which designs will be used. LabelPatterns.org can help managers and planners with the communicative dimensions of a labeling program.

The third group consists of consumer groups and individuals who might take a public position (very possibly in opposition) regarding the communicative characteristics of a label or a planned labeling program. So, for example, if a consumer group believed that a label was hard to understand or employed design elements that inappropriately reduced the public's perception of the harmful implications of product use, the activist group could consult LabelPatterns.org to validate their concerns or more effectively articulate their complaint, and they could cite our patterns (and the research cited therein) to support their argument.

Central to any pattern library and to its future growth and usefulness is the choice of design patterns—how many there will be and what they will be about. With over 75 patterns, LabelPatterns.org can be considered a relatively comprehensive pattern library—especially for an area of design that, while complex, is not so vast in scope as, for example, web design.

Most of our patterns pertain specifically to label design—for example, “Avoid cognitive dissonance between descriptors and rating symbols” and “Choosing an effective title.” But others patterns address general information design/graphic design topics. These include “Hanging indents” and “Using text weights.” Such

general patterns can certainly benefit non-designers, but they can benefit trained designers as well because the discussion and the examples focus on label design. Furthermore, it is plausible that trained designers who see the title of a general pattern in a list of pattern titles generated by the site's Search or Sort features will benefit from the quick reminder provided by the pattern title alone, even if they decide not to view the pattern itself. Our operating principle is to include general information design/graphic pattern topics if they seem especially relevant to labels.

THE PATTERN MODEL

Below we describe the model used in the LabelPatterns.org design patterns. The model consists of components that may be either mandatory or optional. For this reason, the sample pattern shown in Figure 1 does not map exactly to the model. In most cases, the patterns are divided into sections with headings that correspond to the components. Subsections, such as “Example,” are also used.

- **Title.** Appears directly below the “labelpatterns.org” header. Patterns in other libraries often employ surprisingly opaque titles (for example “Minesweeping” in Welie.com). We aim for highly meaningful titles, and do not favor short phrases. Many of our titles are prescriptive, specific, and foreshadow the solution: “Provide URLs and QR codes for extra information.” Others are more general and only state the design issue: “Considerations for creating tag lines.” Students had the option of adding a brief explanatory paragraph (without any sort of heading) directly following the title.
- **Problem.** States the design problem the pattern addresses. Narrowly focused patterns, such as “Provide URLs and QR codes for extra information,” typically have a specific and brief problem component: “Because of their small physical dimensions, labels cannot convey detailed information.” On the other hand, for broader patterns such as “Choose your words carefully for improved understanding” the **Problem** component (and the **Solution** component as well) is broader and lengthier: “Consumers should be able to quickly glean a label's purpose and understand the meaning of the text elements. It is especially challenging to communicate abstract or unfamiliar concepts to a general audience.”
- **Solution.** We favor a relatively brief and unelaborated statement describing the solution to the problem—often along with a helpful illustration. Other components, in particular **Use When**, **Considerations**, and **Rationale and References**, provide more context regarding the

solution. We followed common practice in placing the **Solution** component directly after the **Problem** component so that readers who are satisfied with the solution they have found need not read further. These individuals, however, will perhaps miss important caveats in the **Use When** and **Considerations** components.

- **Use When.** An optional component that should make clear when the pattern does and does not apply.
- **Considerations.** Also an optional component, except that most patterns should have either a **Use When** or **Considerations** component. This broad component consists of relevant issues, trade-offs, and the like. It is akin to the somewhat cryptic “Forces” component used by Alexander and other pattern creators.
- **Rationale and References.** An optional component that explains and justifies the solution, generally with literature citations. In some instances, a rationale is unnecessary because the rationale (sometimes with literature citations) has been provided in earlier components.
- **See Also.** An optional component consisting of hyperlinks to related patterns, as explained in more detail below.

WEBSITE DESIGN AND CONTENT

LabelPatterns.org is intended to serve multiple purposes. Below we describe each section of the website (visible as navigation tabs) and show how the sections fulfill these purposes.

- **Home Page.** Explains the purpose of the website and the patterns. In addition, a limited number of patterns are spotlighted to encourage visitors to explore the site and its content.
- **Pattern Library.** Provides access to the patterns by means of the Sort feature (discussed below). This will be a heavily used part of the website.
- **Participate.** Here we invite interested individuals or groups to express opinions, ask questions, and contribute patterns, ideas for patterns, and other content. We also provide a link to the LabelPatterns.org Facebook page.
- **About Us.** Visitors may want to know something about the individuals directly involved in the project—especially to assess whether the website and its content are trustworthy. On our part, we are trying to make clear that this is a non-profit, volunteer endeavor. The About Us section also enables us to credit the students who contributed patterns and contributed to the design of the website.
- **More Information.** Here we provide a broad range of information that supplements the design

patterns. This includes a list of labeling programs worldwide, a bibliography on consumer-decision messaging, and a section where we can express our views on broader issues such as the ethical, societal, and legal aspects of labels and consumer information. For example, we address the ethical problem of “green washing,” where a company uses a labeling program as part of an effort to look better than its actual behavior warrants.

SEARCHING AND SORTING

Many web-hosted pattern libraries have minimal features for finding patterns of interest. They simply provide lists of patterns divided into several categories. This is acceptable for a small library, but the larger the library, the more desirable it is to provide more capable findability features. LabelPatterns.org, as noted, employs both Search and Sort. The Search feature—found on every page of the site—searches the titles of the patterns, and will likely be a highly used form of navigation. The Sort feature—found in the Pattern Library section of the site—enables site visitors to display pattern titles according to these categories:

- **Alphabetical.** Displays all of the patterns sequenced alphabetically from A to Z.
- **Domain.** Displays patterns that are especially relevant to one or more domains. These are the current domains: Environment, Food, Health, Medical, Safety, Products, and Other. “Products” pertains to product performance excluding safety.
- **Type.** Displays patterns that are especially relevant to one or more particular kind of label. Our categories are Endorsement, Warning, Information only, Comparative, and Hybrid.
- **Components.** Displays patterns that are especially pertinent to one or more of the recognized components of consumer-decision labels. These components are as follows: Signal icon, Title/Descriptor, Tag line, Rating element, Scale, Interpretive aid, and Source. (These terms are defined on the site.)
- **Reader Response.** Displays patterns that are especially pertinent to one or more of the three ways in which information is processed: Perceptual, Cognitive, or Emotional (affective). For example, the pattern “Using vivid imagery to reinforce health warnings” appears in the Emotional category.
- **Text & Graphics.** Displays patterns that are especially pertinent to one or more of the ways in which label elements are encoded. The categories are Text/Fonts (where Text includes effective writing and, especially, brevity and clarity), Pictorial (any kind of representational graphic),

Symbols (includes bullets, rules, and borders), Color, and Tables/Graphs.

- **General.** Displays patterns that are especially pertinent to one or more of the following: Production (the physical label), Placement on product, Layout (including size and shape), Audience (including demographics, cultural differences, and inclusive design), Prioritizing information, and Other.
- **Digital.** Displays patterns that employ digital technology. The first of the two categories, Pointing beyond label, includes the use of URLs, QR codes, and other means to direct the consumer to a website or other form of digital information. The second category, Digital content design, includes animation, sound, and other ways in which information is presented on a digital device.
- **Large-Size Graphics.** This category pertains to posters, handouts, and similar consumer-decision documents. We focus on their relationship to labels.

HYPERLINKING THE PATTERNS

Pattern libraries often provide pointers in the form of hyperlinks or traditional cross references from one pattern to one or more related patterns. Hyperlinks are being provided (on an ongoing basis) in LabelPatterns.org. They serve several roles: First and most obviously, hyperlinks can direct a visitor to more information on the general topic the visitor has just read. Second, because there is often a design workflow, a probable sequence in which certain design decisions are made, hyperlinks can direct visitors to patterns about likely follow-on design tasks. Third, if the visitor has initially accessed a pattern that is not quite pertinent to her goals, hyperlinks can direct this person from the “near miss” pattern to the pattern or patterns she actually wants.

CONCLUSION

We plan to publicize LabelPatterns.org within the communities that take an interest in environmental communication and the design of consumer-decision graphics. This includes university departments of environmental studies, family and consumer science, and nutrition, as well as departments focusing on graphic and information design. We recognize that both in the United States and worldwide only a limited number of labeling programs are initiated, re-assessed, or re-designed in a given year. For this reason, we do not expect LabelPatterns.org to become a heavily visited site. But it is, we believe, the only pattern library and the most comprehensive resource devoted to the design of consumer-decision labels, and we believe it can contribute to messaging that helps people make better choices.

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ACKNOWLEDGEMENT

The authors thank Jean Farkas for editing this paper.

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