The design of a physical space can and should take advantage of information architecture (IA) deliverables, in particular when designing an integrated model of IA across environments. The user must be able to easily consult technology-dependent environments such as digital media or printed paper catalogs in line with the information flow carried through the website. Conveying the relevance of information to the user/consumer by means of applying IA principles with a view to designing a crisscross-connecting model of human-information interaction is the focus of these studies.

Information-sharing experiences span various technology-dependent environments, and these environments are not self-limiting. Let’s reflect on the experience of buying a product. It could start by browsing a particular website or by leafing through a printed product catalog. Similarly, the experience can come about via a handheld device and/or software interface and could end inside the physical retail space of a large chain store or specialty shop.

Regardless of where the experience begins and ends, it is highly desirable that the consumer be permitted to interact in a seamless manner and that no information flow fractures be apparent. Continuity can be provided by a structured, bridge-like experience. It follows that the users can keep the same mental model through each step of experience, which will provide a homogeneous model of interaction [1]. Bridge experiences synthesize this process by identifying continuous passages of information

- from one web or software environment to another
- from the web to a software environment
- from a software environment to a hardware environment
- from the web to a physical environment.

In his article, “Design for Bridge Experience” [2], Joel Grossman asserts that bridge experiences involve situations in which people must traverse different domains in order to communicate successfully, complete a task or elicit a desired physical, mental or emotional response.

The evolution of IA leads to a crossing and integrating information architecture, a component of the bridge between various user experiences. This passage is highlighted by the definition of IA in the third edition of Rosenfeld and Morville’s *Information Architecture for the World Wide Web* [3, p.4]:

- The structural design of shared information environments
- The combination of organization, labeling, search and navigation systems within websites and intranets
- The art and science of shaping information products and experiences to support usability and findability
- An emerging discipline and community of practice focused on bringing principles of design and architecture to the digital landscape.

In this article we illustrate the principles of bridge architecture with two studies of how websites and physical environments might be integrated. The studies were not sponsored by the enterprises described. Their aim, however, is to show possibilities, both realized and potential, within real environments. Erika Salvini’s study was a class project for Information Architecture and Knowledge Engineering, a course taught by Luca Rosati at the University for Foreigners of Perugia (Italy) in 2007/2008.
Apple’s Integrated Information Architecture (David Potente)

Close analysis of the Apple website and, in particular, the Apple Retail Store highlights the role of information architecture in building bridge experiences. IA can cross various contexts of experience with the objective of defining a unique human-information interaction model by means of proper organization of information flows and tasks.

**Apple bridge experiences and crossing IA.** The website and the store share a common information organization, despite their obvious and necessary interface differences (Figure 1).

The navigation bar in the menu shows the following tabs:

- Home
- (logo Apple)
- Store
- Mac
- iPod+iTunes
- iPhone
- Download
- Support

Product organization follows standard guidelines throughout the worldwide network of Apple stores. On entering a store this consistency is noticeable in the following specifically organized areas:

- Mac computers
- iPod and Apple TVs
- iPhone

**TABLE 1.** Comparison between the Apple website IA and Apple Retail Store IA

<table>
<thead>
<tr>
<th>Home</th>
<th>Posters on the walls as product previews</th>
</tr>
</thead>
<tbody>
<tr>
<td>Store</td>
<td>All tables showing products with related details</td>
</tr>
<tr>
<td>Mac</td>
<td>Area showing Mac computers</td>
</tr>
<tr>
<td>iPod+iTunes</td>
<td>Area showing iPod, iTunes and Apple TVs</td>
</tr>
<tr>
<td>iPhone</td>
<td>Area showing iPhone</td>
</tr>
<tr>
<td>Downloads</td>
<td>Area showing applications</td>
</tr>
<tr>
<td>Support</td>
<td>Genius Bar for product support</td>
</tr>
</tbody>
</table>

Table 1 compares the two organizational structures. This organizational solution is a good example of efficiently and effectively crisscrossing IA between two environments, the web and the physical retail space (Figure 2: Apple Retail Store views).

Inside the store, LCD video screens might be provided in the particular areas to demonstrate the products on sale, their specifications and any related accessories—highlighting products corresponding to the visited area of the store. Inside the dedicated Mac area (Figure 2.1), computers are displayed. Likewise,
within the confines of the iPod area (Figure 2.2), iPods and Apple TVs are on display. The same holds true for the iPhone with a specific physical space allotted to bring attention to this similarity and compatibility with the iPod, in particular the iPod Touch. This arrangement further highlights the accessories and applications available to both the iPhone and the iPod.

Accessories (which are not clearly noted on the webpage) could be displayed and contextually included within the related Mac and iPod areas by means of the video screens. In addition, the retail store could promote the most requested line of accessories on the website, so that popular selections/purchases made by online users can also be offered in the physical retail space (Figure 3).

The location of a particular product within the retail space can also be clearly indicated and displayed on the video screens. Such information is helpful to clients in that it provides a clear idea of how to reach the product sought within the retail space – an example of how to effectively and efficiently incorporate wayfinding strategies in the information-seeking process.

When a product is viewed on the video screen, other co-related products can be suggested using the following purchase-related associations:

- People who looked for this product also looked for …
- People who bought this product also bought …

This kind of suggestion strategy favors a circular flow of information and improves the information-seeking process by leading customers to evaluate needs to which they were previously oblivious. Specific products or services can be suggested as contextual content on the video screens with the aim of encouraging customers to deepen their research. In this way the same information can be retrieved following various information paths through a multidimensional approach.

Customers can identify various paths to follow a specific information need. These paths cross the web and video screen interfaces and the physical retail spaces. The information-seeking process can thus be considered an example of evolving transversal research that is satisfied only by a final set of conclusive information in relation to a specific topic, rather than by various references and information gathered step-by-step (berry-picking process). Users may thus refine and deepen the process at every stage of their research [4].

**Information scent and colored t-shirts.** Colored t-shirts worn by staff have recently been introduced in all Apple Retail Stores. Each color is representative of a specific competence:

- light blue t-shirt: specialist
- dark blue t-shirt: creative and genius
- orange t-shirt: concierge
- polo shirt: business partner
- black t-shirt: stockroom staff

Incorporating a strategy of colored t-shirts can be considered an effective way to convey the crisscrossing of information. If we visit the Apple Store webpage (www.apple.com/retail/) suggestions to improve our shopping experience can be found. For example, we can find answers to our queries by addressing our questions to the staff in the orange (concierge) t-shirt. This type of cue emanates from the website, but it will also prove useful in the physical retail space, as it crosses two different contexts, the web and the real world, and it allows us to perceive the simplest path to follow to access the information we need.
Similar cues can also be introduced for other competencies to ensure that the user easily recognizes the right staff member inside the physical retail space to satisfy an information need emanating from the web. This device is a powerful example of bridge experience. On the Apple website every product could be followed by replicating the color combination used for the staff. In this way purchasers know to whom to address their questions in order to have further information about a product, how to use it and suggestions about other products. A key or legend explaining the color combination should be shown at the bottom of each product’s page to avoid information overload. Colors are an efficient and effective mechanism for conveying a circular and linear flow of information between different conceptual contexts.

**Content as a component of bridge experience.** Bridge experience is defined by a unique mental model the user can keep through a range of concepts, thus ensuring homogeneous interaction. To convey this homogeneity, people need signals and cues connecting the digital world to the physical space. Textual contents can offer a great help to obtain this consistency.

Textual labels, icons and symbols work as signals both in the realm of the web and within physical retail space. The way these signals communicate with people can show consistency through contexts of experience. For example, the box “Shopping Tips from the Apple Store” ([www.apple.com/retail/](http://www.apple.com/retail/)) shows a particular style of communication – warm and close to its users yet not overly confidential.

Content design determines the creation of a closely linked connection between the experience encountered via the web and that of the physical. Web-posted suggestions aim to provide the user with a high-level browsing experience, as close as possible to the one that the customer finds in the physical retail space. Such attention to detail means that the communication mode (electronic for the web or print for the physical retail space) and communication style (advertisement offers and/or posters) together with its content (fonts, titles, short paragraphs, labels) must always be consistent to facilitate and promote clarity in the eyes of the user/consumer.

Micro-content design (titles, paragraphs, labels) must reflect the customer’s point of view. It is very important to offer clear content that, with symbols and icons, conveys that type of crisscrossing of information between contexts of experience. These elements perform an important function for wayfinding strategies between the web and the physical retail space.

**Redrawing the map: From page description diagram to area description diagram.** Page description diagrams (PDDs) allow for the description of content areas of a web page in prose, as in a functional specification. Specifications are arranged following an order of priority and can be followed by mini-layouts to give more details about a specific feature on the page. A PDD is thus valuable for showing priorities and defining a context by providing useful information on content and functionality for the visual design of every single page. An example of a PDD is shown in Figure 5.

On this PDD high fidelity mini-layouts are shown in order to provide a clear document, using existing parts of web pages to obtain mini-layouts. In an ordinary design project, PDDs are developed before wireframes are drawn, but we are able to replace these layouts with those of a lower fidelity.

The purpose of the area description diagram (ADD), on the other hand, is to establish an environment for content and functionalities in a physical retail space. It is a useful deliverable for bringing information architecture from digital to physical environments. Figure 6 shows an example of an ADD for an Apple Retail Store. It suggests conveying IA principles to provide a retail design that is part of the crisscrossing model of human-information interaction.

On the ADD we can show information about product placement inside the store. In the same way it is possible to highlight relevant areas where specific support services are provided, such as help-related information,
This model (Figure 8) shows two relevant connections between digital and physical environments:

- Users can visualize products using the scroll bar, and by the same means they can look for Mac computers, accessories and applications grouped together in contiguous areas inside the store.

Information design used within the Mac webpage is identifiable within the Apple Retail Store, as shown in Figure 9. Each area finds its equivalent on the web and vice versa:

- Grey area (overview): an overview on the website relates to shelves showing Mac computers within the store
- Purple area (what I can do?): the section “Find out how to get more out of your Mac,” showing software solutions and tutorials on the web relating to a specific area where software solutions are shown on display racks
- Orange area (help): learning activities and support are provided on the website and
within the store. The staff can be considered as part of a specific area by providing their competences and offering content to customers in the same way contents are provided on the website. The experience with personal training, workshops and support starts on the web to end at Apple Retail Store.

The same model could be applied to the iPod+iTunes webpage and corresponding physical space inside the Apple store. There is a strong level of coherence when compared to the previously mentioned analysis. The iPod+iTunes webpage replicates the information design from the Mac webpage. Adapting the model shown therein it is possible to identify the same human-information interaction model:

- Users can visualize products using the scrollbar, and by the same means they can look for iPods, Apple TV and accessories grouped together in contiguous areas within the Store.
- Information design used in the iPod+iTunes section (www.apple.com/itunes/) is identifiable within the Apple Retail Store (Figure 10). Each area finds its equivalent on the Web and vice versa:
  - Grey area: an overview of the website relates to the display shelves showing iPods and Apple TVs inside the store.
  - Purple area: the section “Featured on iTunes” together with “Tutorial+Tips” and “Accessories” on the web relate to a specific area where accessories are shown on the display racks.
  - Orange area: within the iPod+iTunes webpage, links are not provided to learning activities and support. The staff offers advice and information on products provided in this area of the store, so it could be useful to provide information about workshops and support on the web in order to convey a bridge experience between these environments.

Organizational and human-interaction models are thus being merged in a unique process conveyed through a clear bridge experience. Users will therefore receive a seamless and continuous experience between the digital and the physical environments.

Individual web pages like “Mac” and “iPod+iTunes,” each with its related physical areas, reiterates the organizational system noticed for the homepage and the overall design within the store. The corresponding PDD could be superimposed on the Mac’s ADD or on that of iPod+iTunes, which means there could be a continuous, reciprocal recall mechanism between the macro-architecture and the micro-architecture both on the website and within the retail store.

This adaptability to different conceptual contexts is proof and further testifies to the integrated information architecture and organization of information flows and tasks obtained by crossing digital and physical space and thus conveying a unique human-information interaction model. Through these ADDs it is possible to verify that the Apple Retail Store is representative of the entire Apple website and vice versa.

**FIGURE 9. Area description diagram for an Apple Retail Store. It shows connections between the Mac area inside the store and the related webpage, www.apple.com/mac/**

**FIGURE 10. Area description diagram for Apple Retail Store, showing connections between the iPod+iTunes area inside the store and the related webpage, www.apple.com/itunes/**
IKEA's Integrated Information Architecture (Erika Salvini)

This case study illustrates how bridge experiences help individuals get access to information. The analysis focuses on IKEA’s catalog and retail stores. We have considered the Florence retail store, but the results can be valid globally. The main goal is to develop a unique organizational scheme for the entire system, starting from the product catalog, which is better organized than the website.

IKEA offers a wide range of products at affordable prices. Customers are actively involved in the shopping experience. They begin by choosing their products at home on the website or in the paper catalog. They then collect their products at the store and assemble the items themselves following the instructions. This idea of collaboration has been summarized by the following slogan: “You do your part. We do our part. Together we save money.”

IKEA’s strategy toward buyers aims to induce them to feel part of a whole evolutionary process termed “experiential shopping.” In order to reinforce this strategy, IKEA shows hundreds of inspirational displays providing fresh ideas with product combinations, contemporary interior design suggestions and the possibility of product testing. In this way customers perceive a strong emotional experience.

Moreover, the interaction between physical and digital worlds is already provided by the website and virtual interior design facilities access. The website allows shoppers to consult the range of products to be aware of periodic offers and extra services. The virtual design planning allows customers to act as interior designers.

The target of this project. The problem addressed in this study is the absence of a unique and coherent human-information interaction model. IKEA’s actual approach to information is managed in different ways, according to the context: the product catalog, the website or the retail stores. The aim is to address this weakness by suggesting the reorganization of their information in a crossing way. According to the IKEA concept, the shopping experience can be considered a circular process – it starts and ends at home. For this reason, it is even more important to create bridge experiences, which facilitate the passage from one domain to another.

The catalog. The annual catalog shows the range of products for sale, related technical guides and the extra services information. It is built on a hierarchic-enumerative classification: 15 classes highlighted by different colors and relative subclasses.

From analyzing this taxonomy we can detect several different criteria or attributes used for each hierarchical level:
1. Rooms linked to products’ allocation
2. Customers to whom products are addressed
3. Products’ materials
4. Use of products
5. Sort of furnishings
6. Other

The interference of different categories causes repetitive displays of products. Moreover, some subclasses have no hierarchical relation with related classes (for example, flooring is catalogued under Textiles), and labeling imprecision, found in the Italian catalog, causes confusion and doubts as well.

A matter of coherence. After the previous analysis, we can affirm that the catalog’s information architecture is incoherent and chaotic from a point of view of classification theory. However, beyond this consideration, it is important to check if this classification works anyway for IKEA customers and if it is suitable for the IKEA context.
The main catalog’s classes are created on the basis of customer demands and human cognitive models. For examples:

- A potential buyer looking for a double bed will normally refer to the class “Bedroom.” But if the same customer wants to buy a cot for his baby, this same category wouldn’t be so obvious. The class “Children’s IKEA,” in this case, is a more appropriate reference.
- The “Textiles” class has been created to help a reader find certain items like curtains, which may be difficult to locate because they are potentially linked to different rooms.

Further, the categories’ order follows the degree of importance: The first ones are the most marketable according to business strategies and sales. These new considerations enable us to notice that, even if theoretically scrambled, the taxonomy is perfectly coherent from the empiric-pragmatic point of view, which is the most important issue to make the information retrieval easier.

**Suggested catalog redesign.** In order to overcome other catalog weaknesses, it’s important to do the following:

- Create clear and suitable labels in appropriate language
- Establish subclasses for each class that respect human mental associations
- Avoid class crossover

The improvements in the redesign of the catalog should be placed at both hierarchical levels. Concerning the principal classes:

- “Kitchen” and “Dining” categories could be combined inside the retail store, since people usually associate them as a matter of space; someone who decides to buy furniture at IKEA probably is not the owner of a big, luxury house.
- More attention should be paid to imprecise label translation (found in the Italian catalog), which may lead to misunderstandings and wrong interpretations.
- The “Buying guides” category at the end of the catalog should be eliminated. The technical information would be more easily consulted if it were attached at the end of each category.

Considering the second level, some subclass relocation in different categories would help to respect human mental associations and hierarchical relationships. For example:

- Living Room – sofas, sofa beds, coffee tables, TV solutions and storage
- Kitchen and Dining – units, door styles and handles, interior fittings, planning and pricing, free-standing kitchens, storage and accessories, tables, chairs, stools, cabinets and dining sets
- Bedroom – beds, collections, wardrobes and chests, mattresses, pillows and quilts
- Youth Room – beds, storage and solutions
- Children’s IKEA – furniture, toys, nursery, baby, children’s rooms, textiles and storage
- Home Organization – heavy-duty storage systems, boxes and small organizers
- Workspaces – desks, chairs, drawer units and storage
- Bathroom – units, cabinets, free-standing designs, organizers and accessories
- Textiles – bed and bath, design collections, curtains and blinds and rugs
- Cooking and Eating – tableware, food storage, pots and pans and cooking accessories
- Lighting – table lamps, floor lamps, ceiling lamps, shades, bases and cords
- Decoration – vases, plant pots, candles, wall decorations, mirrors and flooring
- Information – guarantees, special offers, IKEA Family, financial services, shopping at the store, services, stores and maps, index, restaurant

**Towards a crossing and integrated information architecture.** To obtain an integrated model of IA we need to do the following:

- Use the same product’s classification in the three domains (paper catalog, website and retail store);
- Set the same distinctive color proper of each category in all three domains.
The website has several menus with different categories from the ones in the catalog. The main navigation menu displays only the most popular classes, and some of them have different labels. Hierarchical relations are not observed: classes and subclasses are shown at the same level. Though each product can be reached from different paths, links that provide this access are imprecise. As a result we have a chaotic heap of information that may confuse the potential buyer. In the same way the retail store does not observe a common product classification, although crossing information architecture is important to improve the customers’ shopping experience.

For this reason, the use of the same distinctive color in each environment would help customers recognize immediately the class of product they are looking for. In order to highlight a crossing reference between contexts, colors can be used for the main menu’s buttons on the website and also for the entrance walls and floors of each department of the retail store. (Interior walls and partitions of the store must be kept in white because they are frequently used as background of realistic room settings.)

Moreover, to realize an information architecture that would be even more transversal, some of the advantages of the web could be transferred to the retail store. We suggest three interventions:

- More ways to access departments, following a sort of faceted classification;
- Use the collection of maps and information points to make customer mobility easier, to make them aware of their position inside the store (wayfinding) and to let them be aware of the way they’ve walked through it (breadcrumbs);
- Install LCD screens in the central area, showing products and offers with pertinent characteristics and giving information on the items’ pick-up-point area (findability).

The actual internal path within the store is obligatory. Customers are constrained to begin their tour from the first floor, going through all departments towards the storehouse to finally reach the cashier desks on the ground floor. There is no possibility of detouring. This path creates a delimited running flow that may prevent visitors from going back to look over a product. Obviously, this kind of interior space design is based on a market strategy grounded on customers spending time inside the store – the possibility of seeing the whole range of products should induce clients to buy more.

Such an assumption may be partially true, but it is not scientifically proved. An obligatory path could be too long and boring. Usually IKEA stores are crowded, especially on weekends, when shopping experiences become quite stressful. To avoid this problem one could provide separate access to floors and direct access to departments, still maintaining the possibility of a whole exploratory route for people who like spending some hours inside the store. Moreover the aim of the market strategy could be reached anyway by maintaining a low-cost products display close to the storehouse and in front of cashier desks. In this way, even hurried or distracted customers could be tempted to buy those items.

Pocket maps are available at IKEA’s entrance. They are very useful because they concretely help customers to find their way inside the store. I propose to add information panels at the entrance to indicate the departments found on each floor. Each department would be distinguished by its specific color.
Furthermore, I suggest installing an LCD screen in the central area of the store to improve product findability. On the homepage, offers would be highlighted and the catalog categories would be displayed using their respective colors.

**FIGURE 14. Example of LCD screen homepage**

“Too often as designers, we think about users as “static” entities… rather, today users always move “across” something… [5]

**Conclusions**

As shown in the case studies users collect information on the web and use it in the real world and vice versa. These considerations emphasize the role of users and their evolving needs: People can improve the design process by making suggestions about what they need in terms of functions and content, also about the way they recognize information and interact with it. From websites to retail stores, from digital interfaces to physical ones, why would not users play a more proactive role in the overall design and the consequential bridge experiences they create and crisscross in everyday life? Participatory design strategy is the answer because it offers an approach to design that attempts to proactively involve the end users in the design process and help ensure that the product designed meets their needs and is usable.

**Resources Mentioned in the Article**


**Resources for Further Reading**


Resources for Further Reading, continued


