**Information Architecture Techniques and Best Practices**

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**Abstract**

Developing information structures, such as websites or systems, involves a complex set of processes with the goal of making information usable, findable, and organized.  Information Architecture tools, techniques, and best practices provide the building blocks to achieving the end state.  With hundreds and possibly thousands of tools and techniques available, this paper explores five specific options: card sorting, free-listing, perspective-based inspection, personas, and content value analysis.  These five techniques span the breadth of the information architecture project and provide insight into the constantly evolving and developing information architecture field.

## Information Architecture Techniques and Best Practices

This paper explores the tools, techniques, and best practices for Information Architecture. However, it would be impossible to discuss every possible tool or technique.  Instead, this paper focuses on five different techniques: card sorting, free-listing, perspective-based inspection, personas, and content value analysis.  These five techniques were chosen as a subset of the hundreds of options because, when combined, they span the entire length of a project lifecycle.

The paper is split into two major sections.  The first provides a brief overview of information architecture as background and to develop context.  The second section provides information on the five tools and techniques. Lastly, the figure provides a chronological view of the information structure design and development project showing the recommended relationship between each technique and the associated phase of the project.

## Information Architecture Overview

Information Architecture is a constantly evolving discipline transposing elements of traditional architectural into the digital frontier.  According to Morville & Rosenfeld's (2006) definition, IA is composed of four elements:

1) The structural design of shared information elements.
2) The combination of organization, labeling, searching, and navigation systems within web sites and intranets.
3) The art and science of shaping information products and experiences to support usability and findability.
4) An emerging discipline and community of practice focused on bringing principles of design and architecture to the digital landscape. (p. 4)

The field of information architecture is still relatively young and developing.  As Nathaniel Davis (2010) described, "information architects have an opportunity to begin an era of

methodical practice that enables a discipline as well as the transference of acquired knowledge to address the real qualitative effects of information." As the field of study and practice grows, tools, techniques, and best practices surface to aid architects in accomplishing their groundbreaking efforts. Ultimately, the architect should focus efforts on the user experience when making decisions about how to organize and present the content of a site (Chapman, 2010).

## Tools & Techniques Analysis

This section will explore several tools and techniques available to information architects. Each sub-section will consist of a description of the technique, review advantages and disadvantages, and provide insight into the best usage of the technique during the design and development process.

## Card Sorting

The first technique discussed is the card sorting technique. Card sorting is a "user-centered design method for increasing a system's findability. The process involves sorting a series of cards, each labeled with a piece of content or functionality, into groups that make sense of users or participants" (Spencer & Warfel, 2004). Depending on the method of card sorting, the participants may or may not be given a set of pre-defined groups to place the content cards into. If groups are provided, the method of card sorting is considered closed; conversely, if no groups are provided, then the method is of card sorting is considered open (Spencer & Warfel, 2004).

Executing the card sort technique involves three simple steps. First, the practitioner creates cards where each card identifies a single piece of existing or desired content. Second, the participants place the cards into groups based on similarities. Additionally, groups can be based off statistical factors derived from cluster analysis and tree graphs. Some cards may fit into

multiple groups whereas others don't seem to fit into any.  The practitioner may duplicate cards

that fit into multiple groups or review labels for those that don't fit at all.  Lastly, the participants

determine names for each of the newly created groups by identifying keywords, commonalities,

or re-occurring themes (Ooi, 2011).

This technique has several advantages and disadvantages.  The advantages relate to the

ease of use and low cost of execution.  Since the technique is performed using the real users, the

resulting information structure does not rely on those less intimate with the content such as

designers or architects.  However, one significant criticism is that the technique is inherently

content-centric.  This can cause problems as the resulting information structure does not take into

consideration the users' tasks (Spencer & Warfel, 2004).  Combining the card sorting process

with a non-content centric technique such as a needs analysis or task analysis can ensure user

views are considered in the design and development effort.

The card sorting technique is best used early in the design or redesign of a site.  The

technique is not intended to be an evaluation technique.  Once the content inventory and

assessments are conducted, the practitioner will have the prerequisite information needed

(Spencer & Warfel, 2004).  If new content is going to be added to the structure, the open card

sorting technique can be used on the new content to establish appropriate groupings.  See figure

1 for a diagram depicting where this technique fits into the overall design and development

process.

**Free-listing**

The next technique discussed is the free-listing technique.  The purpose of free-listing is

to help the architect gather data about topics by asking people to list all the related items that

they can think of.  The data gathered can then be analyzed and used to explore user

categorizations (Sinha, 2003). For example, the architect can ask a group of users to list all the tasks that they perform on a project. The resulting lists are compared and analyzed noting the frequency and order of answers which provide a sense of "coherency" of the domain. Once complete, the architect can create a frequency diagram showing the items collected most frequently (Wilson, Method 3 of 100: Freelisting, 2011).

Free-listing has advantages and disadvantages. One advantage of free-listing is that it is highly cost effective. Large amounts of data can be collected quickly without the need to train participants or facilitators (Wilson, Methods - Free Listing, 2009). Additionally, the technique can be used in many different ways such as Internet based, face-to-face interviews, or in a group setting. However, one disadvantage is that analyzing for patterns can be time consuming especially with large sample sizes (Wilson, Method 3 of 100: Freelisting, 2011).

The free-listing technique is best used early in the design process. The technique can be combined with brainstorming and card sorting to help form categories of content (Sinha, 2003). Also, the technique can be used when short on time with the user communities. The process can take a few minutes and still collect a significant amount of information. For example, using this technique at a large meeting with hundreds of users can provide a substantial amount of data in just minutes if all contributors write their responses down on paper. See figure 1 for a diagram depicting where this technique fits into the overall design and development process.

**Perspective-Based Inspection**

The next technique discussed is the perspective-based inspection. This technique can be performed by the design and architecture staff without the user involvement. Each member of the staff is given a perspective in which they assume while reviewing a website or information structure. The resulting observations can provide a wide range of critiques that would not have

normally been identified.  The following perspectives were identified by Chauncey Wilson

(Wilson, Method 10 of 100: Perspective-Based Inspection, 2011):

- **Consistency czar** – this person looks for any consistency issues with the product.
- **Disabled user** – this person would role play a person with specific disabilities and note where the product is not accessible.
- **Psychologist** – this person would look for violations of psychological principles related to memory, learning, attention, fatigue, interruption, persuasion, etc.
- **Super power user** – this person would look at issues of efficiency, shortcuts, and aspects of the product to support the very expert and frequent user.
- **Error expert** – this person would focus on areas where users might make errors and  in places where the system could support error prevention.
- **Artist** – this person would look for problems with aesthetics like clutter, poor use of color, graphics that look amateurish, and ugly icons.
- **The Keyboarder** – this person does not use the mouse and evaluates a product for complete keyboard access. (p. 1)

The use of perspectives in usability inspection has proved to be beneficial; those using

perspectives have higher success than those that did not.  An experiment conducted at the

University of Maryland showed a 30% improvement by perspective inspectors in detection of

usability problems compared to heuristic inspectors (Zhang, Basili, & Shneiderman, 1998).

As with many of the techniques discussed so far, this technique has an advantage of being

relatively inexpensive.  Additionally, this technique can be implemented at different sites using a

variety of online tools.  However, a significant disadvantage lies in the inspector's ability to

assume a perspective that he or she may know very little about (Wilson, Method 3 of 100:

Freelisting, 2011).  For example, it may be difficult for an inspector to assume the perspective of

"The Keyboarder" if that person normally uses a mouse.  Some people are not as adept to role-playing activities as others.

Perspective-based inspections can be used later in the design process to identify usability problems.  Once a prototype is developed, these inspections will broaden the problem-finding ability of inspectors or testers (Wilson, Method 10 of 100: Perspective-Based Inspection, 2011).  This technique can also be used earlier in the design process by assigning perspectives during review of architecture products or content maps.  See figure 1 for a diagram depicting where this technique fits into the overall design and development process.

**Personas**

The next technique can assist architects by ensuring the information architecture and design meets the demands of the expected typical user.  This technique involves creation of personas based on the user research conducted early in the design and development.  Use of personas falls within a user-centered design process and provides a link between development efforts and the user's behavior, attitudes and needs.  Personas can be a fun way to communicate user research to the designers in a simple and accessible manner which will ensure the research is taken into account throughout the project (Gray, 2010).

Using personas involves creating made-up examples of people that fit each of the major segments of the site's user base.  Typically, the site would have three to five personas to prevent overwhelming the development and design team (Gray, 2010).  Too many personas may result in blurring several into one losing the effectiveness of the technique.  The information that goes into each persona can be unique to each organization or project.  According to Gray (2010), the following information may be helpful for the design/development team:

- Pictures – makes the persona feel real and helps designers/developers empathize with the persona.
- A description – demographic information including job, their technology, and the pressures or situation they are in when they use the system or site.
- Needs, goals, & features – either a straight list or a table which helps define a priority list for features before development starts.
- A 'quote' from the persona – this gives the persona more personality while also summarizing their needs and goals into a single sentence.
- Frustrations – these are the problems that the user encounters in using the system or website and focuses the designers/developers to the biggest issues
- Ideal features – these features may be impossible to produce but help designers and developers think of alternative approaches.
- 'Need to know' – this is information the persona needs when trying to accomplish tasks on the system or site.
- Behaviors – these are the typical behaviors the persona exhibits that directly relate to the needs or requirements of the system or site.
- Scenarios – these are sample use cases that the persona might do and can clarify how the system will be used (p. 1).

The key to successfully use of personas depends on the adaptation during design and development.  Some organizations find it useful to display the personas on posters within the workspace to help keep the development team focused on the user-centric design process (Gray, 2010).

The personas technique offers several advantages and disadvantages.  The main advantage is that the personas provide a vehicle to represent user research in a tangible and workable medium. Conversely, one of the disadvantages is that the very realism that makes personas effective may complicate and potentially distract the designer because of extra fluff and mere artistic concoctions (Constantine).

The persona exists throughout the lifecycle of the design and development project. The personas should be created early in the research phases and exist throughout the testing and 'go live' events. See figure 1 for a diagram depicting where this technique fits into the overall design and development process.

**Content Value Analysis**

The final technique discussed in this paper is a Content Value Analysis (CVA). The role of a CVA is to provide quantitative feedback on content value for a current system or website. This technique aims to provide a mechanism for analyzing and assigning a value based on heuristics to a subset of the content. Furthermore, this technique then uses statistics to back the notion that the arrived upon value is representative of the entire collection of content (Walsh, 2008).

To accomplish a content value analysis, Walsh (2008) developed an activity flowchart outlining a six step process:

1) Scope the site – for accurate results, the size of the site to be assessed should be determined based off number of pages.

2) Select the sample size –a statistical sampling table to define the Acceptable Quality Level (AQL) should help the practitioner develop the required sample size for statistical relevancy. Military Standard 105E provides a statistical sampling table which can be used in CVA calculations.

3) Select the pages to assess – to select pages, Walsh recommends using a random set of pages selected through an online tool at random.org.

4) Select the heuristics to be used – value indicators are assigned to each page from the sample set. One set of heuristics described by Walsh is a 0 to 1 scale based on content

value.  For example, of the page has obsolete or no content, the practitioner should assign

a value of 0.  If the page has good content, the practitioner should assign a value of 1.

5) Record the findings and scores – the practitioner should record each page visited and the

corresponding score.

6) Analyze the findings for patterns and produce a report – the practitioner should then

develop charts or graphs to represent the value of the current content.  For example, 48%

of pages have content that is irrelevant or outdated.

The content value analysis has advantages and disadvantages.  Specifically, the CVA has

the ability to provide quantitative feedback to the site owner about the content using statistical

modeling.  This technique is relatively inexpensive to implement and requires only one person.

However, the quality of the heuristic can be debated which still leaves an element of human

opinion in the analysis.  For example, one practitioner may feel that a page is irrelevant while

another feels that the same page has adequate content.

The ideal use of this technique is before the start of a website renovation effort or as a

check and balance during the final testing stages.  Use of this technique early will develop a

quality baseline as well as identify whether a significant content problems exists.  Conducting

the same technique during final testing will measure the growth in content quality from the initial

baseline.  Unfortunately, identifying content problems late in the project may create substantial

costs to fix compared to finding the problem early.

## Conclusion

The evolving field of information architecture is bursting with endless tools and

techniques to help architects develop effective solutions.   Some tools are user-based while some

are content-based, but all tools are aimed at providing an architecture solution that keeps up with

technology.  As technology changes, the tools and techniques used by architects will continue to adapt.  This paper only scratches the surface on the variety of tools and techniques available to create a positive user experience.

The card sorting technique describes a method to cluster content into logical groupings based on user input.  The free-listing provides a mechanism to gather ideas and brainstorm (which could be a tool within itself) by asking people to list as many aspects as they can about topic X.  Perspective-based inspection describes a method of evaluating a prototype site by role playing a certain perspective.  Similarly, the personas technique involves usage of realistic potential examples of customers or visitors to a site.  Lastly, the content value analysis allows architects to obtain quantitative measures of content effectiveness based of sample sizing and statistical analysis.

Along with descriptions of several tools, this paper reviewed advantages and disadvantages for each technique and offered suggestions on when to use each technique. Ultimately, there is not a regulated or mandated usage of any tool set; rather, the tools can be used as needed dependent on the situation at hand.  Similar to a plumber's toolbox, the information architect's tool box contains hundreds of techniques which can help organizations develop usable, findable, and organized information.

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**Figures**



Figure 1: Phases of Web Design Process (Malone, 2003)
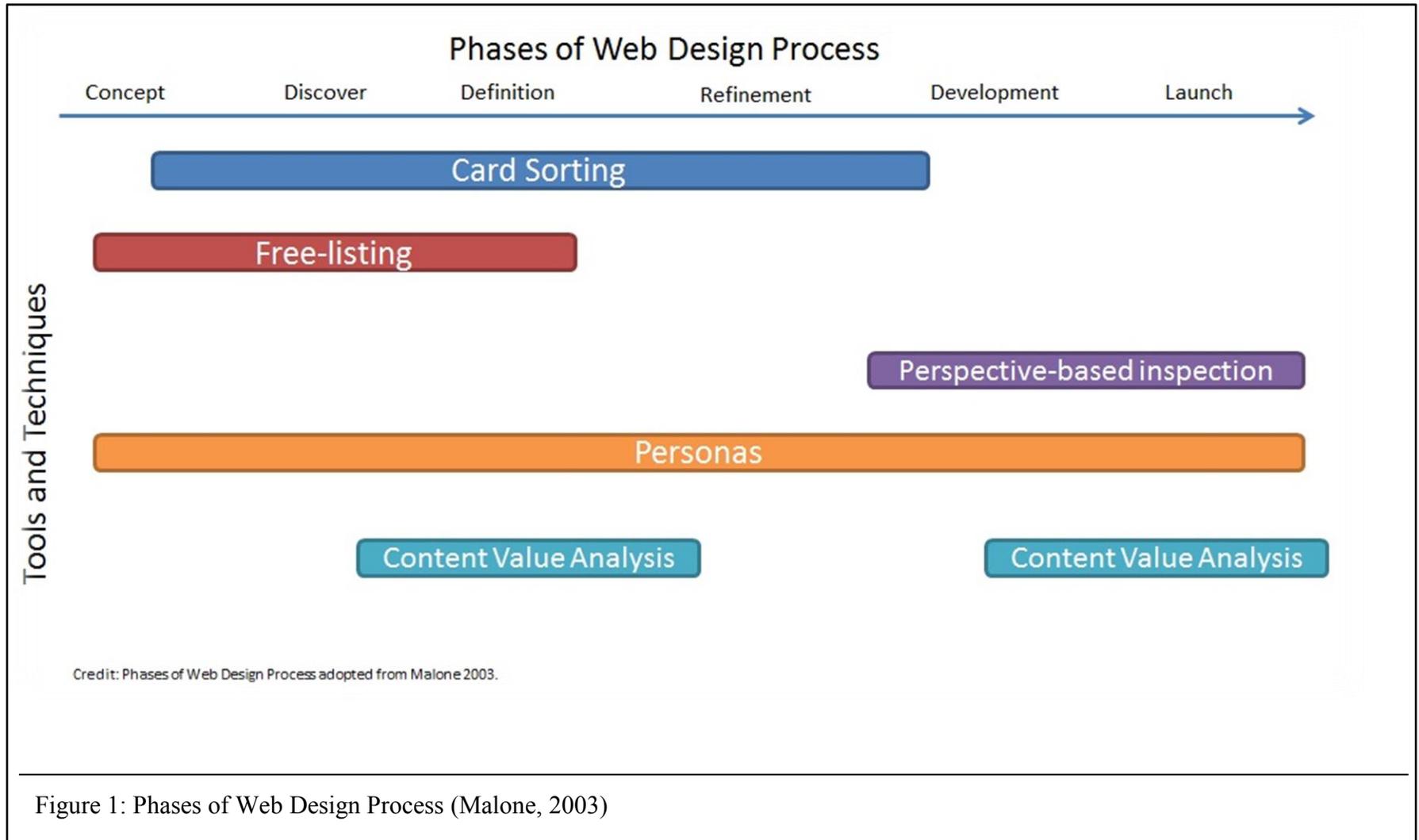
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