

# ***Twenty-One Aspects of Information Architecture***



**IA Design & Usability: White Paper**

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**Topic: Information Architecture and Design**

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## 1.0 Current Trends

### Information Architecture, “Best Practices” in Usability Testing— The Creative Information Architecture Model—The IA Model

#### 1.1 Introduction: Different Aspects of Information Architecture— Design Approach and Process

According to research, current trends in Information Architecture, and user-centered design “best practices,” current trends are leaning towards the idea that a systematic approach works better. With regard to Information Architecture and current trends, many different aspects of Information Architecture are relevant to the professional Information Architect practitioner.

Sections 1.1.1-1.21.1, detail pertinent information on current trends and other related aspects to user-centered design and “best practices.” In other words, all of these different aspects are important components that include additional elements with regard to Information Architecture design and implementation.

Part of the Information Architecture design process with regards to organization, structure, and producing high-quality Websites requires understanding The IA Model, design and processes—and how all of these items are used together for designing Websites. Source: <http://www.stevenheitman-ia.com/html/MAEd.html>.

### 1.1.1 Current Trends in Using The IA Model

Current trends suggest and recommend that it is better to use The IA Model (see Figure 1), since incorporating user-centered design into Websites simply means superior usability for end users. Per Morville & Rosenfeld (2006), Nielsen, et al., (1994), Goto, et al., (2005), the *Research-Based Web Design & Usability Guidelines* (2006), state that the Information Architect practitioner includes IA deliverables for clients that provide detailed specifications about Information Architecture requirements in the Information Architecture Design Plan Report with appropriate research and documentation.

#### **Create an Information Architecture Design Plan Report:**

Planning is a way to understand and get agreement on what you are going to do, in what timeframe, with what resources, and at what cost. If you have usability activities in your project plan, you build in the time and resources to carry out those activities. By reviewing the *Step-by-Step Usability Guide*, you can better understand which fit with your needs so you can put them in appropriately in your plan. Think about and get agreement on:

- **Scope**—What are you developing? What is the Web site going to cover? About how many pages will it be?
- **Audiences**—Who are the major groups you want the site to serve?
- **Objectives**—What goals should the Web site help your agency or organization to meet?

Source: <http://www.usability.gov/plan/develop.html>.

The IA Model has eight steps in it. Following the steps allows Information Architects or Corporate Trainers to break tasks down into manageable units. In order to provide the reader with concise definitions and background information on what all of this means, let us now examine and clearly define The IA Model (see Figure 1). Source: <http://www.stevenheitman-ia.com/html/MAEd.html>.

### 1.1.2 Relevancy of Navigational Systems to Information Architecture

Per Fleming (1998), effective navigating within Websites is accomplished by designing (Heitman, 2000) fully integrated navigational systems when designing wire frame mockups. These systems should be integrated within Websites or other digital design products. According to Fleming in *Web Navigation*, the *ten principles* of good navigation are to:

1. Be easily learned,
2. Remain consistent,
3. Provide feedback,
4. Appear in context,
5. Offer alternatives,
6. Require an economy of action and time,
7. Provide clear visual messages,
8. Use clear and understandable labels,
9. Be appropriate to the site's purpose, and
10. Support users goals and behaviors.

Source: <http://www.stevenheitman-ia.com/html/MAIA.html>.

### **1.1.3 Different Types of Navigational Systems for Websites— Part of Information Architecture**

Per Morville & Rosenfeld (2006), Fleming (1998), Heitman (2000), navigational systems are designed when doing wire frame mockups. This relates to another aspect of Information Architecture. Many types of navigational systems help to incorporate user-centered design into the overall Information Architecture relevant to Websites. Let us review seven commonly used navigational systems:

1. Hierarchical navigational systems (narrow and deep, broad and shallow).
2. Global navigational systems (main navigational systems).
3. Local navigational systems (sub navigational systems).
4. Integrated navigational systems (global, local, ad hoc, remote, search engines navigational systems).
5. Remote navigational systems (only supplemental to global and local navigational systems).
6. Ad hoc navigational systems (hypertext links or image maps, etc.)
7. Search engines in Websites (part of a complete navigational system or systems).

Source: <http://www.stevenheitman-ia.com/html/MAIA.html>.

#### 1.1.4 Sense-Making and Wayfinding on Websites— Part of Information Architecture

Per Passini, et al., (1999), with regard to a *new* and *emerging* field of Information Design or Information Architecture, one possible definition: “Information design [Information Architecture] is defined as the art and science of preparing information so that it can be used by human beings with efficiency and effectiveness.” This then relates to sense-making and wayfinding on Websites by end users. However, Jacobson (1999) stated that none of the authors were able to agree on exactly what Information Design is or is not. To each individual, it means something different. In the context of Information Architecture (Heitman 2000), it can be clearly defined.

The concept of sense-making naturally is a concept about mental cognition and psychological cognition that relates to how end users deal with both the subjective and objective psychological relationships between objects (inner and outer conditions or cause and effect relationships) when using Websites. This refers to Human-Computer Interaction, since so many digital design products lack in user-centered design—might be designed with best intentions but appear to lack in usability—these Websites or other digital design products do not work for end users.

A human being must successfully interact with Websites and affordances for interaction designs should be considered prior to implementation. Affordances always allow end users a way out when surfing on a Website if a transaction online does not work out right for a variety of reasons. That means an Information Architect bridges the gap end users oftentimes experience online in terms of designing navigational systems to help end users wayfind effectively, including built-in affordances.

In reality, end users desire to have digital design products that function right. If user-centered design is incorporated into Websites prior to implementation, then sense-making and wayfinding really do make more sense to end users. Concepts about designing information as it relates to Information Architecture and usability are:

1. Information describes an ordered reality.
2. Information describes an ordered reality but can be “found” only by those with the proper observing skills and techniques.
3. Information describes an ordered reality that varies across time and space.
4. Information describes an ordered reality that varies from culture to culture.

5. Information describes an ordered reality that varies from person to person.
6. Information is an instrument of power imposed in discourse on those without power.
7. Information imposes order on a chaotic reality.
8. Information is a tool designed by human beings to make sense of a reality assumed to be both chaotic and orderly.

Source: <http://www.stevenheitman-ia.com/html/MAIA.html>.



### **1.1.5 Information Architecture and User-Centered Design**

Information Architecture and user-centered design are accomplished when research is done right to ascertain business requirements as well as the end users needs. The importance and significance of user-centered design is that it refers to Websites and/or digital design products that are well thought out by doing specific Information Architecture design research, using The IA Model.

Source: <http://www.stevenheitman-ia.com/html/MAEd.html>.

### **1.1.6 User Experience Architecture— Part of Information Architecture**

User Experience Architecture is a field that derived its roots in “human factors” and “ergonomics” since the late 1940s. The focus is on how humans interact with computers. These specialized practitioners always address end users’ experience before designing Websites or other digital design products. Thus, in line with current trends, this term has more recent connections similar to “user-centered design principles.”

In reality, this field is connected with: “human-computer interaction, Information Architecture, interaction design, user interface design, usability, and visual design.” It is also a “multi-disciplinary field” where other aspects of psychology, anthropology, computer science, graphic design, and industrial design are taken into consideration.

Other “content design” specialists include: communication design, instructional design, or game design. User Experience Architects collaborate with Subject Matter Experts (SMEs) when doing their research and “planning.” Their deliverables might include:

- User Experience Architecture Design Plans,
- End user flows,
- Navigational maps,
- Personas,
- User case scenarios,
- Wire frame mockups,
- Blueprints,
- Storyboards, and
- Prototypes (paper based or online).

Source: <http://www.stevenheitman-ia.com/html/MAEd.html>.

### **1.1.7 Website Design Architecture— Part of Information Architecture**

Website Design Architecture is an “approach” to the Information Architecture design and planning of Websites; it has its roots in Information Architecture and includes “technical” aspects, aesthetical considerations, and user-centered design. This means great attention to the details of business requirements, content, business plans, usability issues, Interaction Design, and Information Architecture. Other items taken into consideration are fully integrated navigational systems and search engines because these features help end users to find information on the Internet. “Website architecture is coming within the scope of aesthetics, critical theory, and postmodernism.” Now it is more in use and a current trend.

Since “Web 2.0” involves social networking and self-generated content by end users, these new advances in the Internet industry speak directly for the real need of Information Architecture, Information Architects, and Usability Testers. Of course, graphic design and interface design are other aspects to designing Websites. The design of Websites and their interfaces involves different parameters than printed materials generated from paper-based products. The Internet’s technical requirements and limitations always have to be accounted for in IA Design Plans. Source: <http://www.stevenheitman-ia.com/html/MAEd.html>.

### **1.1.8 Web Indexing, Internet Indexing— Part of Information Architecture**

Web Indexing, a part of Information Architecture, or Internet indexing includes indexes, like those found in books. Information Architects do research to figure out what keywords and/or metadata provide a good and meaningful or useful vocabulary for Internet or “onsite search engines.” Given current trends and high-volumes of end users on the Internet—that means an “increase in the number of periodicals that have articles online.” Web Indexing is also becoming important for periodical Websites. The “back-of-the-book-style” Web indexes might be referred to as A-Z indexes. The advantage of using A-Z is an alphabetical browse view or interface developed by Information Architects. The interface design differs from that of a browse through layers of hierarchical categories, which are commonly referred to as “taxonomy.”

The problem is that on some Websites the so-called user-centered design for Web Indexes might not be in alphabetical order. It appears that Website A-Z indexes have several advantages over Search Engines. A problem might be that the language used is full of homographs and synonyms, not relevant to end users. A good example is: a computer-produced index of the 9/11 report showed many references to George Bush, but it did not distinguish between George Bush (senior) and George W. Bush (junior). A few hits might be time-wasting references, such as looking up “teaching children” and finding only the statement saying “...the above is not relevant when teaching children.” In addition, Search Engines can miss information—if the programming is not done right to match end user’s needs.

An Index produced by a human being and hand crafted or spelled out means that a researcher checked contextual elements and text to make sure it is congruent. “While a Search Engine leaves the responsibility for finding the information” with the end user, this might or might not involve using keywords restricted to a controlled vocabulary list. Thus, using keywords and a controlled vocabulary list is considered “best practices.”

Source: <http://www.stevenheitman-ia.com/html/MAEd.html>.

### 1.1.9 Enterprise Architecture for E-Commerce— Part of Information Architecture

Enterprise Architecture for E-Commerce is the way in which an Information Architect organizes “logic” for “business processes and IT infrastructure,” reflecting conceptual integration and standardizing the firm’s operating model. These practitioners are referred to as Enterprise Architecture practitioners. In this field, “Enterprise Architecture has evolved into a broad category of activities designed to understand, justify, optimize and, communicate the structure and relationships between various business entities and elements.” These practices include:

- Business architecture,
- Performance management, and
- Organizational structure.
- Process architecture is regulated since:
  - The U.S. Federal Government controls/monitors the Capital Planning and Investment Control (CPIC) process.
  - The Federal Enterprise Architecture (FEA) reference models serve as a framework to guide Federal Agencies in development of their architectures.
  - Thus, to ensure their business strategy and IT investments are in alignment.
  - Companies that work with Enterprise Architecture: BP, Intel, and Volkswagen AG because they are able to improve their business architecture, business performance, and their productivity.
  - This idea of increased productivity relates back to why doing good Information Architecture saves money in the long run.

Source: <http://www.stevenheitman-ia.com/html/MAEd.html>.

### **1.1.10 Human-Computer Interaction and Human Factors— Part of Information Architecture**

Human-Computer Interaction and Human Factors are terms that might cover these items: The science of understanding the properties of human capability is referred to as Human Factors Science. The application of this understanding to the design and development of systems, and services on Websites is referred to as Human Factors Engineering.

The art of ensuring successful application of Human Factors Engineering to Websites is sometimes referred to as Humans Factors Integration. The term “human factors” is to a large extent synonymous with the term “ergonomics.” In different geographical locations terms and definitions have different origins. The recognition and study of human factors is important for safety and protection the public—if safety is not taken into account human beings could make mistakes—ultimately, it could cost lives.

Human-Computer Interaction is when Human Factors are taken into consideration: How end users relate to Internet environments, user-centered design, Information Architecture. Thus, Human-Computer Interaction is relevant to Information Architecture, including creating meaningful online experiences for end users so they can use digital design products. Human-Computer Interactions were taken into consideration, during World War II to improve pilots’ performances and reduction of errors. Within this field, specializations might be:

- Cognitive ergonomics,
- Usability, and
- Human-computer or human-machine interaction.
- User experience engineering and related facts:
  - New terms and jobs are developed, an example is: “User Trial Engineer,” which might refer to a human factors professional who specializes in end user trials.
  - Human-Computer Interaction or Human Factors practitioners come from a variety of backgrounds, though predominantly they are psychologists (engineering, cognitive, perceptual, and experimental) and physiologists.
  - From other fields: Designers, anthropologists, technical writers and computer scientists might contribute.

- Though some practitioners enter the field of Human-Computer Interaction or Human Factors from other disciplines, both MS and PhD degrees in Human-Computer Interaction or Human Factors Engineering are available from several universities worldwide.

Source: <http://www.stevenheitman-ia.com/html/MAEd.html>.

### **1.1.11 Graphic Design, Interface Design, and Typography— Part of Information Architecture**

Graphic Design, (Interface Design and Typography), is a field that involves the design using graphical elements, photographs, illustrations, typography, use of colors, historical elements within a given context, ornamental designs, collages, and typographical designs that make Websites more appealing to end users. If the Information Architecture and user-centered design are appropriately incorporated into overall Web page or Website designs, then combined with high-quality graphic design and typography—it might enhance interface designs within Websites. Source: <http://www.stevenheitman-ia.com/html/MAEd.html>.



### **1.1.12 Information Design— Part of Information Architecture**

Information Design, in my researched opinion, is part of Information Architecture. In 1999 or 2000, Information Design was referred to as though it were Information Architecture. In 2008, Information Architecture was no longer referred to as Information Design, with the advent of Information Architecture becoming a highly specialized field.

The Information Architects design, organize and structure Websites, creating meaningful online experiences for end users. This is why Information Design is important to Information Architects. Information Design is defined by different practitioners, according to their intellects, their biological attributes, their educational experiences, their intellectual-mind-power, their brain-and-think-mental-reasoning abilities, and their conceptual idealizations—this relates back to end users—and their ability to wayfind and sense-make on Websites.

Navigating through cyberspace takes time and effort due to millions and millions of Web pages or Websites. It can be confusing to end users if the Information Architecture is not researched and implemented. The IA Design Plan Reports are developed, end user's requirements understood, business plan's requirements interpreted, and matched with digital design products and user-centered design principles.

The design of information, when accomplished with researched facts and congruent with user-centered design principles helps to create experiences online that work, enabling end users to actually use these products. According to Jacobson, et al., (1999), his book about Information Design from The MIT Press, indicates that different practitioners have differing opinions about what Information Design is or what it is not.

Source: <http://www.stevenheitman-ia.com/html/MAEd.html>.

### **1.1.13 Information Systems— Part of Information Architecture**

In different arenas, Information Systems is defined with contradictory terms. For the purposes of Information Architecture, the researcher concentrates on the historical development of Information Systems. According to Wikipedia, the field and study of Information Systems originated as a sub-discipline of Computer Science. Information Systems for companies is: “to understand and rationalize the management of technology within organizations. It has matured into a major field of management—being emphasized as an important area of management studies.” It is taught at all major universities and business schools globally. The higher-ups in organizations: referring to Executives, Chief Information Officers, Chief Executive Officers, Chief Financial Officers, and Chief Technical Officers. Information Systems, as it relates to Computer Science, is an important resource to their corporations. Source: <http://www.stevenheitman-ia.com/html/MAEd.html>.

#### **1.1.14 Information Graphics— Part of Information Architecture**

Information Graphics are important components of Information Architecture because they might help end users to navigate better. These Graphics are visual representations of data used in conjunction with text. They might assist learners to learn faster on Websites. When appropriate, Information Graphics might lessen a learner's cognitive load. The old saying "a picture is worth a thousand words" is relevant and gives end users visual clues, using:

- Drawings,
- Paintings,
- Print making illustrations,
- Line art,
- Etchings,
- Illustrations,
- Graphs,
- Diagrams,
- Symbols,
- Maps,
- Photographs,
- Engineering drawings, and
- Computer graphics or Web graphics.

Source: from <http://www.stevenheitman-ia.com/html/MAEd.html>.

### **1.1.15 Process Architecture— Part of Information Architecture**

Process Architecture relates to Information Architecture, since it is the “structural design of general process systems and applies to fields such as computers, software, hardware, networks, etc.” It also applies to “business processes” in Enterprise Architecture, policy and procedures, logistics, project management, etc.” Any type of Process Architecture works better when a good model is used to improve performance, including achieving superior quality-control.

Source: <http://www.stevenheitman-ia.com/html/MAEd.html>.

### **1.1.16 Taxonomy and Information Architecture— Part of Information Architecture**

Taxonomy, with reference to Information Architecture, refers to arrangements, hierarchical structures on Websites (Morville & Rosenfeld, 2006); “narrow and deep; broad and shallow.”

It includes the classification of lists or how navigational systems might be structured, “sub-type and super-type,” “parent-child relationships,” including “relationship schemas.”

Taxonomy is quite important to overall architecture design relationships because it adds structure, integrity, and meaning to Websites. Navigational systems are structured since Websites need both global and local navigational systems, etc. Of course, this relates to the organizational qualities or structures of Websites. Sources: <http://www.stevenheitman-ia.com/html/MAEd.html>; <http://www.stevenheitman-ia.com/html/MAIA.html>.

### **1.1.17 AJAX and CSS— Part of Information Architecture**

AJAX is defined as: Asynchronous JavaScript and XML. AJAX is a group of inter-related Web development computer programming techniques used for creating interactive Websites or Web applications. A primary characteristic is the increased responsiveness and interactivity of Web pages achieved by exchanging small amounts of data, with the server “behind the scenes.”

The reasoning behind using AJAX is that an entire Web page does not have to be reloaded each time there is a need to fetch data from the server. AJAX intended to increase the Web page’s interactivity, speed, functionality, and usability. AJAX is asynchronous, in that if extra data is requested from servers—it might be a faster download to end users. For Machine-based Interaction (API), API allows Web-based access to data and functions.

AJAX may have disadvantages in terms of browser integration, response-time concerns, search engine optimization, and reliance on JavaScript and the DOM, including Web analytics.

CSS is defined as: Cascading Style Sheets, which allow greater typographical control for Graphic Designers and/or Information Architects. These items when used correctly could make for better designs on Websites. If usability and user-centered design are not taken in account, AJAX might not work.

Source: <http://www.stevenheitman-ia.com/html/MAEd.html>.

### **1.1.18 Web 2.0 Technologies— Part of Information Architecture**

Web 2.0 Technologies is a current trend in the use of the World Wide Web and Internet technologies. It is Web design or Websites designed to foster information sharing, creativity, and collaboration among end users or learners. These concepts have led to the development and evolution of Web-based communities, hosted services, social-networking Websites, Wikis, Blogs, and Folksonomies.

Information Architects or Instructional Designers could use this new technology, if necessary or required, per Design Plans or client's needs. The researcher has found (to his utter dismay) oftentimes Web 2.0's sites lack in user-centered design, Information Architecture, or high-quality navigational systems.

Source: <http://www.stevenheitman-ia.com/html/MAEd.html>.

### 1.1.19 What Does an Information Architect Do for Corporations

The researcher discovered, after reviewing many Senior-Level Information Architecture job orders, that potential employers confuse Information Architecture (mainly front-end analysis and conceptual designs) with requirements for back-end developers or Information Technology specialists. While Information Architecture or Information Architects have a knowledge base of computer science or computer programming, then doing computer programming is generally not an Information Architect's job because other specialists are trained specifically to do it. Information Architects or others should follow The IA Model for professional results and for quality-control purposes (see matrix below):

### The Creative Information Architecture Model—The IA Model

The IA Model is comprised of eight steps. As previously discussed, it provides a systematic approach anyone can use on projects for building high-quality Websites and/or digital design products (see Figure 1).

Source: <http://www.stevenheitman-ia.com/html/MAEd.html>.

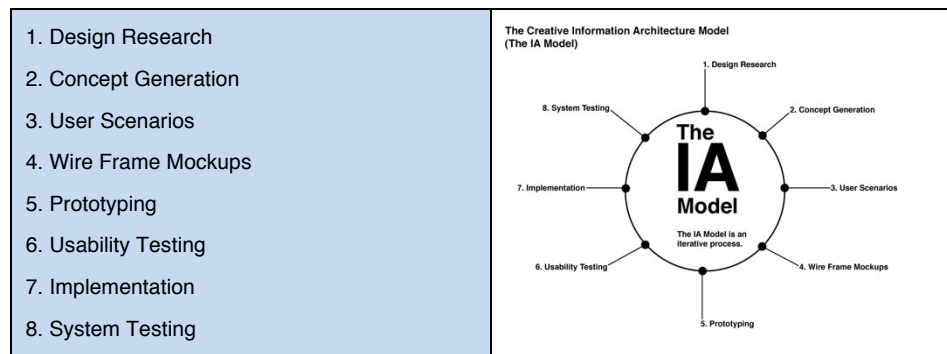


Figure 1: The IA Model



### 1.1.20 Unique Design Products Require Information Architecture, Navigational Systems, and User-Centered Design

According to the authors of *Cool Stuff 2.0 and How It Works* (2007), many design products are unique. Some critics remark Information Architecture has no value. In reality, Information Architecture and Navigational Systems are required elements for unique Websites and/or digital design products—for devices that require use of computing technology—end users have to be able to use these products, for example:

- High-tech toilets,
- User interface screen designs that super markets want end users to use,
- Watches to alarm clocks,
- E-voting,
- A petcam device,
- Aircraft HUD,
- Robotical navigational systems used in robotics to navigate,
- Second Life,
- A hawk-eye device,
- A sandstorm navigational device,
- Navigational systems for a Mars rover,
- SpaceShipOne,
- A space station in outer space,
- A neutrino tank,
- A reactor vessel,
- A Falkirk wheel,
- A computerized monitoring device—a mass damper,
- Airport security devices,
- X-ray machines,
- Stealth military technology,
- Simulators,

- Silent flight technologies,
- Tsunami alert systems,
- Many computerized design products used in the military,
- Many computerized devices used in health care, and
- Other computerized devices used to protect and keep the public safe.

Source: <http://www.stevenheitman-ia.com/html/MAEd.html>.

### **1.1.21 Conclusion: Infinite Possibilities for Information Architecture**

Start out by doing Information Architecture design research and brainstorming to come up with high-level conceptual ideas.

Completing a competitive analysis and writing an IA Design Plan Report that documents requirements for Websites, this helps a client to define their end users and their business plan needs. Information Architect's figure out what patterns provide clarity with regard to Information Architecture and designs, enabling end users to stay found and wayfind by implementing clear navigational systems. Information Architect's build in affordances for end users, so they can navigate on a Website or Web pages. Designing clear interfaces and aiming for consistency in interface designs, this makes for consistency in interface design and provides a clear message and delivery system to end users. Writing for the Internet as well as for end users to meet their goals, then text is made easier to read for end users by developing shorter sentences in paragraphs.

Because end users may only scan Websites for information and downloads, it makes for easier reading on Websites. Information architecture, user-centered design, and usability testing improves an end user's performance. Information Architecture and navigational systems and user-centered design are supposed to help an end user in accessing information and accelerate end user's surfing and learning experiences. Most importantly, effective navigational systems that are fully integrated systems conserve the end user's time. The more time an end user saves retrieving information online will enable corporations to increase their profit margins, and improved productivity of their work force.

In conclusion, there are infinite possibilities for Information Architecture career opportunities as well as many ways in which an Information Architect can apply a knowledge base of skills. That is why Information Architecture is relevant and helps provide a solid framework for Websites—using The IA Model provides the most systematic approach and quality control on IA projects, including an excellent way to project manage all IA projects—from start to finish.

Source: <http://www.stevenheitman-ia.com/html/MAEd.html>.

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My experiences and credentials are in information architecture, user experience design, interaction design, graphic design, project/product management, and usability testing.

My expertise and knowledge base are in information architecture—coupled with experiences in technical writing, editing, corporate training, instructional design, and the ADDIE model. In addition, the author and inventor of The NS Model (copyright), The IA Model (copyright)—all about navigational systems, information architecture, user-centered design, usability testing, including why and how information architecture may be professionally practiced, accomplishing high-quality products.

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