Information Architecture for Informal Educational Web Activities
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(Adapted from the Webmonkey Information Architecture Tutorial by John Shiple)

Information architecture (also known as IA) is the foundation for great Web design. It is the blueprint of the site upon which all other aspects are built: form, function, metaphor, navigation and interface, interaction, and visual design. Regardless of the content or size, initiating the IA process is the first thing you should do when designing a site or Web module. This document describes specific methods and processes for developing a site’s information architecture.

You may be tempted to just wade in, thinking that you already know what you want to accomplish and how it should look and feel. But moving through this process in the order the steps are presented will help you define fundamentals that later stages are based on. Each step is a milestone in the development process. When you complete a step, you will want everyone who has review authority to review and approve the specification in that milestone before you move on to the next step.

If you follow this procedure and use the attached checklist, in the end you will have a complete IA design document; the record of the decisions made in designing the site. It serves as a road map for the site’s construction. Additions and revisions are made easier by this document, as it provides a ready reference for anyone needing to understand the status and shape of the project. Usability issues are much easier to deal with if you follow this process, too.

If you are an experienced exhibit developer or designer, much of this, both in structure and specifics, may seem very familiar. We encourage you to rely on your exhibit-making skills, as we firmly believe that the Web is very much like a museum in many respects, the greatest exception being, of course, that the Web is not a physical space.
Step 1.
Define the Site’s Goals

The first step in the IA process is to define the site’s goals. With the increasing emphasis on curriculum standards, almost any educational program must begin with some sort of clear, well-defined, and manageable goals for learning or affective outcomes. It’s no longer the case that the cool factor of an online activity can transcend lack of focus in learning goals or target audience.

You want input from the people in your organization that will pay for, promote, use, and maintain your Web activity. But you don’t want everyone telling you precisely what the final product should look like. You want everyone to agree on the contents and purpose of the site that you are going to build.

Defining the goals of an online activity, module, or entire Web site is much like the formative period of a physical exhibit. The more you can front-load the process with information about internal needs and issues, along with your audience and the messages you are trying to communicate, the better guidance you will have in development and production of the actual product.

Key Questions

Whether it’s just you or a committee working on developing this project, you need to answer these questions about it:

What is the mission or purpose of the organization?

This may seem obvious, but reminding yourself of this and formally placing it at the top of your IA document can help serve as a touchstone for your work, as well as be a useful sales point to those who control money and resources. Stating how your product meets the goals of your organization shows you’re not doing it simply for the sake if the cool factor.

What are the goals of the project?

These goals should be concrete enough that should you need to, you could later go back and evaluate the success of the project against these initial goals, either through formal summative evaluation or more casual anecdotal evidence. Depending on your audience, your goals could include both learning goals and institutional goals (for instance, increasing teacher access to curriculum materials). If you must connect your materials to existing standards, do that, too in defining your learning goals.

Gammon (2001) offers a useful typology of learning goals. Identifying which category your project fits into will help you choose an activity type later.

- **Cognitive:** Acquire and assimilate new knowledge into existing schemas, apply existing knowledge, connect concepts, draw analogies.
• **Affective:** Challenge beliefs and values, appreciate viewpoints in other people, inspire interest, curiosity, awe and wonder, associate curiosity and thinking with enjoyable experiences.

• **Social:** Develop skills of co-operation and communication.

• **Developing skills** (mental and physical): Prediction, deduction, problem-solving, investigation, observation, measuring, classification, testing theories, making and telling stories, decision-making, manual dexterity, craft skills, etc.

• **Personal:** Increasing self-confidence and self-efficacy; motivating to investigate further.

**Who are the intended audiences?**
Grade level or age cohort is usually the first distinction informal educators make in their audiences. Our research has found that different age groups respond to different kinds of online activities in very different ways, so prioritizing grade levels and adult audience segments is crucial. We have also seen differences between boys and girls. Socioeconomic and cultural demographics also influence choice of language and visual treatments, as well as technical considerations such as assumptions about the quality of computer and Internet connection a user might have.

**What is the desired pedagogical approach?**
Pedagogy greatly affects the activity design; an activity based on information transmission theories of teaching will present didactic content in an organized, building-block fashion, while a truly constructivist activity will consider previous knowledge and experiences of the learners and find ways to help them assimilate and accommodate new concepts. Hein has created a useful diagram of theories of knowledge and learning (see Schaller and Allison-Bunnell for a summary and discussion of Hein’s ideas applied to the Web). Other pedagogical approaches are Bernice McCarthy’s 4MAT System, which describes a four-step process based on individual learning styles, and Howard Gardner’s theory of Multiple Intelligences and his multiple entry points. You, or your organization, may have already adopted one of these approaches, or a different one. What’s important is to explicitly identify a pedagogy to guide the development of your online activity.

**Why will people come to your site?**
What is unique about what your institution does in the real world or what it already does online? Why will people come to the site the very first time? Will they come back? The days of “build it and they will come” are over on the Web, and potential visitors must be offered compelling reasons to come and to come back. Is your organization prepared to promote the online product offline? Does this project support another specific initiative in your organization? Can you commit to ongoing care and feeding of the content on the site to prevent it from becoming a “Cobweb site?”
Design Document: Goals Statement

Now separate the answers about your intended audiences and save them for later. Rephrase the rest of the questions as goals. Put those into a list. If you have a long list, group the goals into categories. Take this list back to everyone who must approve your project and have them rank each goal’s importance. If your goals are grouped by categories, have people rank the importance of each category separately. After collecting everyone’s rankings, you need to distill them into a master list.

Once you have agreement from everyone involved, document the goals of the site and publish them where everyone in your organization can see them. If you have time, summarize the list and write a few paragraphs about the goals.

The list of goals is the basis for your design document, which we mentioned at the outset. After you have published the goals, use them to create the first chapter, called Goals, of your design document.

Step 2. Define the User Experience

Although the educational and institutional goals for your project may seem like they already presume a specific audience, such as fifth-graders or homeschool parents, you may have the same basic goal, such as increasing the appreciation for your subject matter, for different audience segments. The solution to meeting those goals will depend greatly on the specific audiences. The commercial marketing world continues to slice audience demographics even more finely, and the Web in particular is a place where people expect to be catered to personally.

A true audience definition consists of who the users are and their goals and objectives. Scenarios, or stories, are useful in visualizing the audience.

Just as in exhibition design, defining beforehand the user experience you seek establishes a clear, well-documented definition of your audience, and it helps you think about how users will react to the site.

How to Define the Audience

Now is the time to return to the list of audiences you gathered during your goal definition phase. It is the basis for a list of all possible audiences. Add as many audiences as you can to the list, and ask everyone if they have any additions. If the list gets too long, you may have to break it down into categories. Have everybody rank the importance of each audience on the list.

Then give the list of intended audiences to everyone so that they can write down what they think the most important needs and goals are for each one. Once again, compile the results, and create lists. Have everyone rank the importance of each need and goal for each audience. Once you have processed all opinions, add the needs and goals to the list of intended audiences. The top two or three audiences
will be the ones that the site will serve most directly and effectively. Other audiences can find what they are looking for, but will not get such personal attention. Many educational Web sites have a core target grade level and assume that younger or older students can find something of value there. Similarly, special materials for teacher or parents may or may not be the primary focus.

Now you are ready for one of the most fun steps in the entire IA process.

Define the User’s Experience

Now that you know what your site is going to be about and whom it is for, you are ready to imagine what the user’s experience will be like. You should choose an activity type based on your previously stated goals and audiences. We have identified six activity types based on our previous Web development experience and a review of the literature (Gogg and Mott, 1993; Karat et al, 2001; Plowman, 1996b; Sumption, 2001). They are not exhaustive, and there is plenty of room for redefining them. The main point is that they are organized around the type of experience the user has, rather than subject matter or age level. They also help focus on the strengths of the Web as a medium.

- **Creative Play.** Draw a picture, write a story, make a movie, etc. Create something original based on the things you learn along the way.
- **Guided Tour.** Join an expert to explore a topic that he or she knows and loves. The guide leads you on the path they choose through the topic.
- **Interactive Reference.** Explore a topic on your own, through informative words and pictures. Choose the links that interest you.
- **Puzzle/Interactive Mystery.** Put on your thinking cap and solve a puzzle or mystery. Put the clues together to discover the right answer.
- **Role-playing Story.** Choose your own adventure—pick a character, play a role, make decisions, and see what happens. You choose your own path.
- **Simulation.** Run a model of the real world and see what happens when you change things. The choices you make determine the results.

[Note: we are currently re-examining these activity types, particularly the distinction between narrative or language-based creative play and aesthetic creative play, which focuses on visual or auditory creativity. We are also considering role-play as one type of a larger category called Narrative-Driven Exploration, which encompasses various ways to use stories as the hook and organizing structure of an activity.]

Selecting an Activity Type or Approach

In terms of Gammon’s typology of learning, Interactive Reference and Guided Tour lend themselves primarily to cognitive learning. Creative Play, Puzzle/Mystery, Role-playing Story, and Simulation support both affective learning and developing skills. Creative Play will help learners with skills such as storytelling and art making; Puzzle/Mystery and Simulations with prediction, deduction, and other problem-solving skills. Role-playing Stories can challenge beliefs and values and help learners appreciate other people’s points of view. This list can help you choose an activity based on your goals.
The activity types also help you choose the right experience for your audience. Our research has found that no single activity type appeals equally to all ages and genders. Adults prefer clearly structured sites that allow them to readily access information they are already interested in or seeking. Children, on the other hand, prefer experiences that contain the motivation to continue through some clear goal or payoff. Girls often like interactive stories and role-playing games, whereas boys tend to prefer open-ended creative play activities.

Selecting an activity type helps structure your content development process and gives it narrative and functional coherence. Just as a murder mystery movie works differently from a screwball comedy, a Creative Play Web activity will approach the subject matter quite differently from an Interactive Reference. Settling on an activity gives you and your team strong guidance about what content is central and peripheral to the product.

**Comparative Analysis**

Depending on your project and subject, you may be certain that nobody else has created anything remotely like what you're doing. Unlike a business Web site, where out-selling the competition is everything, informal education sites are very much growing in a garden of a thousand flowers.

However, it can be helpful to briefly survey what peer institutions are doing in your area. This can help justify your approach to funders as truly innovative and supporting current best practices in the area. If you can find 3-5 sites with similar content or approaches, try filling out this table for each, along with tabulating your own approach. Also unlike the business world, you can probably ask your colleagues at other institutions about their materials:

1. Audience (demographics, reach).
2. Pedagogical approach and activity type (i.e., reference, puzzle, etc.).
3. Depth of content (total volume; depth versus breadth).
4. Functionality and services offered (such as search tool, email updates).
5. Technology (HTML, DHTML, Flash, server-side scripting, database, hardware required to support software and predicted traffic).
6. Ongoing staff commitment required (i.e., bulletin boards or new content).
7. Accessibility (level of Section 508 compliance).
8. Cost (Both in-house and outsourced).

**Design Document: Audience, Activity Type, & Comparative Analysis**

Create a new chapter in your design document called User Experience. Add the audience definition and the scenarios. Next, write a summary of the comparative analysis and add it to the design document. Your table can be an appendix or in the main body of the document.

Step 3.
Step 3.
Outline the Activity and Content Requirements
Before you dive into writing fun copy and working with your designer on great graphics, you need a blueprint for how the activity will work and what it contains.

If there are specific informational content or specific cognitive experiences that must be included in the project to meet standards or your other goals, make a list of those items so you can see what you need to integrate into the activity. If the informational content clashes with the activity type, it’s important to bring the two into line before continuing. For instance, a large number of specific facts to be presented probably means that a Creative Play activity is not the solution.

Activity Sequence Narrative
We will elaborate a specific structure in the next stage, but for the purposes of review and approval, you now need a brief description of what will happen in the activity, based on the activity type and content you’ve identified. This should be a couple of paragraphs sketching out the setting and action of the story scenario(s), areas of reference materials, candidates for puzzles to be solved, etc.

Asset Inventory
This list provides you with the fodder for the precise structure and storyline of your activity. This list of informational content also serves as a “content inventory” during production. What photos do you have to round up from the archives? What object identification do you have to confirm with a curator?

Design Document: Content
Create a new chapter in your design document called Content and include the narrative of the activity flow and a summary of the content inventory.

Step 4.
Structure & Function
Activity Outline to Script
Now that you know what your activity will include and what flavor you want to give it, you can start to assemble it into a structure. If you anticipate a complex, large structure, writing individual items on note cards and laying them out and rearranging them can be very helpful. The results can be entered into a flowchart program such as Inspiration (http://www.inspiration.com) or MS-Word for printing and distribution. If your activity is quite linear, a traditional written outline with nested numbered paragraphs can be enough to convey the structure and progression through the activity. Brainstorming ideas with designers and writers can be helpful to set the mood of an activity.
As specific text is written and editorial images are selected and added to the outline, the activity outline will become a full-blown script that can be approved and frozen. It is important for the text and image specifications to be contained in one place that the production can copy and paste from. Retyping bits of text for headlines, body copy, or captions introduces errors that may be costly to correct if overlooked until late in the process.

Finally, revise the content inventory, if necessary, to reflect the new organization of the information.

**Navigation**

How will users use the site? How will they get from one place to another? How do you prevent them from getting lost? Defining the navigation system for the site solves these problems. Even if you are creating a complex Role-Playing game or simulation, you must have consistent navigational cues and structure.

Take a look at your Activity Outline and Flowchart. What are the major sections? How are they conceptually connected to each other? These are excellent candidates for the global navigation system, which appears everywhere in the activity and enables users to quickly jump between sections. If at all possible, try to limit the number of global navigation elements to between five and seven. Nested lists are becoming increasingly common as sites become deeper and more complex.

Local navigation can take a number of forms and will be tailored to each section. It can be a list of topics within a section. It might be as simple as a forward or backward button. If global navigation allows the user to move sideways from one major area of the site to another, local navigation allows a user to drill down for more specific content within an area.

It is essential that you document the global navigation system and as many of the local navigation systems as you can. This can be as simple as compiling a list of elements that make up each system. Although the flowchart will show some of the basic navigation with arrows linking major levels, you can’t include all the arrows going in all the directions that all possible links in the activity might go.

**Functional Needs Follow Form**

Also make a list of the functionality your activity requires. Does your activity include allowing a user to save something they’ve created? Will the user be manipulating existing materials or creating something from scratch? Do they need to be able to search for a single item in a large pool of things? The technical implementation of your project will depend on these needs.

Using the content inventory, revise your list of functional requirements. Make sure all of your information and experiences are represented. Work with the technology and production people to determine the feasibility of each requirement. Do you have the technology and the skills to meet each
requirement? Do you have the time and money to buy or build the functionality? Do you have the staff resources to maintain your grand creation? Rank the importance of each requirement. You may have to get rid of some in order to meet your deadlines or budget. Attach each functional need to the content it supports in your content outline.

If your project involves a great deal of custom programming or technical expertise beyond producing standards-compliant Web pages, you will need to expand on the technical issues outlined in the Functional Requirements section. Each functional need must be matched with a specific technical solution. You will need to know what technologies are allowed or supported by your organization’s existing Web site. What tools you can use might affect your content. For example, if you can use a server-side scripting tool such as PHP (free) or Macromedia’s ColdFusion that dynamically creates Web pages based on user input, you can create a Role-Playing story with many more branching points than if you have to manually create duplicate sets of static Web pages that hard-code every possible path through the activity.

**Design Document: Structure & Function**

Add your completed Activity Outline. If the complete script is too long, include it as an appendix. Include a graphic of your flowchart. A PDF file can print on a variety of systems without losing layout and graphics. Document the global and local navigation schemes, and add your functional requirements and technical solutions.
Step 5.
Visual Design

Now you’re finally ready for the look and feel of your project. Why the long wait? Good design doesn’t just look good. It serves the functional and communications needs of the project. Now you know what they are and you can charge your design team with coming up with a design solution that meets those needs. Since even the most experienced designers are by nature intensely visual people, they often need clear parameters to work within regarding functional needs.

Wireframes

Wireframes are layout grids that show how all the content, navigation, and other design elements are physically organized on the screen. They don’t have fonts or color. They just show the layout grid. This is where usability issues – what’s next to what, where a person’s eye is drawn, what will require scrolling to see, how clear the navigation is, can be identified and fixed.

You only need one wireframe for each unique type of page or screen in your project. At a minimum, that’s usually the main, or home page, top or second level section pages, and second or third level content pages. For a Creative Play activity or simulation, there may only be a couple of interface screens, but a lot may change on them as the user interacts with the activity. To get started, take the Activity Outline and make a list of all the possible page types. Individual pages within the site should be similar in form across all the major sections. Users get orientation cues about where they are from overt things like color, as well as more subtle things like page layout. Review the content inventory, then try coming up with two or three generic page types. You’ll start by designing these and then use them as the basis for all the other page types.

We usually distinguish between editorial and design content. Text and images that convey specific information make up the editorial content, whereas text and graphics that create the look, or give instructions, are part of the design. Your organization and/or sponsor logo need a place to live, as well as any site-wide functions like search tools.

Your wireframe, which can be a very basic pencil sketch or made with a drawing program or the text and graphic layout tools of Microsoft Word, should show where all of the content and interface elements go. Pay attention to what appears on a single screen and what the user must scroll to see. You may have to fit your content into a site-wide frame set with a header, footer, and navigation bar along the side. Make sure that your layout works with this and doesn’t compete or duplicate the global template.

Navigation is very important. Global navigation must be consistent across every page of the site. Local navigation systems can change, depending on the content, but try to be as consistent as possible.
This is an iterative process. You will need to revise the layout grids several times. You will probably want to do two or three different styles for the layout, if you have time. If you’re not up to this yourself, enlist the help of your designer or a professional usability expert to polish the layouts.

**Functional Prototype & User Testing**

This step is optional. Depending on the size and complexity of your activity, you may be ready to move straight to graphic design comps and actual production. However, if you are concerned that the navigation is complicated, or you want to see how a story flows from screen to screen, you may want to turn your wireframes and script into a functional prototype. This means making HTML pages with the text and perhaps crucial editorial images, as well as working global and local navigation links on them.

If you plan to do any user testing of the activity prior to production, a functional prototype is a must. Having even a handful of people representing your target audience go through the prototype can pinpoint problems with usability, confusing directions or explanations of concepts, and vocabulary. Be aware that students may have a hard time divorcing form from content and may be turned off by the prototype because it lacks the final graphics and design. Make any changes you feel are appropriate to respond to user testing of the prototype.

**Design Comps & Style Guide**

Design comps establish the look and feel of the site. They can be integrated with the metaphor or site structure rationale, but this isn’t always necessary. As soon as the wireframes are approved, the design team can add type, graphics, and color to bring the wireframes alive. It’s important to work from the wireframes because they have helped you solve your usability issues. Great design can’t help a poor layout. If the activity is large and several people will be working on it, or it must be updated later, create a style guide with font, color, and other formatting information such as image treatments and column layouts. A basic design treatment that works for the main page must also be able to be applied to the lowest level pages.

If many people must sign off on the design, create several color schemes and type treatments before working up intricate renderings. Make sure you have approval for the design before going into production! Even in a digital medium, changes can be more time consuming than you might think. It’s also very important for the designer’s sensibility and style to be well matched to the activity type and audience.

**Storyboards**

If the interface is very dynamic, or you have a very specific series of images that tell your story, you should turn the Activity Script into a Storyboard that visually shows each key state of the interface and how it changes. Clip art and simple
cartoons are more important than polished graphics. Skip this step and you may pay for costly double work if your production people don’t understand the specification clearly or a usability issue surfaces because you haven’t thought through what will happen after a series of user choices. Go back to your user scenarios for guidance in developing the steps you want the interface to enable.

**Design Document: Visual Design**

Create a new chapter in your design document called Visual Design. Document the wireframes, and be sure to include the diagrams you made. Compile the design comps and style guide and add those to the document. Include a URL where your functional prototype can be found, and discuss any relevant issues that came up during user testing.
**Conclusion**

Congratulations! Your design document is now complete, providing a thorough description of the site’s design. It will be useful in constructing the site, for adding content, and in revising the site when the time inevitably comes. If the Design Document is ship-shape, the final production and deployment phase is almost anti-climactic, as it should be.

You can see how this process has built upon itself to yield a robust, comprehensive plan for your project. Like any creative process it is both organic and structured. This outline is not meant as a straightjacket, but it is an excellent and indispensable roadmap. By getting approval for significant milestones along the way, you should be able to avoid nasty surprises and keep in budget and on deadline.

**References**


http://www.eduweb.com/goalbasedscenarios.html


Last revised 6/28/02 DTS
1. Goals
   1a. Who are the audiences for the Web activity?
   1b. What are the learning goals? (Content, types of learning, etc.)
   1c. What is the desired pedagogical approach?
      • Hein: transmission, discovery, constructivism
      • 4MAT
      • Multiple Intelligences/Multiple entry points
      • Other?
   1d. How does the Web activity support the institutional mission?

2. User Experience
   2a. Refine the audience definitions. Who is the primary audience? Define in terms of age, subject knowledge (novice – expert).
   2b. Who are secondary audiences?
   2c. What type of activity is best suited to serve the project goals and audience?
      • Creative Play (Narrative or Aesthetic)
      • Simulation
      • Role-play (more generally, Narrative-Driven Exploration)
      • Puzzle/Mystery
      • Interactive Reference
   2c. What comparable sites already exist?
      See Appendix A: Comparative Analysis Table

3. Content
   3a. Briefly outline the activity sequence. What will users do? What will happen as a result? Will the user end up with a product of their creation?
   3c. What assets will be required? Which are available in-house? How and where will the rest be obtained?
      Use Appendix B: Activity Content & Asset Inventory

4. Structure & Function
   4a. Create a flowchart detailing the user experience, covering all the major paths and options.
   4b. Define the navigation scheme for the activity, both globally (throughout the entire activity) and locally (specific to each section)
   4c. Describe the activity’s functionality—list the desired functionality and the technical methods for implementation.
5. Visual Design
   5a. Create wireframe layouts of key pages in the activity
   5b. Create a functional prototype and conduct user testing (optional)
   5c. Create an activity storyboard
   5d. Create design comps for each wireframe
   5e. Create a style guide (specifying display font, body font, colors, image treatments)
   5f. Develop a working prototype

Appendix A: Comparative Analysis

- Audience (demographics, reach).
- Pedagogical approach and activity type (i.e., reference, role-playing game, puzzle, etc.).
- Depth of content (total volume; depth versus breadth).
- Functionality and services offered (such as search tool, individual user accounts, email updates).
- Technology (HTML, DHTML, Flash, server-side scripting, database, hardware required to support software and predicted traffic).
- Ongoing staff commitment required (such as Q&A, bulletin boards, updated content).
- Accessibility (level of Section 508 compliance).
- Cost (Both in-house and outsourced).

Appendix B: Activity Content & Asset Inventory

- Text
  - Informational (Editorial content)
  - Other (Navigation, instructions, titles, &c)
- Images (Existing or commissioned? Usage permissions? Photo or illustration?)
  - Editorial
  - Layout and design
  - Scrap/reference only
- Audio
  - Sound effects
  - Music
  - Interviews
  - Narration
- Video
- Animations