Information architecture for a new TERC corporate website

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Overview

TERC, Inc. is a non-profit organization whose mission is improving math and science education in grades K-12. Its product generally falls into these categories:

- Classroom curriculums – math and science programs for students
- Professional development workshops & seminars for educators – sometimes in support of specific classroom curriculums, but often on broader and deeper issues in public education
- Curriculums for teachers – programs to improve teacher understanding and effectiveness
- Pure research – basic scientific inquiry into human learning and cognition

TERC's funding derives mainly from these sources:

- National Science Foundation grants
- Federal and state Departments of Education grants
- Sub-contractor fees for work done on the grant-funded programs of colleague organizations
- Royalty income from products licensed to commercial publishers

TERC champions a resolutely constructivist, investigational, and humanistic approach to education – philosophies not currently favored by the Bush administration, and at odds with the current trend to use standardized tests as the principle measure of student learning. For this and other reasons, TERC faces serious financial challenges. This circumstance has led to a strategic shift to developing new sources of funding: specifically, to increase royalties from published projects and to increase grant and endowment funding from private foundations.

A by-product of this need to "reach people who don't already know and support us" is a redesign of TERC's corporate website.

Confronting problems with the current TERC website

The TERC website was launched in 2000 on an information architecture that was already years out of date. The organization and labeling of content was based largely on internal political organization and on insiders' mental models of what their work was about and how to label it. The home page is a collection of long lists that have grown longer still as the site ages, creating a classic "hidden in plain site" effect.

TERC's Communications department is the owner of TERC's website, and their narrow focus is especially apparent on any internal page of the site, where even the cryptic labeling of the home page is abandoned. Internal primary navigation is labeled "About TERC", "News", and "Hands On!" (Hands On! is a newsletter published by the Communications.) Each of these labels reflects TERC as defined by Communications tasks. (See http://www.terc.edu/TEMPLATE/topic/index.cfm?topicID=1 for an example.)

Many of the most common complaints about the current website are founded in its information architecture. These include:

- The very nature of TERC is not made clear, either explicitly or through an intuitive presentation of content
- Content labels are obscure and often seem to overlap
- Visitors cannot quickly perceive where content they would find useful might be located

- TERC's products are labeled "projects" – a term rooted in the vocabulary of the NSF but obscure to anyone not a member of a research community
- The Search engine is unreliable and regularly misses major chunks of relevant content

In 2001, TERC named a new president, Dennis Bartels; Dennis came to TERC from the Exploratorium in San Francisco, an organization that had put considerable emphasis on reaching its community through an intuitive, attractive, and usable website. In that same year, TERC Information Services named Bryce Flynn, the author of this report, as its first Manager of Web Design and Development, recognizing the importance of its online presentations at both the product and the corporate levels. In early 2002, TERC hired a marketing consultant to advise on the feasibility of self-publishing certain TERC products; in their report, the consultants cited the need for a vastly improved web presence.

In 2003, TERC created 2 committees to participate in creating a budget proposal for a redesigned company website. The first was a joint committee of Communications and Information Services staff, called the Website Implementation Group (WIG). The second was the Website Advisory Group (WAG), a less formal body composed of staff and stakeholders representing various groups or factions within TERC.

The WIG began with 4 members, instantly expanded to 6 for internal political reasons. The sheer size of the committee was of course an impediment to its progress. Nonetheless, the Information Services faction of the WIG was committed to a well-though-out process for designing and building this website, and the Communications faction soon made this a shared goal.

This time, there would be a user-centered approach to design, and user-centric information architecture would be its cornerstone.

Defining goals for a new TERC website

The first stage was to define specific and explicit goals for what the new website would attempt to do, and what it would not. The newly formulated TERC Strategic Plan provided guidance, as did the obvious requirement of "increase revenue" though that was soft-pedaled to a greater degree than would have been the case in a for-profit entity; many TERCies regard their mission to improve education as their primary goal and revenue enhancement is only valuable in service to the mission. In a parallel process, TERCies were asked to describe the most important audiences that website would serve.

TERC prides itself on a maintaining an inclusive corporate culture in which all voices can be heard. Regardless of the degree to which that exists in fact, service to that goal is an important political reality. Input from the entire TERC staff was elicited through a process that Bentley Labs' Beth Loring described as unique in her experience. First, blank posters with pen attached were posted throughout TERC's offices, and TERC staff members were encouraged to write their ideas of business goals on these posters. A special email address was established to gather more input. The process culminated in a "rolling meeting" – held for an entire afternoon – where refreshments were provided and staff were encouraged to come into a conference room and write their ideas on one on the posters or white boards that covered the walls. We made the audience and goals definition process look a bit like a party.

This resulted in an unprecedented level of participation – nearly 50% of TERC staff provided some level of input. (At TERC, high levels of participation are generally considered more valuable than speedy implementation.) It took several man-days of work to collapse all this input into a manageable set, which we formally defined as:

- Increase revenue (through both funding and sales of products and programs)
- Disseminate (TERC-ese for "distribute") our work
- Branding
- Advocate our philosophies

- Recruit staff and collaborators

It also revealed at least one significant difference between the business goals of TERC and the mission goals of TERC staff: “parents” were identified as an important audience despite TERC having very few products created for parents, and little revenue generated, or likely to be generated, by that group.

High-value target audiences for the website were ultimately defined as:

- Primary:
  - Funders (grant-writing officials)
  - Publishers (commercial)
  - Collaborators (fellow researchers, co-contractors)
  - Educators (teachers and curriculum officials)
- Secondary:
  - Parents
  - Students

Research into the needs of our audiences

TERC contracted with Bentley College Usability Center to conduct field research into the habits and goals of the four primary audiences. Funding for this had been set aside earlier but the amount was insufficient to the task. Bentley Labs was limited to interviewing 14 representatives of these groups. It also restricted interviews to subjects in the Boston area – a serious drawback, especially for the 2 most important groups, Funders and Publishers, who exist and operate on a national level. We remained mindful of these shortcomings as we analyzed the Bentley report and developed profiles to represent the key groups.

User profiles

The purpose of the profiles is to provide a user-centered focus to the design of the site, beginning with the information categories, and the labeling and indexing of content.

These profiles have already proven their value to keeping our design team on track. When a subcommittee of the Website Implementation Group slipped into an “internal-centric” mindset and created elaborate models that drew more on TERC internal politics and less on the user requirements revealed in the Bentley report, I could point to the funder, teacher, and curriculum official profiles and ask, “What does this mean to them?” The answer was obvious and inescapable – “Not much.” The profiles made obvious the risks of thinking in a different model than the one we planned to expose users to.

The profiles also helped to establish that this same subcommittee was assigning private definitions to some well-established domain terminology. Specifically, they had come to use “Browse” and “Search” to describe content categories. The viewpoint of our teacher profile (rushed, goal-driven, and with just a medium level proficiency at Internet use) showed how that risked creating confusion with the well-known behavioral and functional definitions of those terms.

The profiles have proven so valuable that I intend to develop full personas from them before the next phase of our project.

User characteristics and information architecture

The user interviews show that two of our highest-value groups (Funders, Educators) are very oriented toward getting quick returns when they invest their time browsing a website. They feel that is facilitated by websites that identify content areas according to the visitors’ role, and at a

very high level (e.g., home page buttons that say “Info for Funders,” “Stuff that Teachers Can Use in the Classroom.”)

The following diagrams show wireframes of a sample site homepage, and of a sample silo, or category, home page.

Figure 1: Wireframe of hypothetical home page

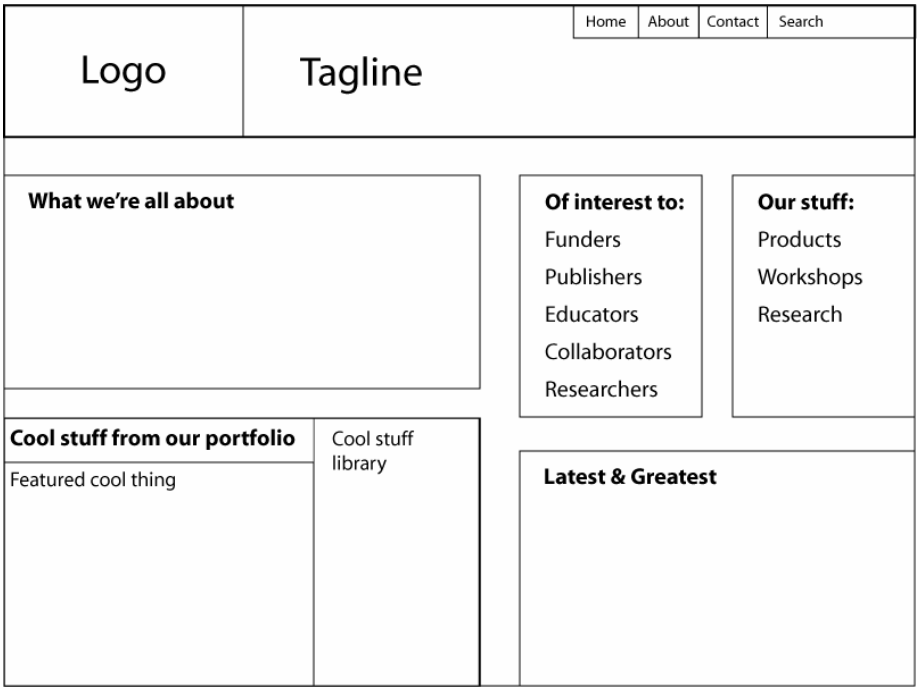
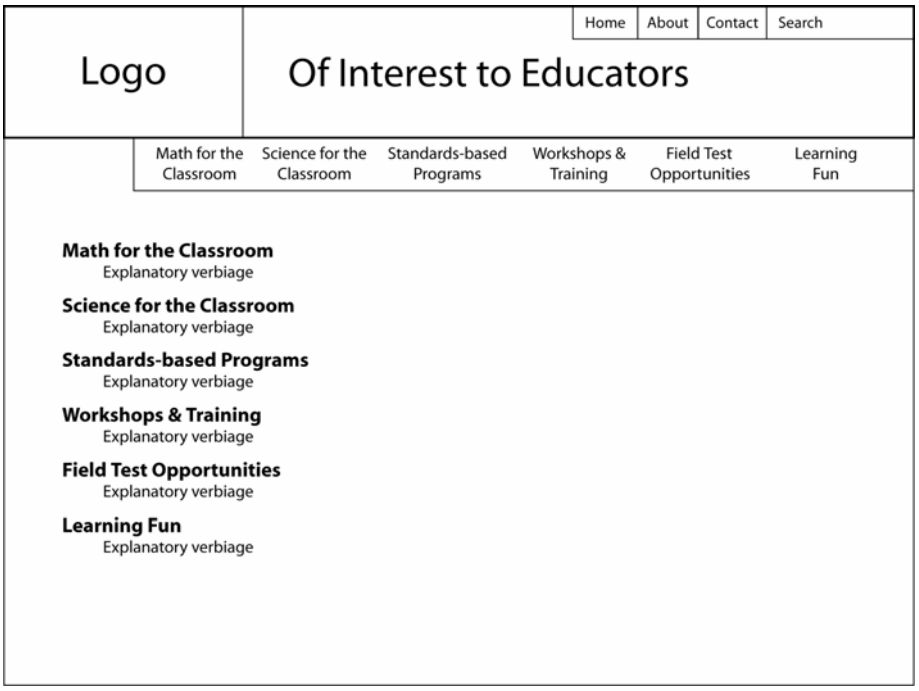


Figure 2: Wireframe of hypothetical gallery page for Educators section



Once inside their areas, Funders and Educators have different needs.

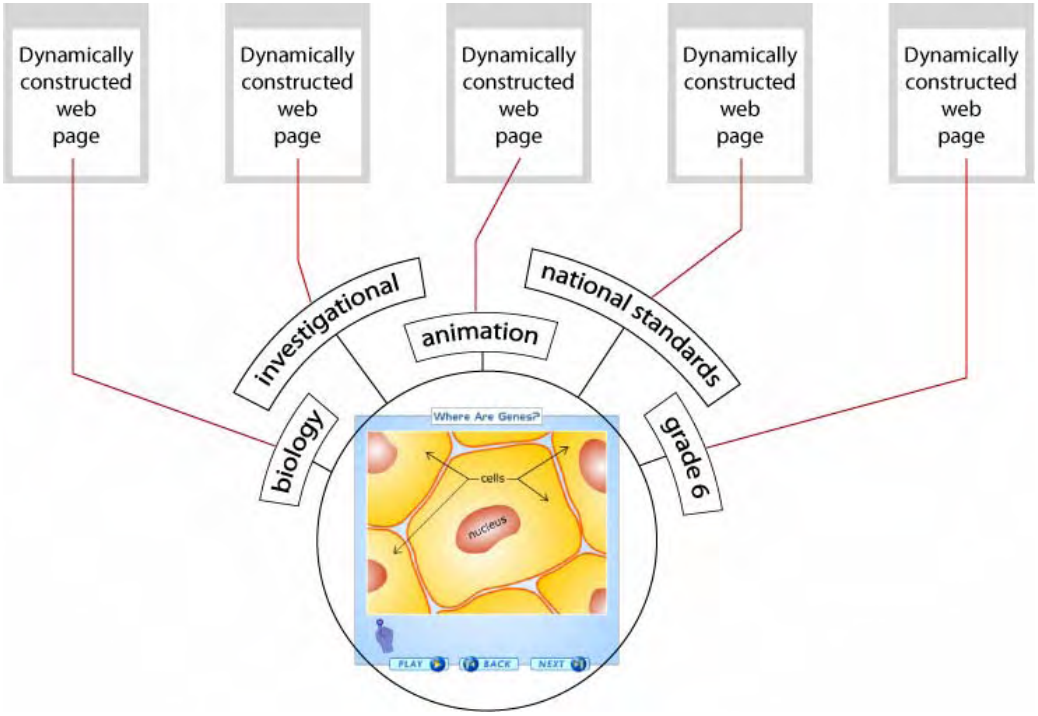
- A Funder is oriented toward topics based on generic categories or even on a political viewpoint or a philosophy, e.g.:
  - Technology-assisted learning
  - Investigative learning
  - Education that promotes environmental awareness
- An Educator is oriented toward specifies, e.g.:
  - A 6th grade science unit that meets standard "X" and supports requirement "Y" on my state's standardized proficiency test
  - A classroom exercise that investigates the nature of pi in an interesting way
  - A summer workshop that will help me prepare to teach TERC's *Investigations* math curriculum for the first time next school year.

Publishers, however, are most likely to be looking for materials according to categories and sub-categories that correspond to their product lines, e.g.: "Math, 5th grade, supplemental, meets National Standards, plus Texas & California standards." This is also how some Educator-Curriculum Officials imagine our content should be organized.

These insights have important implications for how site content will be sorted, indexed, and labeled. Each content chunk will need metadata associated with it that will allow it to be dynamically placed on a page that users may have navigated to from one of several different directions. Metadata must also support key-word based searches that may be either specific or conceptual, e.g.: "algebra" or "standards-based mathematics."

The following diagram illustrates this concept using the one example, a simple animation that shows the location genes inside a human cell. (The complete animation can be viewed at http://sftt.terc.edu/units/cells/students/session03/session03_act02_page02.cfm.)

Figure 3: Content object and associated metadata



New content required by the information architecture

At some point while browsing the site, users will encounter one or more tables, or "galleries", of content objects that may potentially meet their needs. Because they will have with a fairly well-defined mental model of what they are looking for, they will benefit from summaries that describe the content in terms relevant to their goals on that occasion. For example, for the gene animation pictured above:

- *If browsed to via "biology"* -- "An animation of the location of human genes, useful for science or biology teachers who want to engage their students….
- *If browsed to via "standards"* – "Supporting National Standards in Science Education for Grade 6 students, this animation shows where genes are located…"

Such descriptions will reassure users that they are on the right track and encourage them to continue (what Jared Spool describes as "the scent of a web page.")

It comes as no surprise that descriptive content must be created for this or any website, but the requirement for different descriptions that support different user goals was a new idea to the Website Implementation Group. It has implications for budget and schedule that must be accounted for when drawing up a proposed budget for construction of the site.

Taxonomy and labeling

Because content will fall into multiple categories, and relate to other content in a variety of meaningful ways, we will need to develop content metadata that has never before existed within a single storehouse at TERC. The possibilities are virtually infinite, and the delivery technologies we will employ have a virtually infinite capacity. This part of the process could spiral out of control, becoming so extensive and fine-grained as to defeat or at least seriously delay completion of the website.

Card-sorting exercises could be useful tools in keeping the taxonomy under control. Using techniques developed and described by Peter Merholz and Indi Young, Gerry McGovern, and others. Because while it is true that the possibilities are infinite, the categorization of content and the labeling for those categories will nonetheless tend to cluster around a relatively few common phrases.

This research with representative groups of users will also help us determine the most meaningful labeling to use on the website. We should also use this data to create a controlled vocabulary that will improve the user experience by ensuring consistent presentation of content and consistent results when using the site's keyword search engine.

An expert in library science and/or indexing would be a valuable addition to the team at this phase of the design process, and we should budget for this – probably on a consulting basis.

Estimating success before the website is built

The information architecture of the new TERC website will be the single biggest factor in its success, so it will be worthwhile to gauge this before work goes very on either the graphical user interface or the underlying content management technology. I believe we can effectively do this testing through a few of reliable methods:

- Card-sorting: Once we've determined labeling for the site navigation, we can get representative users to tell us where they are most likely to look for given chunks of content.
- Paper-prototype testing of wireframe diagrams.

The value proposition

(Except for the overview sections that are intended to provide a context for anyone unfamiliar with TERC, the content of this paper will be adapted for inclusion in a proposal to fund further development of a new TERC website.)

The biggest issue with TERC's current site is the difficulty users have in finding what they are looking for. Though the site current is organized, it is organized in a way that is largely meaningless to anyone outside of TERC. This translates into an impression of the site as chaotic, confused, under-planned – impressions that unfortunately translate into impressions of the site's owner-entity.

I have used some or all of these information architecture concepts and techniques on many of the project sites I have built for TERC, and the result – as provided by my internal customers and to them by their user communities – has been websites that dramatically improve upon previous websites built at TERC. That experience has shown me the truth of Edward Tufte's claim that good graphics can't rescue bad information architecture. To this I would add that is relatively easy to wrap good graphic design around a good info architecture, and much, much harder to make a bad info architecture look good.

Attending to the info architecture at the level of detail described, will add cost and delay up front, but we will recover that in ease of design and construction later on. And without a good information architecture foundation, the inherent problems of the old site will be repeated on the new one.