Components of User-Centered Analysis and Design

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Are you thinking of redesigning your website, or launching a brand new website as part of your online strategy for helping your organization achieve its business goals? If so, what kinds of content, features, and functionality do your users, or potential users, want on a website? Do you know for sure?

Take a look at this example of things on the homepage of an association website, versus the things that actual website users go to the website to find. As you can see, there is huge disparity. Unfortunately, this scenario is typical of many websites. That's why it is critical that you determine what users want to DO on your website so you can best serve their needs.

But how do you figure out what users want and/or need? This short paper outlines the process that TerpSys follows to ensure your website is designed to best meet the needs of your users. While different design groups may have their own way of doing it, TerpSys follows a model in which we examine the perspectives of four key groups: stakeholders, competitors, usability experts, and website users. Following this model helps us to achieve user-centered analysis and design.

What is User-Centered Analysis and Design?

User-centered analysis and design focuses on the needs of the user to determine things like content, features, functionality, information architecture, content structure, and visual design. It is used for designing websites, web applications, computer software, and hardware.

Associations, non-profits, and for-profit businesses can all realize a high return on investment by employing user-centered analysis and design. It will help them to:

- Increase their website's value to their constituents
- Avoid future costs from failed designs
- Reduce development cost by detecting problems early

By identifying and addressing areas of concern to users, organizations can:

- Gather more accurate user requirements, which gives a website or application improved quality
- Enable users to accomplish their online tasks more efficiently and easily
- Provide users with a positive overall experience, which will hopefully result in a greater chance of repeat visits and increased traffic, which, in turn, can grow revenue
- Avoid investing in costly system features that users don't want or can't use

When Should User-Centered Designed Be Conducted?

Freedom of design is highest at the beginning of a project. However, that is when you actually know the least. That's why it is really important to learn as much as possible about your users' needs early on, as you begin to think about your design ideas. You want to make sure your ideas are well-thought out and that you have a concrete rationale on which to based your design choices. Therefore, user-centered analysis and design should be conducted early in the design process.

The Components of User-Centered Analysis and Design

What is involved in user-centered analysis and design? The main components include:

- Working with stakeholders to develop a vision and strategy for the website design
- Getting to know your users (target audiences), by developing User Profiles and Personas
- Gathering and analyzing data to flesh out what you know about users and their needs
- Developing user scenarios and conducing a task analysis
- Developing the information architecture and framework for the graphical user interface (GUI)

To address these components, TerpSys uses a four-stage Market and Usability Research model that helps us determine users' needs, make recommendations, and help implement customer-driven changes. Our process includes looking at the perspectives of stakeholders, usability experts, competitors, and, of course, users.

The Stakeholder Perspective

Stakeholders are members of the project team who have a stake in the outcome and success of the website. Examples of stakeholders may include the CEO, senior management, division heads, content owners/developers, marketing folks, and the IT manager/director.

Figure 1. Four Perspectives of User Centered Design

By conducting a series of "vision" meetings, TerpSys strives to understand the goals of the organization, identify its key competitors in the marketplace, discover and refine the goals and objectives for the website, gather baseline information about the target audience, take inventory of the online assets, and determine the scope and initial ideas for the functional requirements of the intended website.

Note that a good site redesign should *always* start with an objective. So we ask stakeholders: Why are you considering a change? Are you merely trying to give the current site a facelift? Or are you trying to create a more engaging environment for members? Are you trying to make your site content easier to manage and keep up-to-date? Once the stakeholders decide on their motivation and objectives, these should become the team's mantra at every stage of the project and what is benchmarked against for critical decisions. If what you are considering doesn't further the main objectives, don't do it.

The outcome of this stage is a Stakeholder Vision Document. This document is referred to throughout the discovery phase of the project.

The Competitive Perspective

For the competitive analysis, TerpSys analyzes six or eight competitor websites. These are sites identified during the Stakeholder meetings. Our analysis examines how competitor sites handle specific facets of the site such as membership application, newsletter sign up, navigation strategies, search, resource library tools, social networking, etc.

We use this insight to make initial recommendations for features and functionality ideas for the website that will help the organization stay competitive with other organizations in the same space. These, of course, will be reviewed against subsequent user research to make sure that users truly want and need these items. Just because a competitor does something, doesn't mean that it makes sense for your website!

Expert Perspective

Expert reviews are used to identify high level violations of website usability rules and standards and can help predict problems users may encounter on a website. During the expert review, the focus is on functionality, navigation, consistency, content, and the appearance of a website. A cognitive walkthrough is performed where typical user scenarios are used to step through pre-identified tasks. During this process, we note any usability problems. We then compile a list of problems and offer recommendations for improvement, based on recognized usability principles.

An expert review allows us to focus future testing, evaluations, and revisions on the areas that most need it. We strongly recommend validating expert reviews with usability testing that with real users completing real tasks. We will talk more about usability testing later.

User Perspective

The user perspective is, in many ways, is the most important and involved perspective. To design a successful and effective website, it is of utmost importance to research the specific needs of the target audience. Learning *who* you users are (or will be) will help you to make informed decisions that will best meet their needs.

Who Are Your Users?

When we talk to stakeholders, we always ask the question, "Who are your users?" While many stakeholders are somewhat in tune with who uses their website, it is not unusual for lack clarity to exist about the specific characteristics and demographics of users. And when it comes to associations and non-profits, stakeholders often classify users as either "members" or "non-members," without really digging deeper into the specific roles, job titles, and demographic data related to these groups. Learning the specifics about who your users are can help you to make informed decisions that will best meet their needs.

To help determine more about your website's visitors, you can look at the following data:

- Member databases
- Registrations
- Google analytics data
- Market research
- Page views and site usage data
- Any other data that can help you answer the question of WHO

Oh, and don't forget. It is also important to think about what audiences you might want to attract in the future to further expand your business goals.

Once you are absolutely sure about who uses your website, then you want to find out what they want to do there and how your website can best meet their needs.

The ABC's of Mental Models

So how do we find out what users want to do on your website? Well, first, we must peek inside their mental model. A mental model is an explanation of someone's thought process about how something works. All people come with mental models. Usually these mental models are the derived from the culmination of a person's past experience. A mental model is what guides the person's behavior in life, and on your website. Mental models affect the way users work with the information your provide them and determine how they make decisions. It is the predominant method of learning. When thinking about mental models, it is important to note that:

- A user cannot accurately describe his or her mental model—it is the job of a Usability Specialist to define it
- Mental models drive requests for functionality
- 80% of usability derives from matching the user's mental model

To help define the mental models of a website's users, you start with one-on-one interviews. These interviews conducted to gather information about what people think about various topics relevant to a task, domain, or an organization. The data is captured in a mental model diagram, which are used to collect and track the data and present it in a meaningful format.

Mental Model Diagrams

Mental model diagrams are used to represent the thought and action process employed to achieve a set of goals in a topic area that is narrowly and specifically defined. In terms of website information architecture and design, these diagrams help us to understand what type of information users will find most useful. It is important to interview a lot of people from various cultures to see what the task differences are. That way you can track patterns and similarities.
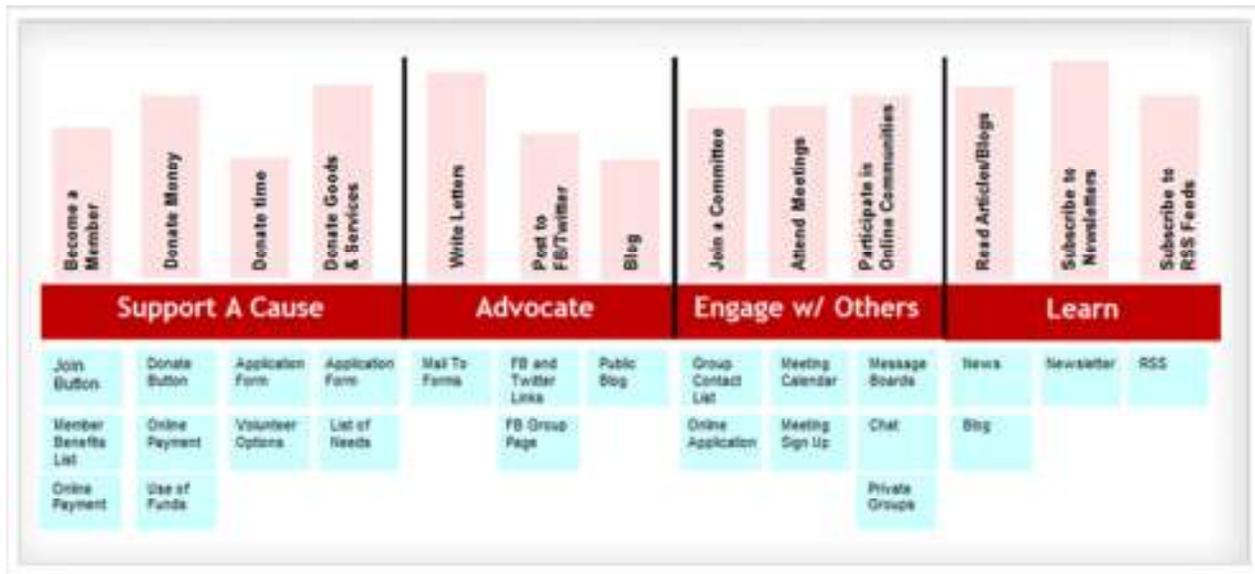
Figure 2. Mental Model of Web Site Users Relationship with a Non-Profit

Take a look at this example of simple mental model diagram depicting how people might choose to interact with a non-profit organization. We started out identifying the types of activities that users typically do in relation to supporting the cause, advocating for the cause, engaging with others who have a similar interest, and learning more about the cause. Then we identified the tasks (shown in pink) that people most often complete related to each of these major activities. And finally, we identified the possible features or content (shown in blue) that the website could potentially include in support of these tasks.

Diagraming mental models in this way helps us to understand what users will find most useful. You can then use this information to make decisions about content, features, and functionality on your website.

User Research

To help deepen our understanding of users and their mental models, we engage in one or more of the following activities:

Activity	Description

Interview Users	• User interviews can be conducted either in person or via the telephone or Skype They are used to:
	  o gain insight on the views, preferences, and ideas of key audience types
	  o generate ideas for content, features, and functionality for a new website
	  o gather opinions about the user experience of an existing site
	  o gather demographic data
	  o identify domain knowledge, expectations, motivations, problems, and usage patterns and scenarios

Distribute Online Surveys	• Surveys are used to:
	  o gather user insight
	  o validate user interview findings

Activity	Description
	• Examples of surveys include demographic surveys, opinion surveys, and user satisfaction surveys • Surveys can be conducted both online or offline, through the mail or other distribution techniques

Develop User, Task, and Environmental Profiles	• Profiles are based on interviews and surveys
	• Profiles help to clarify the Who, What, and Where, which in turn helps us to flesh out the design strategy and further define users' mental models
	• Profiles:
	  o Clarify assumptions
	  o Further identify what website users need to do
	  o Allow us to hone in on things that affect design decisions
	  o Clarify variation and diversity among users
	  o Provide a starting place for prioritizing users

Create Persona Portraits	• Persona portraits:
	  o are derived from the user, environmental, and task profiles
	  o do not describe an actual person—they describe a fictitious person based on a synthesis of the information from the various profiles, and user interview findings
	  o provide composite examples of typical users
	  o should be kept in mind when making all design decisions
	  o feel psychologically real
	  o are concrete
	  o distinguish between developer desires and user needs
	  o help us keep the user in mind: "Will Abby find this feature useful?"
	• The general practice is to create 1 persona for each target user group. It is not useful to create personas for the less important user groups.

Conduct Card Sorts	• Card sorts are used to determine the best schema for organizing and labeling the information on a website or web application
	• There are two types of card sorts: open and closed
	  o open card sort—participants place items into groupings that make sense to them, and then label the groupings
	  o closed card sort—participants place items into pre-determined groupings that are already labeled
	• Card sorts can be done in person, using index cards, or online using a special web application.
	• Conducting card sorts online allows us to expand the exercise to many people in a highly cost effective way.

What's Next?

So what do we do with all the insight and information we have collected from stakeholders, usability experts, and users? Much like the pieces of a puzzle, we need to fit them all together in a meaningful way to shape a clear picture. This picture takes the form of various artifacts and documents that help us translate our design ideas into something tangible that can be shared with stakeholders, and test with users.
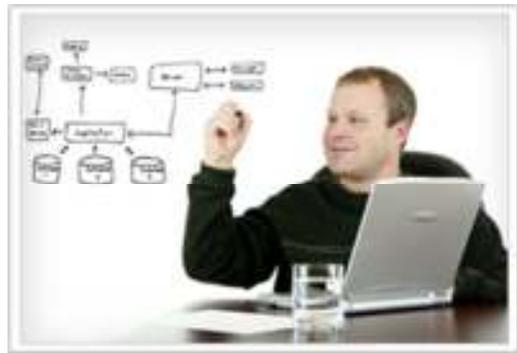
Sitemaps

Sitemap are one of the most important information architecture documents. They are used as a planning tool for helping to map out the organization of the content that will live on the website. You use them to lay out the main content categories of the website and chunk and group content and functionality. They depict all of the main, overarching categories, and the content pages or page types that live within those categories.

Sitemaps are often several pages long with the first page of the document showing an overview of the global navigation, and subsequent pages of the document depicting individual global navigation categories and their child pages. For large sites it's not always necessary or feasible to include all pages in a sitemap. Content inventories are used to document that level of information. It is generally recommended that the sitemap not exceed a depth of 3 or 4 levels or tiers of content.
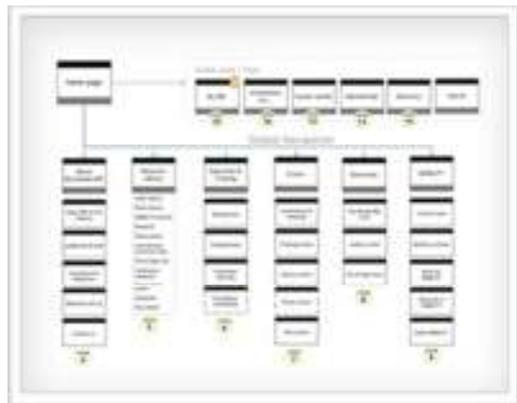
Figure 3. Example of a Sitemap

Content Inventories and Audits

A content inventory is the process and the result of cataloging the entire contents of a website. A related practice—a content audit—is the process of evaluating that content. Content inventories and content audits are closely tied activities, and are often conducted at the same time. To learn more about content inventories and content audits, read the paper entitled: "How to Develop a User-centered Content Strategy."

Link ID	Link Title	Document Type	Keywords	Description	Content Owner	Date Created	Date Updated
1.0.0	Widgets	HTML	widgets, history, widget	Widgets & Co. brings you the	H. Tuckerman	2/12/2009	11/15/2010
1.1.0	Transportation-related Widgets	HTML	widgets, history, transit, tr	Widgets & Co. brings you the	H. Tuckerman	2/12/2009	
1.1.1	Automotive Widgets	HTML	widgets, history, transit, tr	Widgets & Co. brings you the	H. Tuckerman	3/27/2009	
1.1.2	Airplane Widgets	HTML	widgets, history, transit, tr	Widgets & Co. brings you the	H. Tuckerman	3/27/2009	
1.1.3	Bicycle Widgets	PDF	widgets, history, transit, tr	Widgets & Co. brings you the	H. Tuckerman	3/27/2009	6/2/2010
1.2.0	Time Keeping Widgets	HTML	widgets, history, time, wat	Widgets & Co. brings you the	H. Tuckerman	8/9/2010	6/2/2010
1.3.0	Nutrition Widgets	HTML	widgets, history, nutrition,	Widgets & Co. brings you the	A. Powers	8/9/2010	
1.3.1	Food Processing Widgets	PDF	widgets, history, nutrition,	Widgets & Co. brings you the	A. Powers	8/9/2010	
2.0.0	Gizmos	HTML	gizmos, history, widgets	Widgets & Co. brings you the	H. Tuckerman	2/12/2009	5/9/2010
2.1.0	Matte Gizmos	HTML	gizmos, history, matte	Widgets & Co. brings you the	J. Rickards	3/27/2009	5/9/2010
2.2.0	Shiny Gizmos	HTML	gizmos, history, shiny	Widgets & Co. brings you the	J. Rickards	3/27/2009	5/9/2010
2.2.1	Glitter and Your Gizmos	PDF	gizmos, history, shiny, glitt	Widgets & Co. brings you the	J. Rickards	10/14/2010	
2.2.2	The Use of Lamé in Modern Gizmos	PDF	gizmos, history, shiny, lame	Widgets & Co. brings you the	J. Rickards	10/14/2010	
2.3.0	Why Use A Gizmo?	HTML	gizmos, uses, history	Widgets & Co. brings you the	H. Tuckerman	2/12/2009	
3.0.0	About Widgets & Co.	HTML	widgets, gizmos, geegaws,	Widgets & Co. brings you the	H. Tuckerman	2/12/2009	

Figure 4. Content Inventory

Wireframes

Wireframes are schematics that suggest the layout and placement of the fundamental elements on the various page types in a Web site. They are rendered in grey scale and are not meant to suggest graphic/visual design; e.g. colors, graphics, or fonts. Wireframes are completed before any artwork is developed, and must be approved before we continue onto the visual design phase.

Wireframes are low-fidelity, meaning you do not need to create them using actual content. The purpose of wireframes is to indicate where the potential information and interface elements that may appear on a page, not to depict the final content or visual design. For example, for an image or a block of text, you can simply draw a rectangle and place it where those items could be placed. You may have a block at the top of the page to represent global navigation, and blocks for the page header and footer; you may place a block along the side of the page to indicate local navigation, an advertisement, etc.

Figure 5. Example of a Wireframe

Test, Test, Test Your Assumptions!

Before getting too far down the design path, it is imperative that you put your design ideas in front of real or potential users of the website. Usability testing is used to validate assumptions and design decisions made during user-centered analysis and design. It provides measurable data on what works and what doesn't work with a design. It focuses on validating or uncovering issues with navigation, content, presentation, and interaction.

Usability testing will help you determine if the design matches the way users think, work, and expect the website to be. And it will help answer the questions: Is design is effective and satisfactory to users? Can users complete expected tasks?

A few tidbits about usability testing:

- It is performance-based testing, not preference-based
- It is used to gather real world feedback on your website design using realistic usage scenarios
- It can and should be performed iteratively at different stages of the design process
- It can also be performed on an existing website to help inform decision for a new website

Types of Usability Tests

Usability testing can be performed at various stages during the design phase. You can test early, at the wireframe stage, using simple paper prototypes or click-through models. These early prototype tests go a long way to ensuring that design decisions are on target before more serious visual design or build begins. Early prototype tests are used to test navigation systems, labeling, and general structure.

Further on in the process, more fully functioning prototypes are used to test detailed design, interactions, usability, and functionality.

Ways You Can Conduct Usability Testing

Usability testing can be performed either in person either informally in an office, or in a more formal setting, such as a usability lab, where sessions may be recorded and viewed by guests in an observation room. Likewise, usability tests can also be performed and recorded remotely, using special teleconferencing software.

Recorded sessions are then analyzed, and summaries of the key issues are provided as part of a key findings and recommendations report. The recommendations are then folded into the iterative design process in order to improve the design and make it more useful to users.

In-person usability evaluations are moderated by a facilitator who guides test subjects through various scenarios. Remote tests may be moderated or un-moderated.

Other Types of Research

You can use Comparison Studies to test two or more designs against each other, to see which one is most usable and best achieves your goals. With these types of tests, you compare task completion time, error rates, and number of clicks. You can also compare performance data versus preference data. Interestingly, sometimes designs that users say they like best are not the designs that yield the best user performance.

You can also do A/B testing to evaluate variations in specific messaging or labels within a design prototype where everything but your specific areas of interest remain the same. This can help you determine the best messaging and labeling to use for specific audiences to promote conversion.

Conclusion

In conclusion, user-centered analysis and design is a process that focuses attention on the needs of the user to determine things like content, features and functionality, information architecture, and visual design. By employing user-centered analysis and design, Associations, Non-profit organizations, and for-profit businesses can realize a high return on investment by:

- Increasing your website's value to your constituents
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About the Author:

Susan Ward is a practiced Information Architect/UI Designer, Instructional Systems Designer, and writer with over 17 years of experience designing client-side and Web-based applications, informational Web sites, e-commerce sites, and interactive multimedia e-learning programs.