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### Designing Effective Google Maps for Social Change: A Case Study of SmartChoices

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*Trinity College*

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Welcome!

**Designing Effective Google Maps for Social Change: A Case Study of SmartChoices**

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- [Google Mashups User Guide](#)
- [Data Representation in Student Affairs](#)
- [Redesigning Trinity's Campus Map: Coming Soon!](#)
- [Redesigning Professor Evaluations: Coming Soon!](#)
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## *introduction to* the project

This project focuses on the development of interactive, n benefit members of a community. Beginning with a look personalized maps and the start of the online mapping re the ways in which maps, specifically Google Maps™, can informative and useful online tools for community mem methodology for making a website intuitive, useful, and target audience and for community members of all levels literacy. Furthermore, this project will review methods f pages and for increasing awareness and usage of the site, those it is meant to reach.

### THE CASE STUDY

In addition, this project will focus on the creation and de SmartChoices website, a collaborative effort of Trinity C (Connecticut Coalition for Achievement Now). Each cha of the SmartChoices site through the stages of its develop consideration of the principles listed above, from the ne usefulness, accessibility, popularity, and aesthetic qualiti

Below are the links to each of the chapters of the project. Please enjoy!

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# 1 What Are Google™ Mashups?

*introduction:*

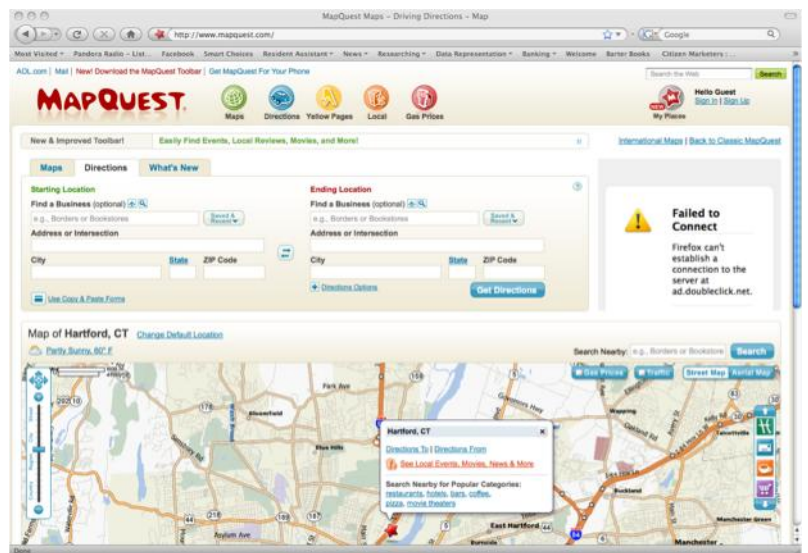
## the age of customization

Our world is becoming increasingly customizable; the music we listen to, the features of the cars we drive, the articles we see when we log onto a news website, the content of online encyclopedias, and even the sounds our phones make when we receive phone calls.

The 1996 launch of GeoSystems Global Corporation's (GGC) *MapQuest.com*, which received one million viewers in its first thirty days of operation, is a prime example of the age of customization. The website (shown at right), purchased by America Online® (AOL) in 2000, allows visitors to enter a start address and destination and obtain personalized, step-by-step directions on the best route to take (Layton, 1998-2009).

Travelers no longer needed to depend on interpreting a generic road map to chart their routes, as they now had the capability to receive tailored directions at the push of a button.

This concept of a personalized map, however, is not a new one. For years, the American Automobile Association (AAA) has offered its members a service called "TripTiks®" with which individuals can provide AAA with basic information about their starting location and destination for a trip, and a AAA representative will plot the best route with a colored marker on a paper map. Online mapping technology has made this service more practical, as it no longer requires a paid individual with a map and a marker to plot the route. AAA now offers this service online, on a website that looks and operates much like MapQuest®.



*MapQuest® Website*

The website offers its users customized directions from point A to point B, even zeroing in on the estimated location of the user upon visiting the site.

Without a doubt, technology has made many expensive personalized services available to the masses. This paper will focus on one such example of customization, the Google Map™ mashup, and will explore the ways in which this kind of personalized online map can be used to make a significant difference in a community.

### *a product of the age of customization:* the mashup

A mashup is defined as an online resource that combines data from multiple sources to create a more powerful, useful online tool. A term formerly used to define combinations of pre-recorded music, “mashup” is now used commonly to refer to online projects that amalgamate data from two or more preexisting sources to make one integrated product. In his book *Citizen Marketers: When People Are the Message*,” author Ben McConnell describes mashups as a by-product of the “Web 2.0” generation, wherein web users create a “hybrid combination of two or more data sources that when combined, create a new product or improve an existing one.” He describes the “Web 2.0” generation as “creating collaborative Web experiences when information is shared multilaterally.” Other “products” of this generation of web users include WebLogs (“blogs”), Wikis (like *Wikipedia.org*), and RSS (“Really Simple Syndication”) Feeds. He adds, “If “Web 1.0” was primarily one-way communication between Web-site owner and visitor, then Web 2.0 is multiple-way communication between Web-site owner and visitor, and visitors with other visitors,” (McConnell, 2006). In their paper “Map Mashups and the Rise of Amateur Cartographers and Mapmakers,” authors Elise Pietroniro and Darlene Fichter attribute the explosion of this kind of user-to-user information sharing to the expansion of Internet availability and the decrease in cost of personal computers, describing these as “fertile soil for the rise of citizen journalism and multimedia production by anyone for anyone” (Pietroniro & Fichter, 2007).

**THE GOOGLE MAP™ MASHUP** Google Map™ mashups, or “Google™ mashups,” use this mashup principle to create new maps by combining other sources of information with Google’s online mapping technology. While Yahoo!® and MSN® have also made their mapping systems available for use by the public, it is the simplicity of Google’s mapping technology that has allowed programmers to “borrow” its service for use in creating online map mashups (Miller, 2006).

Like ordinary maps, Google™ mashups display locations selected by the map's creator, but unlike most maps, anybody with Internet access can create a personalized map mashup, using one of several available websites designed to allow people to create their own personalized maps (some of which are shown later in the chapter, with more listed in the Appendix).

By and large, mashups reside on the website used to create them, and depending on the security settings selected by their creators, can often be edited by anyone with the correct login information (Hughes & Jackson, 2007). The result is essentially a three-layered online map, with Google Map™ technology at its core, the mashup website in the middle, and the mapmaker's personalizations on top (diagram shown at right).



*Three Layers of a Google™ Mashup*

A Google mashup consists essentially of three layers, shown in this diagram.

**A BRIEF HISTORY OF MASHUPS** The technology for personalized online maps first appeared in early 2005, when developers saw an opportunity to use the newly available online mapping capabilities to allow average Internet users to make their own maps (Hughes & Jackson, 2007). Miller (2006) explains,

*Not long after the launch of Google Maps™, alien data (i.e., data not provided by Google™) began appearing over its maps (those hosted by other site, anyway). These data were by turns curious and serious, clever and vital. Google Maps™ mashups (a subset of mashups in general) are the resultant combinations of the existing Google Maps™ geospatial query/display engine with geospatial data provided by non-Google™ users. In many of these mashups, the data are not even provided by ordinary users but merely collected by them. In fact, some of the most compelling mashups so far are the combinations of Google Maps™ with some other data source for which the masher-up (I'm not sure a noun has been established to describe this person: "mashero," perhaps) has no real responsibility.*

The popularization of Google™ mashups is attributed to software engineer Paul Rademacher after the creation of his website HousingMaps.com (shown below), which he created after becoming frustrated with the process of finding real estate listings in the newspaper and subsequently needing to look up the locations of each listing on Google Maps™. His website amalgamates real estate listings from Craigslist.com, a website that lists local classified advertisements in almost 600 cities worldwide, with Google™ map technology (Pietroniro & Fichter, 2007).

## CHAPTER 1: WHAT ARE GOOGLE™ MASHUPS?

The screenshot shows the HousingMaps.com website. The browser address bar displays 'http://www.housingmaps.com/'. The page features a search bar with 'City: Boston' and 'Price: \$1500 - \$2000'. A map of Boston is shown with many yellow pushpin markers. A pop-up window for a property in Braintree is open, showing a photo of a house and a swimming pool, along with details: '\$1,600 - 2bd Convenient to Braintree T (Red line) - Liberty St & Matthew Ln Braintree' and contact info '781-356-1345 / email'. To the right of the map is a table of property listings with columns for price, beds, description, city, and date.

price	bed	description	city	date
\$1550	1bd	711 or 811 Modern High-rise, walk to Harvard Square, parking incl.	Somerville	3/29
\$1800	1bd	All Utilities Included Great location Cambridge	Cambridge	3/29
\$1700	2bd	1Bed + Study + Spare Room 7min to T In-Unit Laundry/Dw.Ava 5/1 or 6/1	Somerville	3/29
\$1650	2bd	5/1 Giant Size 2 Bed+ Study Renovated/New Dw/Fridge/Dish Lib +Garage	Boston	3/29
\$1845	2bd	1,300 Sq. Ft. // // Two Bedroom/Two Bathroom Corner Unit	Quincy	3/29
\$1700	1bd	Huge 907 sq ft One Bedroom, Fitness Center/Parking Included	Waltham	3/29
\$1560	2bd	2 Bed/2 Bath Spacious Free Rent! Pet Friendly	Burlington	3/29
\$1635	1bd	Limited Availability! Spring Forward in Your New Home!	Bedford	3/29
\$1800	3bd	3/4 Bedroom 2 Bath 1,500 sq ft Ranch!	Oak Hill Rd.	3/29
\$1925	2bd	Large 2 BR - June 1st - Beautiful Location!	Boston	3/29
\$1600	2bd	2 plus bdrm Great Location! B&C Lines	Boston	3/29
\$1700		Modern Downtown Living!	Boston	3/29
\$1500	2bd	w/ 2 Full Baths	Boston	3/29
\$1700	2bd	Condo quality new 2 BR w/parking	Cambridge	3/29
\$1600	4bd	Luxury 4 Bedrooms Apartments	Lynn	3/29
		2bath/2orks/Heat & Wat.		

*HousingMaps.com*

The mashup shown above is the evolved version of one of the first instances of combining Google Map technology with information from another source. In this case, “mashero” Paul Rademacher combined Google mapping with real estate listings from Craigslist.com (Rademacher, 2009).

**MAKING A GOOGLE™ MASHUP** There are many available websites for creating Google™ mashups, such as *YourGmap.com*, *ZeeMaps.com*, and *MapBuilder.net* (each shown on the next page). Not every website follows the same format or provides the same features to its users. All Google™ mashup websites allow Internet users to input an address, which is then displayed on the map using a small pushpin-like marker (an example of which is shown at right), using Google map technology to place the marker in the right spot on the map. In many cases, several of a Google™ mashup’s features are customizable, such as the look or color of the pushpin markers, whether or not a map legend is included, and whether the map is displayed as a satellite image, a traditional map, or a hybrid of the two. Most mashup websites also allow users to decide what appears if the pushpin is clicked by someone viewing the map. Depending on the purpose of the map, the creator may choose to include certain details about the location, such as its address, a title (e.g., whose house it is or the name of the store or travel location), and perhaps more details specific to the purpose of the map, such as a review of the location, business hours, or a telephone number where appropriate. Many sites also allow users to upload pictures from their computers, so that corresponding images appear when a user clicks on each pushpin. What all Google™ mashup sites facilitate is the easy creation of Google™ mashups; individuals do not need any knowledge of html (HyperText Markup Language) or php (another scripting language) code to create somewhat complex web resources, and the maps’ visitors can easily navigate them.

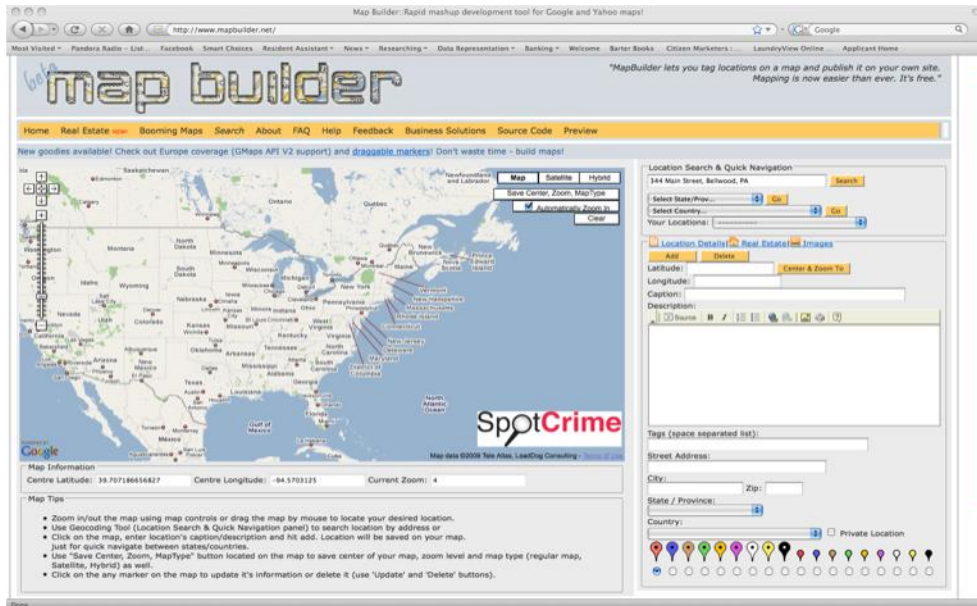


*Google™ Map Marker*

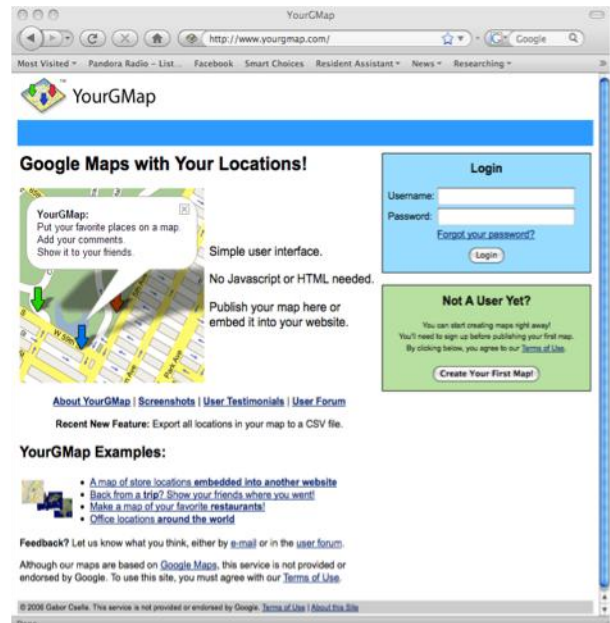
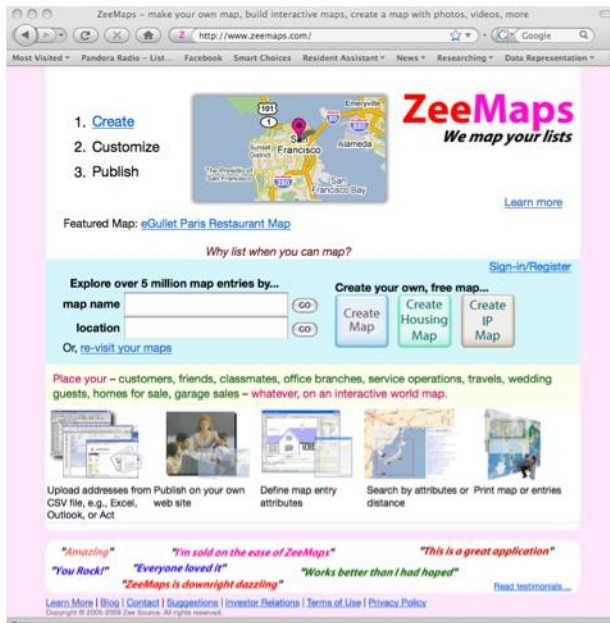
When a location is plotted on a Google map, the default marker looks like the one shown above, with several available variations (image from Maps.Google.com)



# CHAPTER 1: WHAT ARE GOOGLE™ MASHUPS?



Google™ Mashup Websites  
 YourGMap.com,  
 MapBuilder.net, and  
 ZeeMaps.com (shown  
 clockwise from top) are all  
 examples of websites  
 designed to let Internet  
 users create their own  
 online maps (Mashup  
 Technologies, LLC, 2005-  
 2009), (Zee Source, 2005-  
 2009), (Gabor Cselle, 2006).



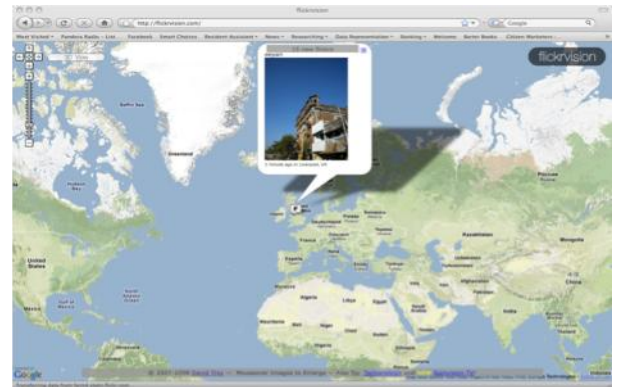
## 2 What Are Google™ Mashups Used For?

*google™ mashups:*

### how are they useful?

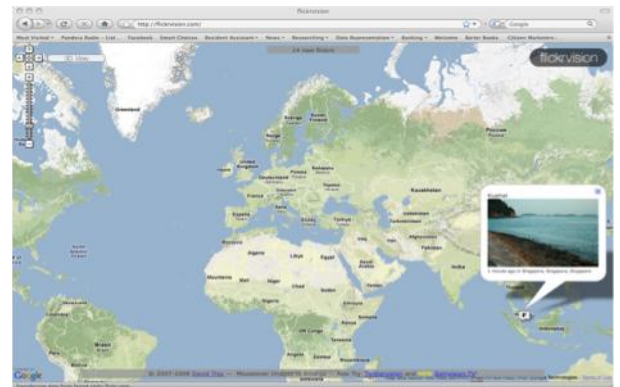
A Google™ mashup allows a user to visually display information in a way that other means of data representation cannot. Whether for personal reference or for the purpose of demonstrating an argument, when points are placed in their geographic locations on a map, some data become much more powerful.

**MASHUPS FOR FUN** Some mashups are made solely for entertainment purposes, although even these maps tend to have valuable qualities. David Troy's *Flickrvision.com* is a prime example. Created in 2007, Troy's mashup displays a constant real-time stream of photos as registered *Flickr.com* (a photo uploading and sharing website) users upload their photographs from different locations around the world. The *Flickrvision* map uses *Flickr API* to display a new bubble with a photograph uploaded moments before, with the pushpin placed on the "geotagged" location selected by the photo uploader, or if no location is specified, on the estimated location of the uploader (Lowensohn, 2007). The result is a mesmerizing, constantly changing website, broadcasting a steady flow of pictures taken around the globe (three examples shown) (Troy, 2007-2009).



*Flickrvision 1*

Displaying a photograph uploaded one minute ago in Liverpool.



*Flickrvision 2*

A few seconds later, another bubble pops up, this time showing a photograph uploaded in Singapore.

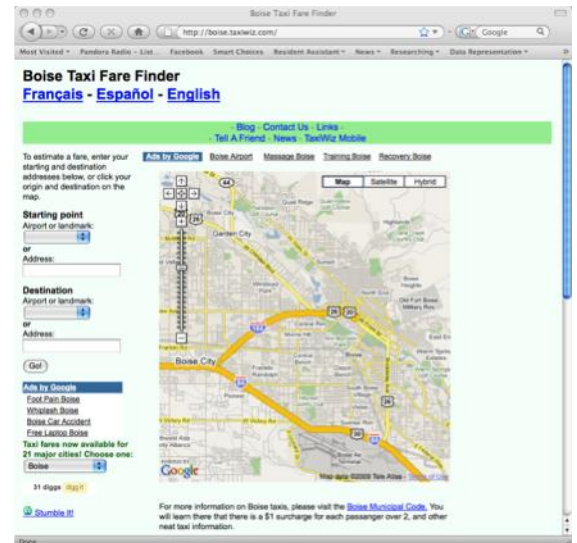


*Flickrvision 3*

This time the photograph uploaded comes from Cagliari, Italy.

Unlike any other stream of photos being uploaded by thousands of users, *Flickrvision* allows its viewers to conceptualize the locations of these photographs as the pushpins and bubbles jump around the globe to represent the location of the photo.

**MASHUPS FOR EVERYDAY LIFE** Adam Ostrow, Editor-in-Chief of *Mashable.com*, lists some of his favorite Google™ mashups in his article, “13 Must-See Google Maps Mashups”. Included in his top picks is a telephone prefix locator, which allows users to input the area code and first three digits of a telephone number and see a mapped estimated location of the call’s origin. Also on Ostrow’s list is a mashup entitled “TaxiWiz,” which lets users type in start and end points to a proposed cab ride and see the best route and an estimated fare, available for 21 major cities (shown at right for Boise, Idaho). Another popular mashup that Ostrow includes on his list is *WalkJogRun.net*, a map that lets users plot a route on the map by clicking a mouse, then calculate distance, time, and elevation. Users may even use their home addresses or zip codes to look up routes that have already been plotted by other users in their areas (Ostrow, 2007).



*TaxiWiz, Boise, ID*

*TaxiWiz.com*, available for 21 cities as of April 2009, allows users to enter a start and end address and receive an estimated cab fare for the trip (Taxi Wiz, Inc., 2007-2008).

These mashups are more complex examples of what is often a fun hobby for many individuals. For less technologically advanced individuals, a simpler mashup that plots the locations visited on a recent trip to Europe or favorite thrift stores in the US, can be equally entertaining. Pietroniro and Fichter (2007) explain, “In the same way that people can blog and share news stories, they are also creating online maps that can be a travelog, tour of their town or list of historical buildings.”

**MASHUPS FOR A CAUSE** While these mashups serve a useful purpose in providing users with helpful information, their primary functions do not involve making or supporting a claim. Online mappers have found another useful application for Google™ mashups, namely, creating visual representations of information that indicates or supports a need for change in a community. In the spring of 2006, Trinity College freshmen Jared Kazanovicz and Michael Miyashiro teamed up with a local Hartford organization, Hartford Areas Rally Together (HART), to create a Mashup of Hartford’s “Problem Properties,” hoping to meet a few ends. Prior to the creation of the map, all information on these buildings lived on paper at HART’s downtown office. The map’s first intention was simply to provide a visual representation of where Hartford’s run down and abandoned buildings are, allowing HART’s team to better conceptualize the information. The map’s second purpose was to allow HART to have a more efficient system for storing and retrieving their data on each property. The map’s creators also hoped it would serve as leverage for

both community activists and the owners of the properties themselves to work toward lessening the number of neglected and abandoned buildings in the city of Hartford. Furthermore, they hoped to eventually link the addresses of the problem properties to the number of 911 calls related to them, eventually finding a way to show Hartford residents the monetary price of maintaining the abandoned buildings.

In its completed state, the Problem Properties Mashup (shown here) includes more than 60 neglected properties in Hartford's Frog Hollow neighborhood, and has since been expanded to represent other neighborhoods as well (Trinity College, 2006).

Each pushpin, when clicked, reveals a picture of the lot or building, an address, Parcel ID number, and the owner's name, address, and phone number. Not only is HART now able to access its information as it is stored and organized on the Internet, but the contact information for the owners of the buildings was made available to the public. In Jane Gordon's May 2006 New York Times article "Mapping the Invisible City Outside Their Walls," HART's executive director Marilyn Rossetti explains her thoughts on the creation of the Problem Properties Mashup: "Now we're asking: 'What else can we do with this? Are there correlations to things?' ... It's one thing for a resident to go to City Hall and say, 'Here's what we think.' It's another thing to have a map and statistics. It makes people the experts" (Gordon, 2006). This kind of community-based Mashup will be the focus of this paper.

**Problem Properties** [\[back to index page\]](#)

The Hartford cityscape is dotted with abandoned buildings; the purpose of this map is to link these buildings directly to their owners. The neighborhood organizing group **HART - Hartford Areas Rally Together** - has long fought to improve every aspect of life in Hartford. Their strategy with abandoned buildings is to offer to help owners rehab their properties. As a first step, however, HART sometimes needs to provide some motivation for the owners to act. Making their names and numbers public is one tactic, which we've multiplied and broadcast with this map. Ultimately, we hope to link addresses with the frequency of 911 calls, and from there document just how much it costs the taxpayers of the city to maintain these wrecks.

The **Trinity Center for Neighborhoods (TCN)** and **United Connecticut Action for Neighborhoods (UCAN)** in association with the Comprehensive Communities Partnership Program of the City of Hartford have developed a manual and supporting documents to assist in collecting data about these properties and working with the owners to get issues resolved. You can [download these materials here](#). You can also download an excel file of the entire dataset [here](#).

Click on a legend item above to toggle it on and off.

Information on properties in Hartford (owner, address, sale date, etc.) is readily available through the Hartford Assessor's office (<http://www.hartford.gov/assessor/>). The specific properties listed on this page were identified as problems by Hartford Areas Rally Together (HART) (<http://www.hartnet.org/hart/>) and cross-referenced with 2003 data from the City Scan project funded by the United Way of Connecticut's Community Results Center (<http://www.city-scan.com/>).

Disclaimers

This website is part of an ongoing student project at Trinity College and is, thus, subsequent to additions, subtractions, and other alterations. Although all attempts are being made to present accurate and complete information, please recognize the variable nature of this work. If you are concerned that you are being unfairly represented on this site, please contact Rachael Barlow (860-297-4114) or David Tatem (860-297-2124).

Mash up created by: Jared Kazanovitz, Michael Miyashiro

Visitors since 4/19/06: **947**

*HART's Problem Properties Mashup*

The creation of this map not only helped HART organize and visualize their records of Hartford's abandoned and neglected properties, but provided the public with a database of these buildings and the contact information of their owners. Furthermore, the map serves as a powerful visual for community activists to act on this problem in Hartford (Trinity College, 2006).

### 3 *Introduction to the Case Study: SmartChoices*

*case study:*

## SmartChoices

In order to best outline the process by which an opportunity for a useful community-based mashup is discovered, I will track the development of the SmartChoices website, a project by Trinity College's *Cities, Suburbs, and Schools Project*, led by Professor Jack Dougherty, and ConnCAN (Connecticut Coalition for Achievement Now), a local nonprofit organization dedicated to bridging the racial and socioeconomic "achievement gap" in Connecticut's public schools.

**DEFINING A NEED** Hartford, Connecticut, advertised as "New England's Rising Star" is the state's poorest city and home to many of Connecticut's lowest performing schools (Simpson, 2008). In 2007, Hartford's Board of Education approved school superintendent Steven Adamowski's proposal for a city-wide "All-Choice" program, designed in an effort to overhaul Hartford's school system and boost student achievement in the city schools (Leavenworth, 2008). According to Adamowski's plan, beginning with the 2009-2010 school year, families with children in transitional grades would be required to submit applications specifying their top three school selections for the upcoming academic year. ConnCAN further explained the plan's rationale on their website:

*Hartford's initiative encourages school improvement by allowing parents to pick from public schools throughout the city for children who are starting elementary school or being promoted to secondary school. The size of Hartford school budgets will be determined by the number of students the schools attract annually. Popular schools will be able to grow to accommodate demand, while less popular schools will shrink or close based on parents' decisions.*

(ConnCAN, 2009)

However, many Hartford parents found this new policy confusing, as they were being asked to make important decisions for their children about schools that they knew very little about.

Additionally, the application process itself was overwhelming for many parents. *Hartford Courant* writer Jodie Mozdzer summarized her observations of the implementation of this “School Choice” system in her September 2008 article “School ‘Choice’ Dismays Some; City Outlines New Program.” In the article, Mozdzer describes parents’ confusion and, in some cases, disappointment in the new program, which some had hoped would allow their children to more easily enroll in schools *outside* of Hartford. She explained, “The new process could mean more paperwork for parents who aren’t sure whether they want their children to attend a public school or magnet school. To place a student at a magnet school in the city, parents will have to fill out a separate application through the Regional School Choice Office.” Mozdzer adds, “If [parents] don’t send in an application, the students will get a ‘deferred placement’ in one of the schools with the lowest demand from students” (Mozdzer, 2008).

Research shows that allowing for school choice in this way is most effective in increasing student performance, particularly for disadvantaged students, if parents don’t have easy access to information on schools’ performances on which to base their decisions (Hastings & Weinstein, 2008). So in order to decrease the number of students whose parents do not send in an application on their behalf, thus placing them in the least sought-after schools, Hartford parents needed a good way to obtain reliable information on the schools available to their children.

Jack Dougherty, Associate Professor and Director of Educational Studies at Trinity College, first began communicating with members of ConnCAN in August of 2008 about working on a project of common interest. Marc Porter Magee, ConnCAN’s Chief Operating Officer, and Tori Truscheit, ConnCAN’s Research and Policy Manager, explained to Dougherty the pressing need for some kind of handout to distribute to parents in the upcoming months to prepare them for the changes in Hartford’s school system.

The question that Dougherty and the members of ConnCAN were left with was, what kind of resource do Hartford parents need in order to facilitate educated school choice decisions?

In her 2007 article “Space and Place: Urban Parents’ Geographical Preferences for Schools,” author Courtney Bell explains that only between 1 and 3 percent of the 3.5 million parents entitled to switch their children out of failing schools (under the No Child Left Behind Act of 2001) actually do so. She summarizes past research that attempts to explain why so many parents do not choose better performing schools for their children when given the option:

*Scholars explain why parents choose failing schools in at least two ways. The first type of explanation focuses on the sub-*

*optimal nature of parents' decisions. For example, some scholars argue that urban parents, many of whom are single mothers, don't have time to adequately research choice options and thus are under-informed... Others point to parents who are uninterested in their children's education or make decisions that are somewhat less than "rational...". The second type of explanation focuses on market imperfections. There is not enough high-quality information..., there are not enough schools to choose from..., or there is not adequate transportation available to parents. (Bell, 2007)*

The rest of Bell's article, however, focuses on an overlooked contributor to parents' school choice decisions: geography. Based on her research, Bell deduced three diverse ways in which geography affects parents' decisions.

1. The school's distance from home: Parents consider the necessary logistics of sending their children to a particular school, such as whether or not they can easily get them there and back every day, or if adequate transportation is provided.
2. The school's "place": Parents consider what kind of neighborhood the school is in, what other people send their children to the school, and the school's overall environment.
3. The school's attachment to "resources": Parents consider the ways in which sending their children to a school requires utilizing resources, particularly social ones, such as assistance from friends or family members. For example, a school's location might require setting up a carpool or asking a friend to pick up the child every day after school.

**BRAINSTORMING A SOLUTION** So what kind of resource did parents need that would "counteract" the problems Bell describes associated with parents' school-choice decisions? I joined the team of individuals from Trinity College and ConnCAN as they began to brainstorm a solution to this question as a "participant observer," offering my knowledge of intuitive data representation design for the creation of a simple and informative tool. As a group, we recognized that this meant providing parents with something that gave them accurate information on school performance in a way that was simple and quick and that all parents could make sense of. Furthermore, we knew that we needed to design something that would spark parents' interest in selecting schools for their children. We would also need to be sure to advertise the many schools available for parents to choose from. And, perhaps most importantly, we needed to incorporate elements of geography into the data we provided,

showing parents where schools were located relative to their homes and what neighborhoods surrounded them.

Professor Dougherty recognized that this necessary information would not fit on a handout alone. He pushed for the creation of a digital resource for parents, which would supply them with as much pertinent information as possible. However, whether or not parents would be able to access an online, digital resource was an important consideration. In the City of Hartford, 28.2 percent of families live below the poverty level, 33.5 percent of residents aged 25 and older have never completed high school, and 45.4 percent speak a language other than English at home. The table at right compares Hartford’s statistics to those of the entire United States. These demographics were important to consider when setting out to create a tool for Hartford parents to utilize when making school selections.

**Estimated Demographics for Hartford and the United States**

	Hartford	United States
Families below the poverty level	28%	10%
Graduated from High School (aged 25+)	34%	84%
Speak a language other than English at home	45%	19%
Have access to the Internet at home	30%	62%

Sources: (U.S. Census Bureau, 2005-2007 American Community Survey, 2005-2007), (U.S. Census Bureau, Census 2000, 2000), (Millman, 2008), (U.S. Census Bureau, 2005-2007 American Community Survey, 2005-2007).

Two logical concerns arose: How do we ensure the intended audience is able to access this tool, and how do we certify that the website is usable by individuals with different degrees of computer literacy?

These questions, and many others, are what I will be addressing throughout this paper. The development of the SmartChoices website is an ideal example of a mashup created with the needs of a community in mind. As I will explain, not only does SmartChoices function as a tool that integrates information from multiple sources for the sake of sharing helpful information with the community, but the data it displays also makes a point on its own, in some instances indicating a need for change.



## 4 *How Can Google™ Mashups Help a Community?*

### *helping a community in* three primary ways

A website with a Google™ mashup can help a community in three primary ways. First, a mashup map can be used to present a community with data that has previously not been easily accessible to the public. Second, a mashup may be used to organize and represent data in a new, cohesive, and simplified manner for use by members of the community. Third, a mashup can be used to make a point and create change. There is, of course, much overlap among these three ways in which mashups are utilized to improve some aspect of a community; a very good Google™ mashup website may meet the criteria of each of these three goals. The mashups described throughout the rest of this chapter provide good examples of online tools created to serve each of these three purposes, though it is important to take note of where the three inevitably overlap.

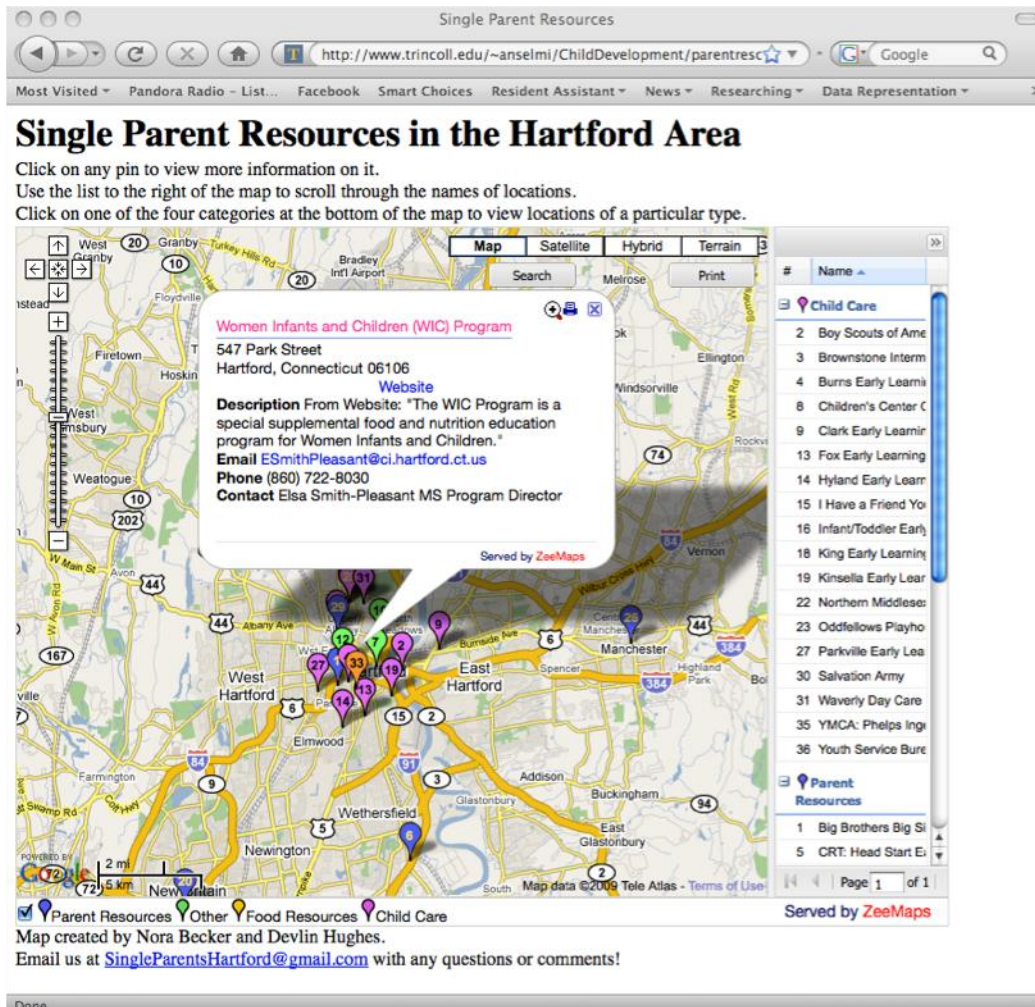
#### **GOAL ONE: PRESENTING A COMMUNITY WITH DATA PREVIOUSLY UNAVAILABLE OR LARGELY INACCESSIBLE**

A mashup that is used to present a community with data that was previously unavailable, or that was not easy to access, involves collecting and organizing data to be uploaded to a map. The mashup's creator must work to find information that is relevant and useful to the target audience. This information may come from several sources, and it is important to remember to cite these sources appropriately when making the data available online (see Chapter 9 for more information on citations). The mashup may aim to inform members of a community about particular resources in their area, such as museums and activities for parents and children, local restaurants, or places that provide student discounts.

**EXAMPLE: HARTFORD AREA SINGLE PARENT RESOURCES** A specific example of this kind of mashup is the “Hartford Area Single Parent Resources” map, created by two Trinity College students in their Child Development class in the fall of 2006. The goal of their project was to create an online tool that would allow single parents in the Hartford area to see a comprehensive list of available programs and other resources that benefit single parents – a kind of list that had not been compiled or published before.

To find the names of organizations meeting the criteria of being relevant and useful to the target audience (single parents in Hartford), the mappers met with employees of local nonprofit organizations to get the names and contact information of other organizations serving similar purposes. Additional organizations were located by searching the Internet. For each organization, they obtained an address, website URL, brief description, phone number, and email and fax number when provided.

The completed website (shown below) features a map of the greater Hartford area, with a list along the right side of the names of local organizations, which were sorted into four categories: Child Care; Parent Resources; Food Resources; and Other. Each category is represented by a different color, which corresponds with the color of the marker on the map. Each organization is then represented by a colored pin on the map, which, when clicked on, displays the name of the organization, its address, website, a brief description, and relevant contact information (names of people to contact with questions, email addresses, and phone and fax numbers) (Becker & Hughes, 2006).



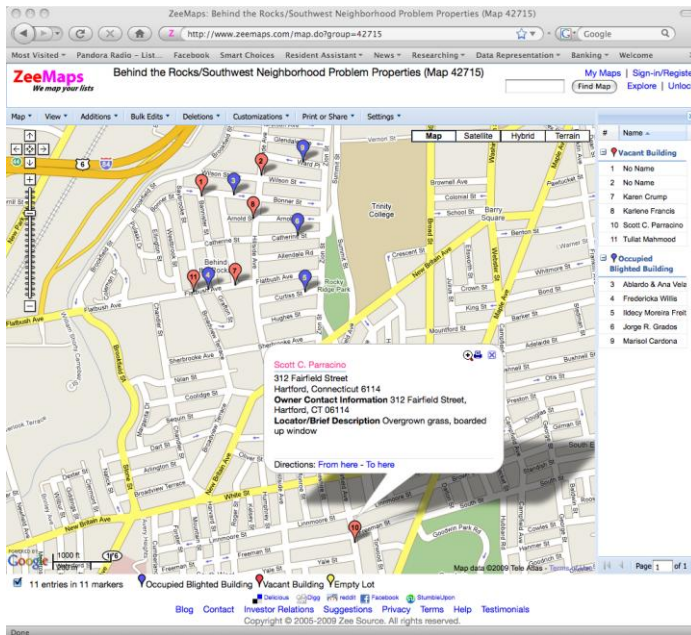
*Single Parent Resource Map*  
The result of the efforts of the Trinity students was a usable online resource that allowed Hartford parents to view the organizations in their area and obtain relevant contact information (Becker & Hughes, 2006).

The map's creators had two hopes in publishing it. First was that it would serve as a visual representation of the many, often underutilized organizations available to single parents in Hartford, and that it would inform parents of their existence and whereabouts. Second, its creators hoped that it would allow non-profit organizations included on the map to become more cognizant of each other, thus making referrals from one nonprofit to another easier. In making this web resource, the creators of the Hartford Area Single Parents Resources map were taking existing information and organizing it for simplified, easy access by parents and the nonprofit groups. Chapter 10 will discuss the additional materials used in this case to ensure that the individuals who would benefit from the map's material knew where and how to access it.

**GOAL TWO: ORGANIZING DATA IN A NEW, COHESIVE, AND SIMPLIFIED MANNER** A mashup designed and used to organize and represent data in a new, cohesive, and simplified manner involves less collection and more organization of existing data. This kind of mashup is appropriate when a significant amount of data on the subject already exists. An example of this type of mashup is the Problem Properties Map described in Chapter Two. To put this map together, its creators obtained paper records from members of Hartford Areas Rally Together (HART), who in turn had obtained these from the Hartford Assessor's Office, on the rundown and neglected properties in the Hartford area. Each paper record included a photograph of the building, its address, information on the last time it was sold, and the name and contact information for the current owner. The creators input the information for over 60 buildings from HART's paper documents to a large Excel file, including links to saved .jpg files of the pictures of the buildings. Once finished, the map visually displayed every building from HART's documents in its actual geographic location. The pushpins used to represent each property were color-coded based on the last purchase date of the property. The finished map (shown back on page 7) allowed viewers to visualize not only the locations but also the patterns in ownership length of Hartford's run-down buildings. Looking at the map, a viewer could see that most of the properties were located in Hartford's Frog Hollow neighborhood and were represented by yellow markers, which indicated sale dates after the year 2000 (Trinity College, 2006).

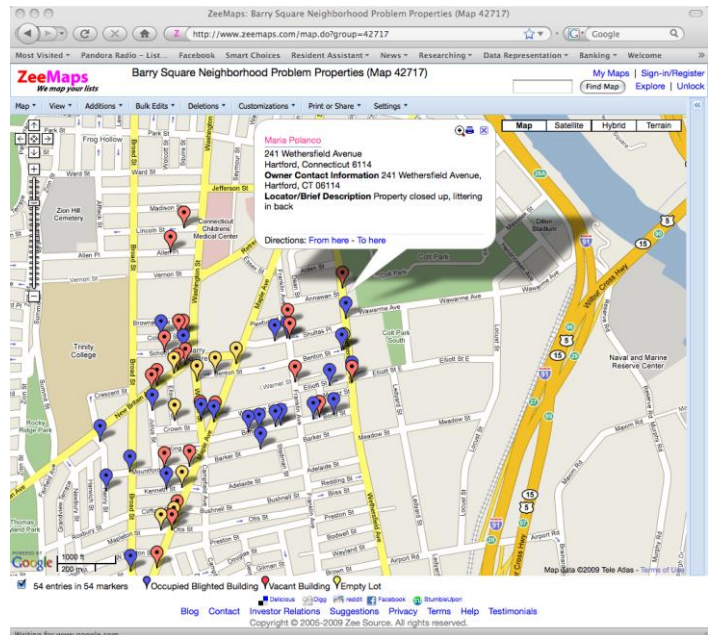
## CHAPTER 4: HOW CAN GOOGLE MASHUPS HELP A COMMUNITY?

HART went on to make several other similar “Problem Properties” maps, including maps of four of Hartford's neighborhoods (two of which are shown below). Different from the original 2006 Problem Properties map, these four color-coded the properties by occupancy descriptors, with a color each for properties that are Occupied, Vacant, or an Empty Lot (Hartford Areas Rally Together (HART), 2006).



*“Behind the Rocks” Neighborhood Problem Properties Map*

After learning how to make a Google mashup of their problem properties data, HART continued to map the rundown buildings in other areas of Hartford, including this one Hartford’s Behind the Rocks neighborhood.



*“Barry Square” Neighborhood Problem Properties Map*

HART replicated the original Problem Properties map to make this one of Barry Square, as well as two others (not shown) to link the blighted buildings to their owners by providing individual contact information.

These neighborhood maps and the original Problem Properties map all display previously existing data in a new and cohesive way, which allows anybody to access and learn from the information that would not have been possible in the data's original format. Creating this kind of map does not involve the same kind of groundwork research that maps like the Single Parents Resource map does, but often does require a significant amount of work to organize preexisting data into a cohesive format. In these cases, it is also important that the mashup’s creators do not overlook the importance of considering what information is worth including. They must consider what their target audience is interested in seeing, as well as what dimensions of data can be shown on the map itself (i.e., what is seen in the information bubbles when they are clicked, what is shown by the colors of the markers themselves, etc.).

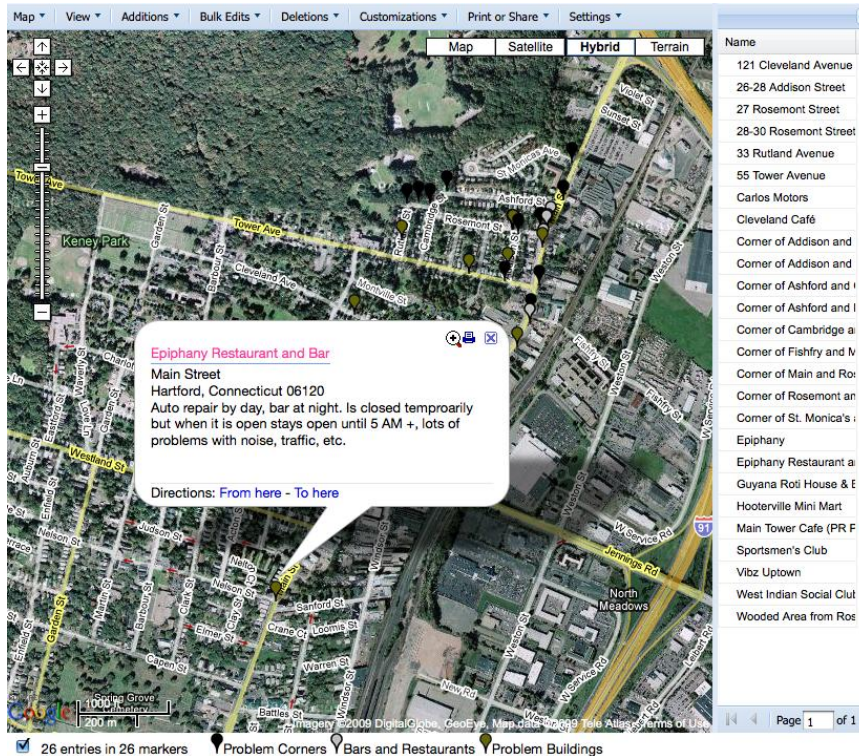
**GOAL THREE: MAKING A POINT AND CREATING CHANGE** The third way in which a mashup can be used to help a community is by aiming to make a point and promote change. In instances for which this kind of mashup would be helpful and appropriate, the data may already be available to the public, and may even already be organized and presented in some other online database. In other cases, the data may need to be collected and organized, as in the single parent resources map. However, what differentiates a map created primarily to promote change is the acknowledgment of a possibility to show something new to members of or leaders in the community by combining the current data with a visual, geographical representation of it.

In September of 2007, Alta Lash, Executive Director of United Connecticut Action for Neighborhoods (UCAN) met with a group of Trinity Students to discuss the issues plaguing the neighborhood of North Hartford. In the meeting, Lash explained that North Hartford, once an attractive, working-class neighborhood, had begun to see significant changes in its local businesses and residents. Main Street, which runs right through the neighborhood, had recently become the home to an abundance of bars and restaurants, which would open as night clubs after hours, known for loud activities that would continue late into the evening. She explained that local restaurants and food vendors had begun practicing irresponsible food-disposal habits, which invited large numbers of rodents to the neighborhood. Other businesses on Main Street, including a used car dealership and several convenience stores, had become places of business for local drug dealers. An increasing number of abandoned buildings and empty lots had also become a significant problem, as these places not only served as eye-sores for the neighbors, often littered with garbage, structurally unsound, and sometimes emitting odor, but had become permanent illegal residences and businesses of many local drug dealers. North Hartford residents were able to provide Lash with several problematic street corners known to be locations for regular drug deals and public consumption of alcohol. Additionally, residents could pinpoint wooded areas within the residential portion of the neighborhood that had become the locations for weekly drug deals and popular spots for drug users.

Together, Lash and the Trinity students, led by Professor Dan Lloyd, devised a map mashup to consolidate and conceptualize the information. They hoped that creating a visual representation of the locations of businesses, empty lots, and abandoned properties would allow them to better present North Hartford's problems to community activists and local politicians with the ability to make changes.

The completed “North Hartford Project” map (shown below) included 26 locations, sorted each into one of three categories: Bars and Restaurants, Problem Buildings, and Problem Corners, represented by gray, green, and

black pushpins, respectively. When clicked, each pushpin marker revealed an information bubble that included the name of the location (i.e., “Epiphany Restaurant and Bar” or “Corner of St. Monica’s and Main Street”), the street address, a brief description of the location (example shown below), and contact information for the owner, if available (Zee Source, 2007).



*North Hartford Project Map*  
The North Hartford project map plotted reports of illegal activity and property neglect for the sake of showing community activists in the hopes of improving the condition of the neighborhood. (Zee Source, 2007)

In a way that a list or table could not, the map revealed the exact locations of the problem businesses, empty lots, abandoned buildings, and wooded areas, allowing viewers to see where clusters of problems existed.

How did the capabilities of Google™ mashups relate to the need for school choice information in the Hartford community? The following section discussed how the purposes of the SmartChoices website measured up to each of these three goals.

*case study:*

# SmartChoices

In creating the SmartChoices website, we hoped to design an online tool that would meet all three of the goals of a Google™ mashup website, keeping in mind that our target audience included Hartford parents, school administrators, and members of school and education-related organizations. **FIRST**, we wanted to provide the Hartford community an easy way to obtain a conclusive list of the schools available to their children.

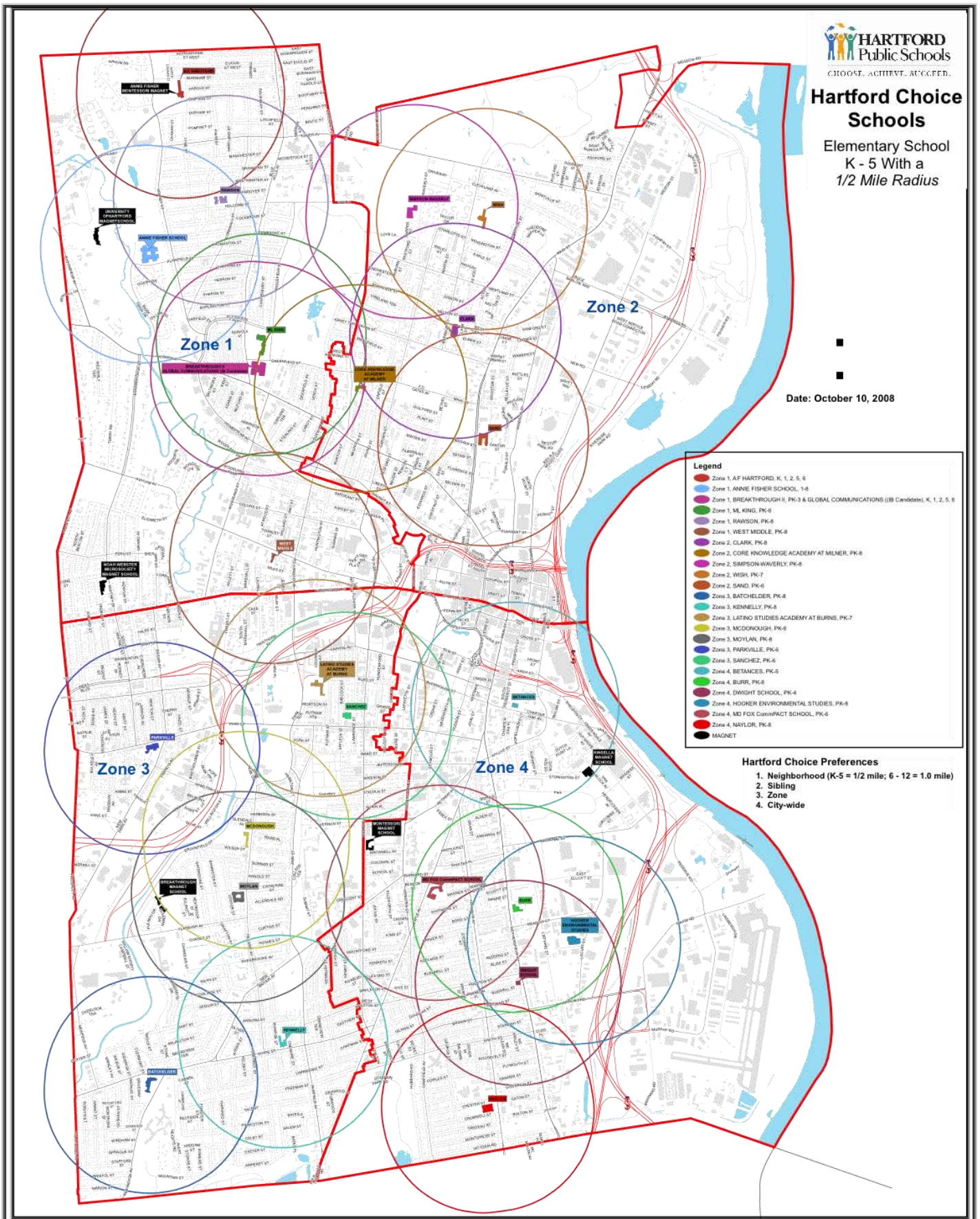
**SECOND**, we wanted to present parents with succinct information about each school available to them, in an effort to provide them with the data needed to help them make an informed decision; do to this, we knew we would need to gather information from many sources (creating an extensive mashup).

**THIRD**, we knew that in creating a website that included this kind of information, we would also be exposing some facts about local schools that would likely spur school administrators, politicians, and other local activists to seek change in some aspects of Hartford's school system.

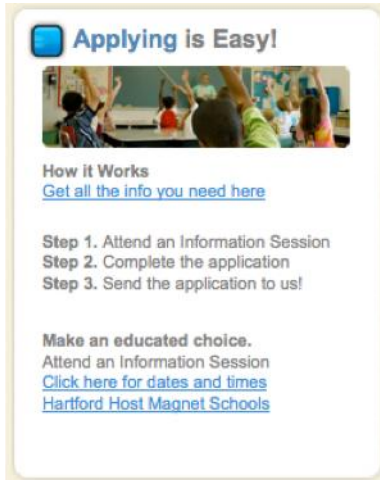
**MEETING GOAL ONE** In the Spring of 2008, a new settlement was reached in the Sheff vs. O'Neill case, which had determined 12 years earlier that Hartford schoolchildren were not receiving equal opportunities in schools due to both racial and socioeconomic segregation of neighborhoods. This new settlement created the Regional School Choice Office (RSCO), which was now responsible for managing the application process for the growing number of charter, magnet, technical and agricultural schools, as well as the Open Choice program, which allows children in the city of Hartford to attend local suburban schools. Furthermore, Hartford schools superintendent, Steven Adamowski's, newly implemented "All-Choice" program now allowed students in Hartford to attend any school in Hartford, no longer only those in their "zone". As such, a new "Choice Office" was created to help guide parents through this new choice program.

*HPS Hartford Choice Schools Map  
(shown on next page)*

This complex map of Hartford's school zones was provided to parents who attended the Information Sessions advertised on the HPS website. From this map, parents were expected to determine which schools their children were eligible to attend. Imagine being given a copy of this map in an 8.5x11 piece of paper! (Hartford Public Schools, 2008).







*Hartford Public Schools Website*

Above is the portion of the HPS website that explains the three steps required of parents in the application process that is a part of Hartford’s new public school “Choice” program. The website does not provide parents with simple information about which schools their children are eligible to attend nor about the performance of each school (Hartford Public Schools, 2008).

Parents were now given a huge number of choices of schools: different types, curricula, and locations. At this juncture, parents who wanted a list of schools for their children needed to call or visit the Regional School Choice Office (RSCO) or attend a school choice fair or information session, held a few times a year at various locations in Hartford. Parents who attended these events were often given a copy of the current school zone map (shown on the previous page) a cryptic representation of the school zones. Most parents found the map confusing and unhelpful. As of the fall of 2008, the Hartford Public Schools (HPS) website ([www.hartfordschools.org](http://www.hartfordschools.org)), did not provide parents with any information regarding what schools are available to their children, and instead directed all inquisitive parents to information sessions (instructions provided on the portion of the HPS website shown at left).

Our intention in making SmartChoices was to provide an easier alternative to the current map handout and the confusion parents experienced when faced with numerous school choice options coming from two different providers: the Regional School Choice Office and Hartford Public Schools. To meet our first goal of providing parents with a conclusive list of schools available to their children, we first needed to collect information on the exact locations of school zones in Hartford. This data then needed to be uploaded to a Google™ Map, a complex task requiring advanced mapping software (ArcGIS) and the latitudinal and longitudinal coordinates for the entirety of the school zone peripheries. Nick Bacon, Trinity '10 and Jesse Wanzer, Trinity '08, a research fellow with ConnCAN (Connecticut Coalition for Achievement Now) and member of Professor Dougherty's *Cities, Suburbs, and Schools Project*, was responsible for digitizing the school boundary lines (“polygons”), so that a parent could input his or her address and immediately see a red boundary line appear on the map, outlining the school zone in which their house is located. Meanwhile, Dougherty worked to put together a complete list of city and suburban schools in the metropolitan Hartford region, their locations, what grades they served, and other relevant information about each school, in the form of an Excel file. This way, a parent could input their child's grade and limit the search to grade-appropriate schools.

Dave Tatem, Trinity College’s Instructional Technologist, met with Dougherty and members of the *Cities, Suburbs, and Schools Project* to outline a general approach to the creation of the project and offer guidance on interface issues. He assisted Wanzer in the creation and cleanup of the

school district polygons and converted the data to Keyhole Markup Language (KML), a file format that allows the data to be read by Google Maps™. Once these data were collected and organized in a format readable by the mapping technology, Jean-Pierre Haeberly, Trinity College's Director of Academic Computing, completed the more technical programming aspects of the website, creating the computer code for the search application that brought together the address input by the parent, the Google Map™, and the database of schools eligible for a student living at the address provided. Haeberly's work allowed parents to search their addresses, see a pushpin appear on the map in the locations of their homes, surrounded by the red line around the periphery of their individual school zones, and obtain a full list of the schools available to their children, the distances of each school from their houses, and other information discussed in the next section.

**MEETING GOAL TWO** While this information alone would have served the purpose of presenting Hartford parents with a conclusive list of schools that their children were eligible to attend, information which had existed formerly but had not been easily accessible by members of the community, we wanted SmartChoices to provide parents with more data to allow them to make educated school choice decisions. Specifically, we wanted to synthesize data from multiple sources in a new, simplified way, thus meeting the second goal of our mashup. To do this, we needed to collect data that would be relevant and of interest to our target audience, which included Hartford parents, school administrators, and other local organizations with focuses on education, such as the Sheff Movement Coalition (an organization devoted to promoting racially integrated classrooms). After interviewing individuals from each of these three subgroups within our target audience, we concluded that the important information to include about each school was: the school's full name and who manages it (e.g., Hartford Public Schools, Capitol Region Education Council, Connecticut Department of Education, etc.), the school website, street address, its distance from the searched address, what grades the school is currently accepting, information on the racial balance of the school, recent test score performance, and a section for “more information,” such as instructions for applying and what applicants are given preference, if any. We hoped to advertise SmartChoices as “one stop shopping” for school information, providing parents with information from many sources in a way that no existing resource did.

In order to obtain data for each of the categories we planned to include on the site, we had to utilize several resources.

**SCHOOL, ADDRESS, MANAGEMENT, AND GRADES** To amass the list of all schools for the 2009-2010 school year, information on the school management, and the grades each school was

currently accepting, Dougherty used a combination of data from the Connecticut State Department of Education (CSDE) Strategic School Profiles (hundreds of individual .pdf files for each school or district available for download from the CSDE website), the Hartford Public School website's School Choice list, the Regional School Choice Office's (RSCO) School Choice list, the Capitol Region Education Council (CREC) website, as well as a few individual suburban district websites for any schools that had opened recently enough that they had not yet been included in the CSDE database.

**DISTANCE** The distance between the input home address and each school was calculated using Google Map™ technology, as programmed by Haeberly. Given the geo-coordinates provided by the user's address, and the geo-coordinates of the schools stored in the database, the straight line distances between the two points were calculated within the database.

**MORE INFORMATION** Each school's data for this section was only included if it was posted publicly on a provider's website. Some of the data regarding preference (i.e., if the school indicated whether preference is given to students with siblings already attending the school, or those who live within the school zone) came from the RSCO website, other preference information was obtained from the HPS website.

**RACIAL BALANCE** To obtain the most recent data on the *racial balances* of Hartford's schools, we visited the Connecticut State Department of Education (CSDE) website, where Connecticut Public School Enrollment Data is available for download on Microsoft Excel spreadsheets. Specifically, we used the file titled "Public School Enrollment, Race and Gender by Grade, School, and District." It is important to note that, while this data was the most recent available, it was also one year behind, collected in October 2007. We then had to organize the data from these spreadsheets to fit our own master spreadsheet, from which the website searches would obtain information. Chapter 7 will cover how we chose to represent this data in a way that was most legible to viewers.

**TEST SCORES** Data on a school's performance on state exams was obtained from ConnCAN. For grades three to eight, ConnCAN used performance reports on the Connecticut Mastery Test (CMT), a standardized test administered once a year to Connecticut students in third to eighth grade, which tests students in math, reading, writing, and (as of 2008) science in grades 5 and

8. For grade 10, ConnCAN used performance reports for the Connecticut Academic Performance Test (CAPT), a standardized test given once a year to Connecticut's tenth graders, which also covers math, reading, writing, and science. The CMT and CAPT reports are available to the public online on the Connecticut CMT and CAPT Online Reports website. ConnCAN calculated schools' performances on these tests depending on the type of school. For each elementary school, ConnCAN found the average CMT score for the school's third and fourth graders in 2007 and compared it to the average CMT score for the school's fourth and fifth graders in 2008, intending to show change in student performance from one year to the next. Similarly, for each middle school, ConnCAN calculated the average CMT score for its sixth and seventh graders in 2007 and compared it to that of its seventh and eighth graders in 2008. Using this method, each school with adequate data to complete these calculations was given a "One Year Gain" score from 2007 to 2008, a number which could be positive, negative, or zero, depending on the students' performance changes. For each high school, ConnCAN simply used the average CAPT score of the school's tested tenth graders in 2008, as there is no way to compare scores as the elementary and middle schools do, because only tenth graders take the CAPT (Cities, Suburbs, and Schools Project at Trinity College & ConnCAN, 2009). Again, Chapter 8 will also cover how we chose to represent all of this data in a viewer-friendly way.

**MEETING GOAL THREE** Although the SmartChoices website was designed to be a resource for Hartford parents, school administrators, and nonprofit organizations, we understood that some of the information we gathered to display on the website would, as the third goal of Google™ mashups explains, make a point. As we calculated the racial balances of many of these schools, obvious discrepancies evidenced; some schools consisted almost entirely of Black and Hispanic students, while others were almost entirely White. Test scores also appeared likely to be a source of controversy; most of Hartford's schools were performing significantly below the Connecticut state average at every grade level, and many of the region's prized magnet and charter schools showed drops in test score performance from 2007 to 2008. We expected that several school administrators would be displeased to see their schools' uneven racial balances or below-average test scores displayed in a clear manner for the public.

## 5 Addressing a Need: What Communities are Good Candidates for a Website with a Google™ Mashup?

*introduction:*

### a community that can be helped

Communities that are most helped by a Google Map™ mashup generally exhibit a few key commonalities. In this chapter, I will discuss four common themes found in communities that tend to benefit from a well-made mashup website.

**DISCONNECTION BETWEEN RESIDENTS AND RESOURCES** One central characteristic of communities that can be helped by a well-made Google Map™ mashup is *disconnection*. A community in which many residents are unaware of local resources or information will likely benefit from a mashup that portrays these things. For example, a map that displays local attractions for parents and children, along with contact information, hours of operation, and a brief description, facilitates the planning process for a family weekend by putting all relevant information in one place. Viewers of this kind of map are not only able to conceptualize the locations of many resources around them, of which they may have been previously unaware, but they have access to other information they might want before selecting which resource to utilize. A good mashup, as indicated by its name, “mashes” together information relevant to its users, obtained from multiple sources, thus saving the research for the mapper, not the users.

**DISCONNECTION AMONG RESOURCE PROVIDERS** Secondly, a community will benefit from a mashup if there appears to be a disconnection among the organizations providing the resources. If a community is home to many organizations with similar or related missions, each of which is largely unaware of the many similar organizations around them, they too will benefit from a mashup that displays the locations and basic information about each organization. In creating such a map, not only are individuals more likely to find and utilize such resources, but also employees of these organizations are more likely to combine efforts with similar institutions and are more able to refer clients to these other resources.

**A REASON FOR MAPPING** Thirdly, there needs to be a logical reason to turn the information into a map. If, for example, a person wished to make a mashup of the stores in a local mall, little would be shown or accomplished by mapping the locations. A good map mashup publicizes locations throughout a community, providing useful information on each one. Alternatively, a good mashup displays the locations of problems (such as locations of reported thefts or abandoned vehicles) for the sake of publicizing and conceptualizing a local issue in the hopes of promoting change. Good mashups all have something to show – whether it be a plethora of local farm stands or a pattern in the locations from which cars are broken into. A Google Map™ mashup of all the stores in a shopping mall would not be a helpful tool because all the points on the map would be very closely clumped together and it would not serve any purpose to direct individuals to the locations of the stores. However, if a map of an area's local soup kitchens were to reveal that they are all within two blocks of each other, even though the locations on the map would also be clumped together, this map would be showing something to its viewers – namely, that the community's soup kitchens are not well geographically distributed.

It is important to keep in mind that a map is not the solution to every data display need, even some that are geography-related. There are some ways in which map mashups hide patterns in the data, including certain frequencies. The map mashup will allow viewers to see areas in which there are several of whatever is being mapped, but they can also hide other frequencies. For example, in the case of the Hartford Areas Rally Together (HART) Problem Properties map discussed in Chapter 2, if HART members wanted to see who the most problematic absentee property owners were, the map mashup would not facilitate this search. Alternatively, tabular representation that included a column for “owner name” would reveal whether or not there were several properties owned by the same person.

**REASONABLE ACCESSIBILITY** Lastly, the community that the map is meant to benefit needs to have adequate access to the map; specifically, members of the community must be able to access and use the Internet. As you may have noted, many of the community-based map mashups discussed thus far were created to benefit individuals who are often from low-income households, and thus may not have easy access to the Internet at home. It is important to consider the likelihood that a map's target audience will be able to access it without too much trouble. For many communities, the target audience's Internet access may come largely from local libraries and Internet cafés. If Internet access in a community is particularly rare, it may not be worth creating an online map for use by residents. However, because many communities have access to the

Internet at a local library or other locations, and because digital resources are often able to convey significantly more information than a reasonable printout could, a map mashup is a good option if people can access it from local libraries and other locations. Instead of expending energy and resources looking for a way to fit, print, and distribute all of the information from a mashup onto a printed document – a futile effort as the interactivity of map mashups is not transferrable to paper – this energy is better spent encouraging community members to use the online resource. A good online resource will be sought by those who need it, even if it requires a trip to a library or relative's house. Also important for the mashup makers to consider is the computer literacy of those meant to benefit from the map. Chapters 6, 7, and 10 will cover the important considerations in making a website easy to use, accessible, and well publicized.

How did the SmartChoices website compare to these criteria? The next section will go through each one individually.

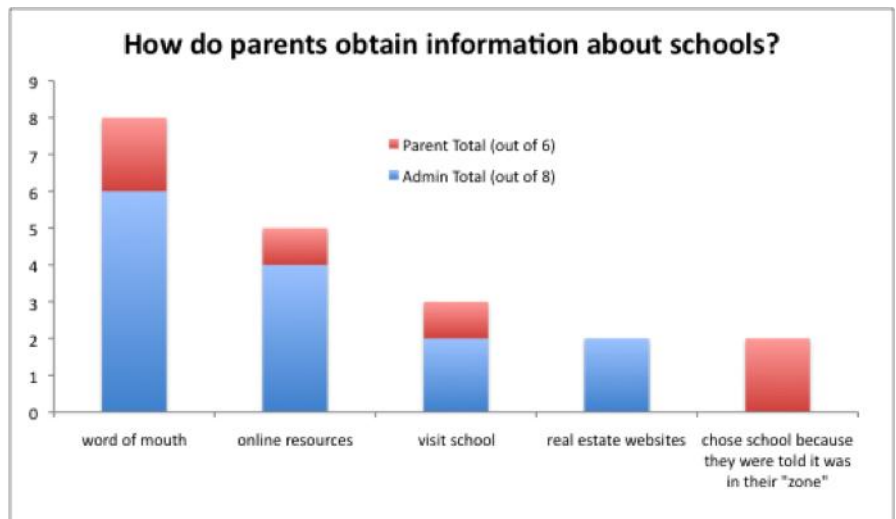
*case study:*

# SmartChoices

Before designing an elaborate resource for parents, we acknowledged that the Hartford community for which we were designing the site met each of the qualifications described in this chapter. This section looks at each of these and how SmartChoices compared.

**DISCONNECTION BETWEEN RESIDENTS AND RESOURCES** It was the dissonance between the existence of relevant information for parents to make educated school-choice decisions, and the extent to which parents were able to access that information that originally caught the attention of Dougherty and members of ConnCAN. As introduced in Chapter 4, browsing the Internet for information on the performances or quality of individual Hartford schools, especially in a way that allowed comparisons among schools, produced few results. Although all of the sources that we used to obtain racial balance and test score data for every Hartford school were available to the public, as explained in Chapter Four, most parents were either unaware of how to find this information or were not sure how to interpret it.

In December of 2008, one month before the release of SmartChoices, members of the *Cities, Suburbs, and Schools Project* held focus group interviews with Hartford parents and school administrators, which revealed much confusion on the part of parents, and even some administrators, regarding which schools their children were eligible to attend. Furthermore, parents reported that they were largely unsure of how to obtain “official” data on a school's performance and often relied largely on word of mouth to obtain information on the quality of a school (Parent and Administrator Interviews, 2008). The table to the right shows the responses of parents and administrators when asked to explain how parents usually retrieve information on local schools. Given that most parents and administrators reported that parents obtained school information through “word of mouth,” the dissonance between existing information and parents' access to it became very clear to us.



*Focus Group Data*

When the group of Hartford parents and school administrators were asked how parents typically get information on schools, the majority reported that information was shared through word of mouth.



**DISCONNECTION AMONG RESOURCE PROVIDERS** Also present within the Hartford Community was a similar disconnection among the organizations providing the services; in this case, these organizations were the schools and their administrators, and local nonprofit organizations with focuses in public education. The December focus group interviews revealed that several administrators were often just as uninformed as parents regarding the school system and application process. In discussing the beta version of the SmartChoices website at the focus group, one administrator requested:

*“I would love [to see explanations of] ‘All Choice: What is all Choice?’ ‘Project Choice: What is Project Choice?’ ‘Open Choice: What is Open Choice?’ [laughs]. Because I can’t believe I’m confusing that! And I know that parents are confused about that as well, because, like I said, obviously I’m not able to answer all the questions...and parents have come up to me and said, ‘If I want to be a part of Project Choice, what options does that give me? If I want to be a part of Open Choice, what options does that give me?’ I mean, I’ve had that exact question.”*

(Parent and Administrator Interviews, 2008)

**A REASON FOR MAPPING** The information we planned to include on the SmartChoices site made sense to be displayed as a map. In addition to Bell’s explanation of the influence of geography on parents’ school choice decisions (as described in Chapter 4), both parents and administrators in our focus group interviews named “distance from home” as the most frequent answer to the question “What are important factors to parents choosing a school?” (Parent and Administrator Interviews, 2008). By mapping the actual locations of the schools, parents would better be able to conceptualize the whereabouts of each school, which was valuable information to them. Additionally, the way the database was constructed allowed the website to calculate the exact distance between the searched address and each school.

**REASONABLE ACCESSIBILITY** Internet access was a concern in creating SmartChoices. In 2006, Hartford Mayor Eddie Perez announced that two-thirds of Hartford residents were still without a home Internet connection (Millman, 2008). Despite this, we decided that the information that we could share with parents using an interactive map mashup far outweighed anything that we could afford to print as an informative handout. Furthermore, we believed that we would be able to publicize the site well enough that Hartford parents who may not have access to the Internet at home would be inclined to utilize a public Internet connection in order to access SmartChoices. Chapter 10 will discuss the best ways to publicize a map mashup to a community.

Upon considering each of these “qualifications” of a community that could be helped by a map mashup, we found that Hartford did indeed meet each one. However, we knew that some characteristics of our target audience would require additional consideration as we designed the site. The next chapter will discuss issues of website usability, which are particularly relevant with a target audience like SmartChoices’.

## 6 *Making a Website Intuitive*

### *introduction:*

## an intuitive website

It is a good idea to make any public website intuitive to use, regardless of the computer literacy of its predicted users. However, it is of course especially important to consider ways to increase a website's ease of use when working to create an online resource for a target audience that includes individuals who do not frequently use computers. The success of a website depends on its usability, usefulness, and even the extent to which users find it aesthetically pleasing.

A website's "intuitiveness" refers to the extent to which its layout, functions, and means by which a user retrieves information are instinctive. A highly intuitive website is easier to navigate, operate, and gather information from for people of all levels of computer literacy, than is a website that requires more experience with computers to use. Making a website intuitive is important for casting a broad net of users. An ill-designed screen layout can cause users to take more time and be less accurate in their performance of a task (Streveler & Wasserman, 1984).

This chapter will outline 12 basic guidelines for creating an intuitive website, based on research that has looked at both human-data interaction and human-computer interaction.

### *summarizing*

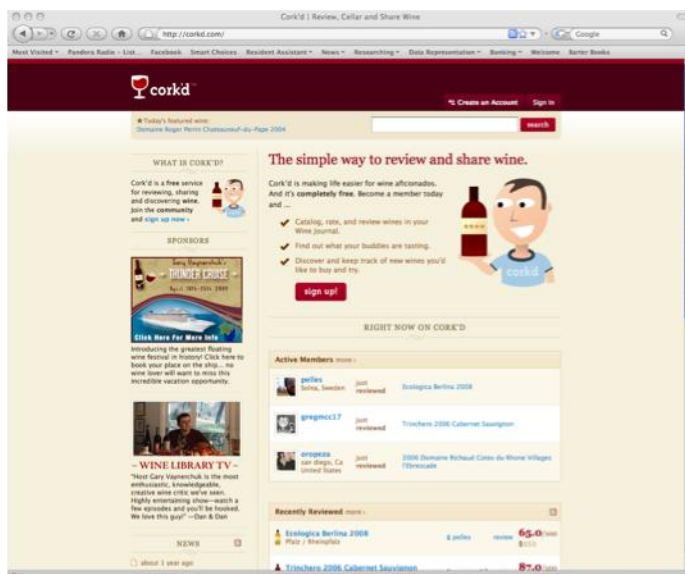
## what the research says

**WEBSITE VISITORS HAVE A GOAL IN MIND** Individuals who visit a website generally do so to find the answer to a question already in mind (Wright, 1982). Website viewers very rarely read the website in its entirety, instead, they scan it to find the information they are looking for (Redish, 1989), so it is important for a site's creators to keep in mind the importance of making information easy to find, in order to avoid losing viewers. Readers who are unable to find what they came for usually stop reading (Vaiana & McGlynn, 2002). Nielsen (1996) adds that web users who experience difficulty in trying to use or navigate a website are likely to give up and begin searching for more usable sites. So what advice for webpage design can we derive from the results of this research?

**RULE 1: TELL VIEWERS WHAT THE WEBSITE OFFERS** Because web users generally come to a website seeking specific information, it is important that the site tell them right away whether or not it contains information relevant to their search. A good website homepage should tell its viewer what the website contains and should make it clear how to use the site (Schenkman & Jönsson, 2000). The homepage of the site should explain right away what the purpose of the site is. If the website is a representation of a company or organization, the site should clearly state what the name of the organization and what it does. Don't leave viewers guessing or assume that they know more than they do.

**RULE 2: MAKE THE TEXT ON THE PAGE SCANNABLE** Because users are unlikely to take the time to read all of the text on the page, the most important information should stand out from the rest of the text. Avoid including a lot of text on the homepage, as it will likely turn first-time viewers away from what will appear to be a cluttered website.

**RULE 3: MAKE THE INFORMATION EASILY RETRIEVABLE** Once viewers have determined that the website will be able to help them, they need to be able to easily access the information they came for. Even a wonderfully informative website will be underutilized if the individuals who visit it are unable to figure out how to get the right information. This means the website must be designed in a way that does not simply allow users to browse through its impressive information – a functional search option must be available. The functionality of a search tool is best determined through observed test runs of the website by willing participants.



Corkd.com

This website, used for posting and sharing wine reviews, follows all three of the rules outlined to accommodate the fact that users visit a site with a particular goal in mind (Cork'd, LLC, 2007).

Corkd.com (shown at right) is a great example of website that follows all three of these rules. Its function is clearly stated in a prominent location on the homepage. The amount of text is minimal, with important headings displayed in a bright color or bold font for easy scanning. There is a noticeable search box at the top of the page, which (when used to search one's favorite wine) retrieves a clear list of users reviews of the particular wine (Cork'd, LLC, 2007).

**THE BRAIN'S ROLE** van Schaik and Ling (2001) describe research on visual search processes that contribute to information retrieval when using websites. They explain that two “visual subsystems” work together to create a “scan path.” Two stages of the visual search process are outlined by Scott (1993) and Wolfe (1994). In the first stage, the viewer's peripheral subsystem processes all locations on the screen in parallel, but the individual does not retain much of the information. The peripheral subsystem then decides where the viewer's attention will focus. In the second stage, the viewer narrows down the amount of information on the page that they take in, restricting it to what is relevant to his or her search. At this point, the viewer's foveal subsystem works to retain more information perform more complex tasks. The second stage's limited capacity, however, means that the viewer can only retain information from a few locations on the page at a time. From this information, we can derive two more rules for successful design:

**RULE 4: MAKE IMPORTANT INFORMATION STAND OUT**

Individuals first quickly process all the information on the page then, with the help of their peripheral subsystems, narrow down what information they will actually pay attention to. In order to increase the likelihood that the important information on the page doesn't get filtered out in the first stage of visual processing, it is important to make the important information particularly noticeable. This might mean making the text larger, a different color, placed prominently on the page.

**RULE 5: DON'T MAKE VIEWERS REMEMBER TOO MUCH**

Because viewers can only remember information from a couple locations on the screen at one time, it is important to avoid requiring viewers to try to remember many bits of information at one time. This means avoiding any task that requires readers to retain information from one part of the page for the purpose of comparing it with information on another part of the page. For example, very long lists of navigation links require users to read the list multiple times before they remember which of the options is likely the best for their search. To avoid this, make the navigation lists brief (group them into categories if needed) and put any other information that users might want to compare side-by-side close enough together that this can be accomplished. The image at right is, ironically, the left panel navigation list from The World Wide Web Consortium (W3C) website, which “develops interoperable technologies (specifications, guidelines, software, and tools) to lead the Web to its full potential” (W3C, 1994-2008).



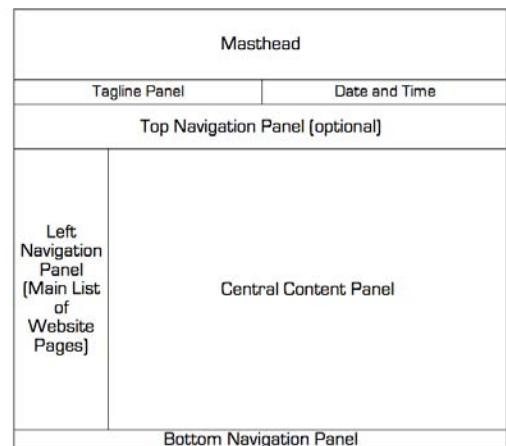
*W3.org Homepage Left Navigation Bar*

Many aspects of the World Wide Web Consortium's webpage, dedicated to “leading the Web to its full potential” violate the rules outlined here, including its left navigation bar, which lists over 70 options for viewers to pick from on the homepage alone (W3C, 1994-2008).

**THE ROLE OF SCHEMATA** In their article on designing reports for consumers, Vaiana & McGlynn (2002) explain that people use schemata, or “organized packets of information stored in long-term memory” to interpret information, and that readers must know what schema is appropriate to interpret information at hand. They add that people who are familiar with a certain kind of information or layout (such as information that compares performances) are more likely to use websites that use this kind of information, because they already possess the appropriate schema. Using and navigating a website can be difficult for some users who have not determined or developed the appropriate schema to do so (Wright & Lickorish, Menus and memory load: Navigation strategies in interactive search tasks, 1994). Again, these findings allow us to set guidelines for effective website design.

**RULE 6: STICK TO A SIMPLE FRAMEWORK**

Because viewers use established schemata to interpret websites, it makes sense to use a traditional webpage format. As Miles Galliford of SubHub.com writes, “With print newspapers and magazines, there are basic elements that people have become used to and comfortable with. Websites are the same” (Galliford, 2006). He offers a “proven industry framework” for site builders to follow in the creation of successful webpages (reconstructed at right). In their research on webpage design and efficiency of use, van Schaik & Ling (2001) found that having a webpage’s navigation bar at either the top or the left increased ease of use for all of their participants, whether they were experienced Web users or less familiar with the Internet.



*Galliford’s Suggested Page Layout*

Consistent with the research findings on webpage processing, SubHub.com contributor Miles Galliford outlines a traditional layout that allows viewers to successfully utilize their established schemata to interpret new websites (Galliford, 2006).

**RULE 7: DESIGN THE SITE WITH THE NEEDS OF THE VIEWERS IN MIND** A common mistake among people who are “experts” in a particular field is a tendency to display information in a way that makes sense to them, but which may not be easily understood by “nonexperts” (Hayes, Schriver, Spilka, & Blaustein, 1986). Understanding the needs of a website's users and testing a website's usability at various points in the development process are essential to creating a successful site (Vora, 1998). *SubHub.com* article “Design Your Website For Your Visitors, Not For You” explains the difference between an award-winning website and one that is easily used:

### Design Your Website For Your Visitors, Not For You

**Most websites that win design awards are not great websites. Infact many provide a very poor experience for their users.**



Awards are usually given to sites that are different and stand out from the crowd, but this often means they have non-standard navigation, lots of flash animations and unique design elements.

The more non-standard variations they have the less intuitive they are to use. Visitors have to think about what they need to do to get the information or result they want.

The more your visitors have to think the more likely they are to give up and go somewhere else. One click and they're gone.

The number one rule of web design is:

***"There is no such thing as a dumb web user, there are just dumb websites"***

Always design your site for your audience, not for yourself. Everything within the design should be aimed at making your visitor's life easier. Don't make them have to think.

Your top three design priorities should ALWAYS be to make you site

...simple

...clear and

...intuitive.

For this reason don't give your web designer free reign.

Designers want to win awards.

*SubHub.com's Advice on Designing for the Visitor*

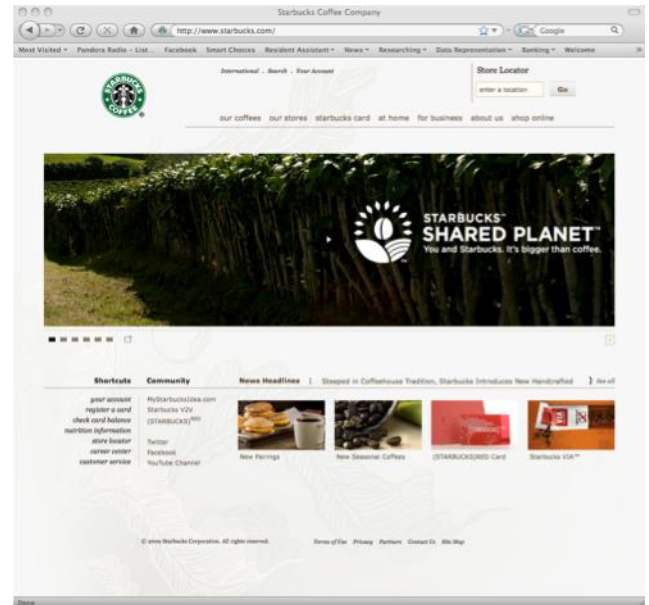
In this article, the author explains potential pitfalls in professional web design (SubHub Ltd, 2006).

**RULE 8: PUT THE NAVIGATION BAR AT THE TOP OR THE LEFT** In addition to being a familiar web design, van Schaik & Ling (2001) research found that websites that have navigation bars at the top (like the one shown at right) and those with navigation bars at the left (like the one shown below) both aid users in faster and more efficient use.



Trinity College Homepage

Trinity's homepage uses a side panel as well as a small navigation panel across the top of the page (Trinity College, 2009).



Starbucks Corporation Homepage  
The Starbucks Coffee Company homepage features a navigation bar with seven options at the top of the page, just beneath their logo and store locator (Starbucks Corporation, 2009).

**MANIPULATING WHAT THE VIEWER SEES** According to van Schaik & Ling (2001), visual conspicuity of the objects or words on the page (such as their size, color, orientation, etc.) plays a large role in what is selected by the peripheral system as the area or areas of focus. Their research also revealed that the visual search process is not affected by color contrast, but rather by the layout of the screen. They summarized their results to explain the stages of visual processing, shown below:

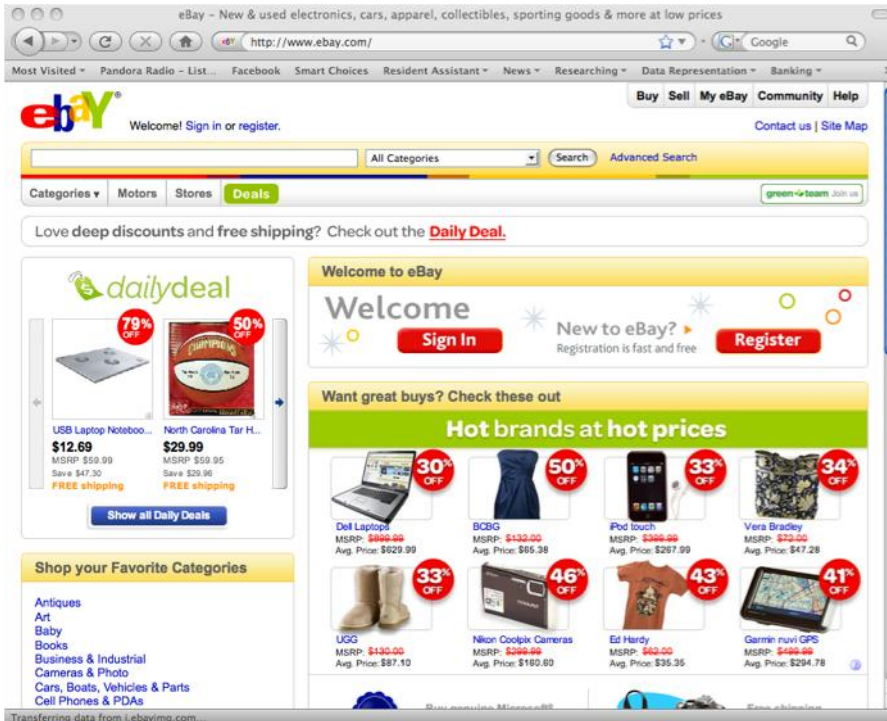
1. A global search of the whole screen to locate the navigation frame.
2. A local search of the navigation frame to locate the target word.
3. A decision to make a motor response indicating either the presence or absence of the target.
4. Making the motor response to show that a target has been detected if stage 2 was successful or that no target has been detected if stage 2 was not successful.

Van Schaik and Ling's (2001) results  
The researchers describe their conclusions on the visual search process in these four steps.

**RULE 9: USE BOLD FONTS AND DIFFERENT SIZED IMAGES**  
In order to make important information stand out, it is a good



idea to use fonts of varying sizes, colors, and styles to make important text noticeable.

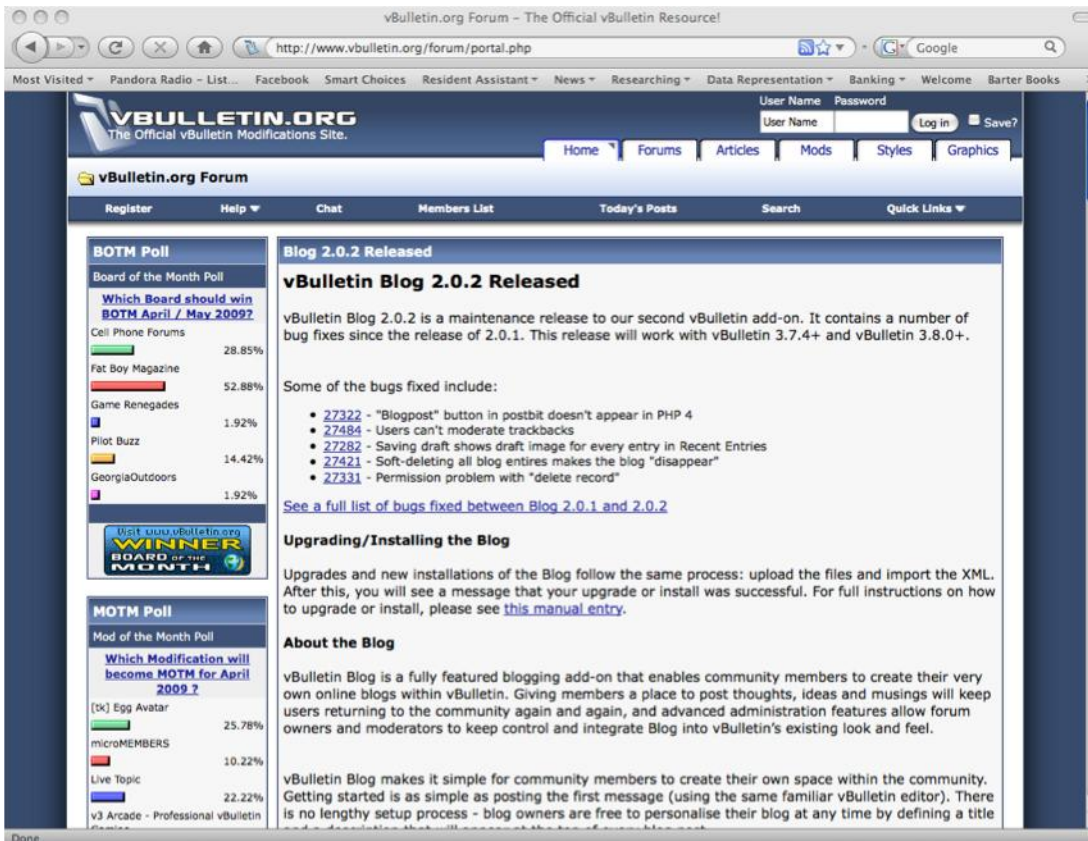


*Ebay.com Homepage*

Ebay's homepage is a great example of a website that utilizes fonts of different styles and sizes and images of varying sizes to grab direct the visitors' attentions to what they wish to advertise (eBay Inc, 1995-2009).

**RULE 10: TEST THE WEBSITE REGULARLY DURING PRODUCTION** It is easy for web creators to get caught up in the construction of a site. A website will likely make sense to a team that has spent a significant amount of time developing and editing it than to an individual who visits it for the first time. Feedback from members of the site's target audience is critical, and receiving viewers responses to the site over the course of its creation will help avoid putting a lot of work into an ultimately unusable website. Holding a few focus groups of a handful (10 or 15) of members of the website's target audience is a good way to observe how individuals view and use the site and get honest feedback (frustrated or confused users will let you know what parts of the site are problematic).

**RULE 11: EXPLAIN THINGS IN A LANGUAGE ALL VIEWERS CAN UNDERSTAND** It is important that the contents of a website, especially one meant to appeal to a community that includes a broad range of computer literacy and education levels. *vBulletin.org*, the homepage for which is shown below, is a great example of a jargon-filled website. One might argue that its users consist entirely of individuals to whom this kind of information makes sense, but the website does nothing to encourage a new viewer to learn about what the site has to offer. The language does not cast a broad net, making it unlikely that new viewers who are not experts in the subject of the website will take an interest in learning more.



*vBulletin.org's Homepage Alienates Non-Experts*  
The content of the website's homepage not only neglects to explain to users what service the site provides but also does a good job of making sure that viewers who are unfamiliar with the subject of the site remain that way (Jeisoft Enterprises Ltd., 2000-2009).

**RULE 12: IF APPLICABLE, INCLUDE OTHER LANGUAGE OPTIONS** If the target audience includes non-English speaking individuals, it is a good idea to provide a link to your site in other languages. Although there are automatic website translating tools available, a professional translation guarantees accuracy.

case study:

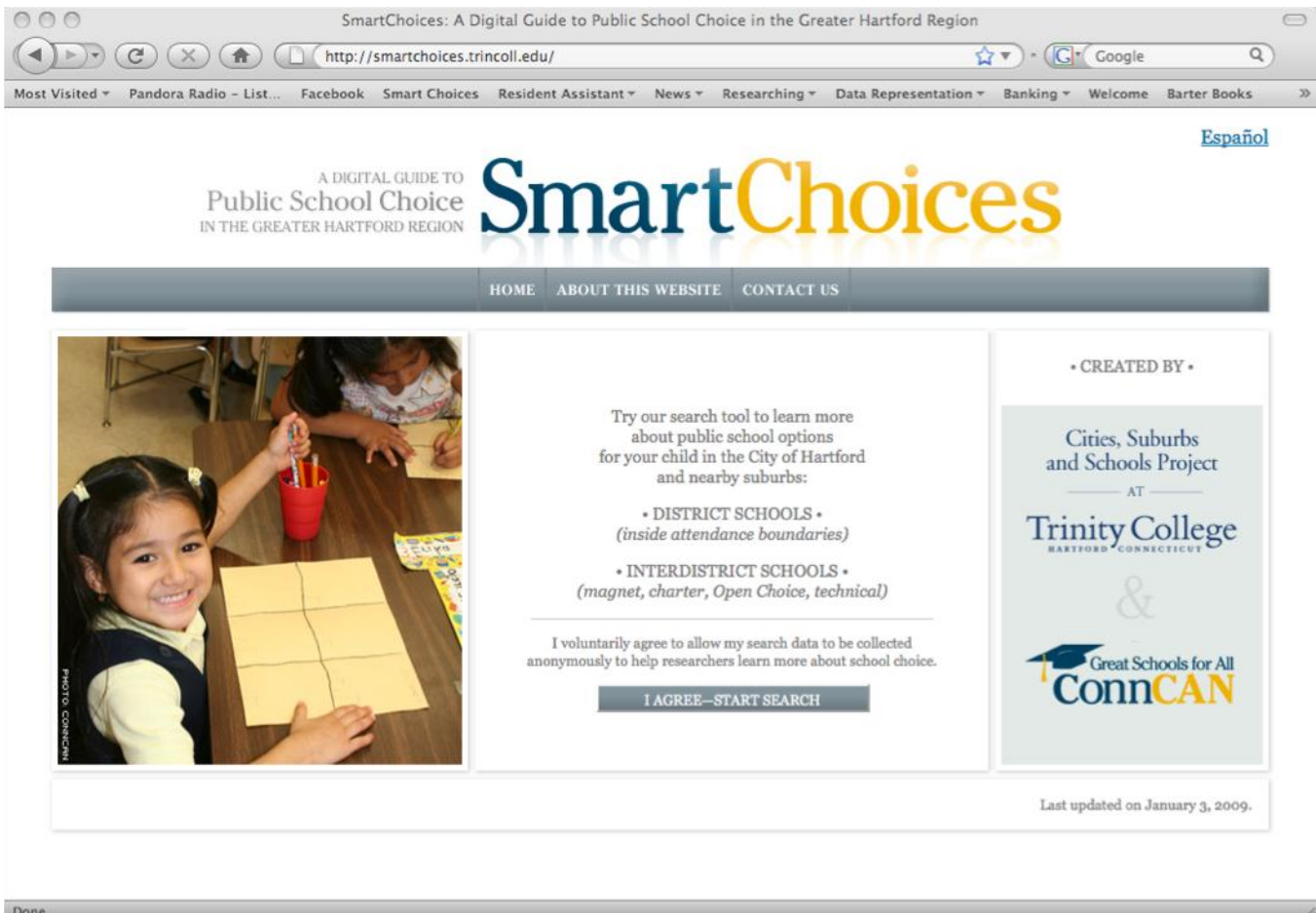
# SmartChoices

All of these design parameters were used in the creation of the SmartChoices website. This section will go step by step through the designs used for the homepage, search page, and the “About This Website” (FAQ) page. Discussion of the website’s results page will be included as a part of Chapter 7 on intuitive data design.

**TELL VIEWERS WHAT THE WEBSITE OFFERS** In designing the SmartChoices homepage (shown below in its completed state), we agreed that it was especially important that the site appear welcoming and approachable from the start. The description is shown at the top left corner of the homepage, where most readers visual search path begins, even before the website’s title. Viewers know right away that they have reached a site that offers “A digital guide to Public School Choice in the Greater Hartford region.” The title of the site is displayed in clear, bright, letters at the top of the screen (Cities, Suburbs, and Schools Project at Trinity College & ConnCAN, 2009).

*SmartChoices Homepage*

In its completed state, the SmartChoices homepage follows each of the guidelines outlined in here in Chapter 6 (Cities, Suburbs, and Schools Project at Trinity College & ConnCAN, 2009).

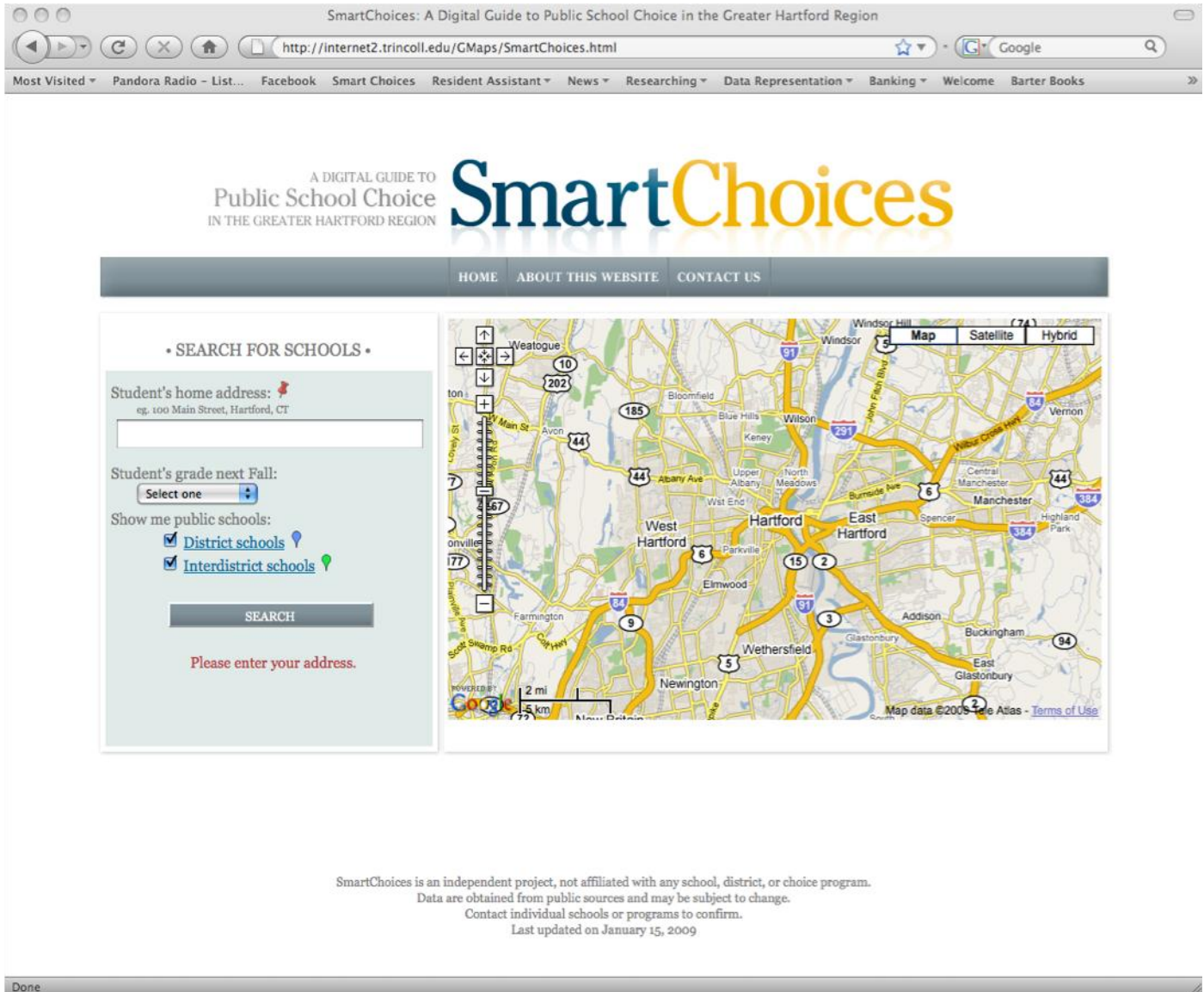


**MAKE THE TEXT ON THE PAGE SCANNABLE** We knew it was important to keep our homepage simple so as not to discourage users. In order to keep the homepage scannable, we kept the amount of text included to a minimum. We also used bullet points and varying text sizes so that the four main points on the homepage were clear.

**MAKE THE INFORMATION EASILY RETRIEVABLE** Because the function of SmartChoices is to allow users to search and retrieve information on Hartford schools, it is especially important that users not become discouraged at any point during the search process. The SmartChoices website is a part of a research project on school choice in Hartford, and as such we needed to require its users to agree to its terms of use. After reading the text “I voluntarily agree to allow my search data to be collected anonymously to help researchers learn more about school choice.”, users click the button to begin their search, which read “I Agree—Start Search”.

After clicking the search button, users are brought to the SmartChoices search page (shown on the next page). The actual search page was designed to make the school search process as simple and straightforward as possible. Because the focus groups revealed a lot of frustration from parents over the school choice process, we wanted to make sure to avoid anything that would deter already skeptical parents from using our useful tool. To do this, we again kept the text on the page to a minimum, including the search box at the top of the search panel at the left of the map. In an attempt to reduce confusion and potential problems involving the format of the typed address, we included an example address directly above the search box. Next, users are asked to select their students’ grades for the coming school year, which they select from a drop-down menu. Lastly, the users select whether they would like to see “District Schools”, “Interdistrict Schools” or both, by clicking or unclicking the check boxes at the left of each option. To conduct the search, they click the “Search” button.

Making the information retrievable also involves more than making the actual search process simple: the search as it is carried out by the database must also be functional, meaning that it retrieves the information asked of it accurately and quickly. To ensure that this was the case with SmartChoices, we conducted many random tests and provided a feedback option on the webpage should anyone encounter a problem in the search process. We were alerted to a couple of issues with the database by early testers of the SmartChoices site and were able to address and rectify them immediately.



*SmartChoices Search Page*

The search page allows a user to very simply type a home address into the search box, select the child's grade and what kinds of schools to display. The required steps to obtain information are straightforward.

After completing the search, the results generated by the SmartChoices database appear below the map in a grid of information (discussed in Chapter 7). To keep the information simple and useful, we did our best to include as much important information as possible, without overwhelming the viewers.

**MAKE IMPORTANT INFORMATION STAND OUT** On the homepage and the search page, we used the least amount of text possible, making sure to make the font size of important text somewhat larger than the rest of the text on the page. On the homepage, we made the website's description prominent, along with the names and logos of the organizations behind SmartChoices, making sure that users could contact the appropriate people with questions and read up on the background of the *Cities, Suburbs, and Schools Project* at Trinity College and the work of ConnCAN. We also made sure that the search button did not become hidden toward the bottom of the page (knowing that we needed to include the description of the terms of the website before it) by making it large and a darker color than the rest of the page.

**DON'T MAKE VIEWERS REMEMBER TOO MUCH** From the homepage to the search page, we made sure that there wasn't any specific information that users would need to remember (and thus have to click back a page to retrieve). To this end, we also decided to keep the page format the same across both pages, with the description, logo, and navigation bar across the top of the page. We believed that, this way, users would not need to spend any time having to cognitively orient where they were hierarchically on the site.

**STICK TO A SIMPLE FRAMEWORK** Along with our decision to keep the framework of all of the SmartChoices pages consistent across the pages, we also followed the basic guidelines for intuitive webpage design. This meant putting the masthead at the very top of the page, followed by the navigation bar directly under it, and the bulk of the information in the center of the page (much like Galliford's diagram on page 32).

**DESIGN THE SITE WITH THE NEEDS OF THE VIEWERS IN MIND** In the case of SmartChoices, we knew that it was of the utmost importance that we not get caught up in organizing the website in a way that would not make sense to individuals seeing it for the first time. The needs of our viewers, as we predicted them, were to better understand Hartford's school system structure, to obtain information on what schools their children were eligible to attend, *and* to get accurate and interpretable data on each school and its performance. We also understood that many parents had become increasingly frustrated by the lack of information available both online and in print, and we kept this in mind when designing the SmartChoices site.

We predicted that many of our users would not be regular Internet users, so we needed to make the site as intuitive as possible. Furthermore, we expected that viewers would not want to have to dig through many other distractions before being able to complete their school searches, so we decided that the search function would be the primary focus of the website. Farah Khan, ConnCAN's graphic designer, was able to integrate our wishes for the layout and function of the SmartChoices site into an attractive and professional quality website.

One of our later additions to the page layout and design was the photograph of the child that appears on the homepage. In conversations with Lourdes Fonseca, ConnCAN's Community Relations Specialist, she recommended that we include a picture of a school-aged child to make the homepage more inviting and to encourage parents to make the effort to learn more about school choice for the sake of their own children.

It was of course equally important that the actual information for each school that appeared after completing a search also be easy to read, understand, and compare. Advice for making *data* intuitive will be discussed in Chapter 7.

**PUT THE NAVIGATION BAR AT THE TOP OR THE LEFT** Following the advice of the research, we opted to put our simple, three item navigation bar at the top of the page, with the search panel on the left hand side. The navigation bar at the top of the page was consistent across all of the pages on the SmartChoices website (the homepage, search page, results page, and the FAQ page). We believed that this would help users, especially those less familiar with the Internet, orient themselves on the site.



### *SmartChoices Navigation Bar*

This three-option navigation bar appears at the top of every page on the SmartChoices website (Cities, Suburbs, and Schools Project at Trinity College & ConnCAN, 2009).

**USE BOLD FONTS AND DIFFERENT SIZED IMAGES** Following this rule was important for creating an inviting homepage, a simple search page, and a clear FAQ page. The “About This Website” page (shown below) utilized the “bold fonts and different sized images” rule the most, as it contains a huge amount of information on one page meant to clarify users questions.

**What is the difference between “Open Choice,” “Project Choice,” and “Hartford Choice”?**

Similar names for different “choice” programs sometimes confuse parents. Here is the difference:

**Open Choice (also known as “Project Choice”):** The Open Choice program “allows urban students to attend public schools in nearby suburban towns and suburban students to attend public schools in a nearby urban center” (<http://www.magneteducation.org/open-choice/what-is.php>).

**Hartford Choice:** The Hartford Public School’s “all-choice” initiative requires that city students in “transitional grades” (the last grade in their school) submit applications for their preferred HPS district school. Also, students who are not in transitional grades have the option to submit an HPS choice application, if desired. (<http://www.hartfordschools.org/about-your-choice>).

[back to top](#) | [close window](#)

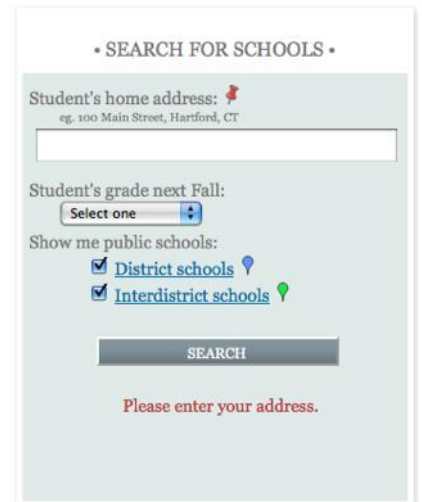
*SmartChoices FAQ Page Excerpt*

This small section of the “About this Website” page shows the simple design used to portray a lot of information. Without making the page “too busy,” the bold fonts and colored link text makes necessary information stand out and facilitates scanning across the page as a whole (Cities, Suburbs, and Schools Project at Trinity College & ConnCAN, 2009).

**TEST THE WEBSITE REGULARLY DURING PRODUCTION** We were able to test the website during the two focus groups at Trinfo Café, a community Internet café run by Trinity College. The feedback we received from the parents and administrators was extremely helpful for us in determining what aspects of the beta site were confusing, misleading, or ill explained. Additionally, we were able to learn what information the parents and administrators most wanted to see and what they spent the most time looking at. With this information, we were able to go back and make revisions to our first version of SmartChoices to make it more informative and intuitive to use.

**EXPLAIN THINGS IN A LANGUAGE ALL VIEWERS CAN UNDERSTAND** We witnessed confusion from both parents and administrators in the focus groups, regarding terms like “District Schools,” “Interdistrict Schools,” and “Performance Gain.” Because these terms are becoming more widely used with the expansion in the number of magnet and charter schools in Hartford (discussed in Chapter 3), we hoped to provide explanations of these terms that would provide clarity for parents, which they would then be able to pass along to other parents.

Because the website inevitably needed to include this “school choice jargon,” we considered it necessary to construct a simple way to explain the terms to parents without sacrificing our simple, uncluttered website layout. To do this, we made the words “District Schools” and



*Clickable Links on SmartChoices’ Search Panel*

To keep the page simple and uncluttered, we decided to make the words “District Schools” and “Interdistrict Schools” into clickable links that would lead parents to the FAQ page’s description of Hartford’s different school types (Cities, Suburbs and Schools Project at Trinity College and ConnCAN, 2009).



“Interdistrict Schools” as they appeared as options on the search panel (shown at right) into clickable links, which would lead users to the FAQ page’s section that defines each school type (shown below), as well as any other potentially confusing terms included on the site.

**What is a District school? What is an Interdistrict school?**

For simplicity, we have defined two types of public schools:

1. DISTRICT schools enroll students who reside inside the local school district.
2. INTERDISTRICT schools enroll students from more than one school district. In the Hartford region, this includes five types:
  - o [Magnet schools](#) promote racial integration by using a special curriculum to "attract" students from city and suburban districts
  - o [Charter schools](#) promote educational innovation and are "chartered" by the State Board of Education, rather than a specific district
  - o [Open Choice](#) (also known as Project Choice) promotes racial integration by allowing urban students to transfer to a suburban school, and vice versa
  - o [Technical schools](#) provide technical/trade education to students in the region, and are administered by the Connecticut Technical High School System
  - o [Regional Vocational-Agricultural centers](#) provide agricultural/technical education to students in the region, but are operated inside a local comprehensive high school

Read more in *Public School Choice in Connecticut: A Guide for Families and Students* (2008-09) at (<http://www.sde.ct.gov/sde/cwp/view.asp?a=2681&Q=320466>)

*FAQ Page’s Description of School Types*

By making some words into links, we could lead users to a small glossary of school choice terms while still keeping the search panel simple and inviting (Cities, Suburbs, and Schools Project at Trinity College & ConnCAN, 2009).

IF APPLICABLE, INCLUDE OTHER LANGUAGE OPTIONS The city of Hartford is home to an estimated 118,655 people, 45.4% of which speak a language other than English at home, 37.3% speak Spanish at home, and 19.7% speak English less than “very well.” (U.S. Census Bureau, 2005-2007 American Community Survey, 2005-2007). Given the large percentage of Spanish-speakers in our target audience, we knew it was a good idea to have a translated Spanish version of the website.

By following the 12 rules outlined in this chapter, we created a simple, attractive, and usable website for parents to conduct searches and obtain information to assist their decisions. However, the website’s interface intuitiveness was not our only design concern; because the website was to include performance data on each Hartford public school, we needed to ensure that the statistics we included were equally legible. The next chapter will cover how to make the *data* presented on the website easy to use and interpret.

# 7 *Making a Website Useful*

## *introduction:*

### a useful website

Even if a website creator followed every guideline presented thus far, the website will not act as a useful tool for the community if it is not useful. A useful website is defined as one which offers its users some service not already available somewhere else and presents its data in a simple, easy-to-read manner. This chapter will discuss what makes a website useful, specifically how to ensure that your material is original, or at least innovative, and what research says about the best ways to display complex information for use by individuals in decision making processes.

### **step 1: making your website original**

A well designed website is not terribly useful to its target audience if the same information is already equally accessible and usable somewhere else. Of course, there are instances in which a community may have access to certain information through one or several sources, but the information is not displayed in a way that is helpful to those who need it. For example, although HousingMaps.com (discussed in Chapter 1) does not provide its users with any information not already available to the public online, it organizes it in a way that made it more useful to visitors. Zillow.com, a real estate website that allows users to type in almost any home address and receive an estimated value for the property, is another example of a website that provides previously available information in a novel way. The Zillow website explains that they “built a Web page for each home and then filled it with data and maps and layered it with publicly available information such as comparables and tax information” (Zillow.com, 2006-2008). It adds, “We were breaking new ground — to package all of this information in one place for everyone to see, for free.” The creators of Zillow were able to package existing information in a way that let individuals conduct searches and retrieve information as they could not have before. When creating a new website, perhaps particularly one that is meant to “mash” data, the makers should first determine whether the site they hope to develop will in fact offer users a service that is different than ones that already exist.

## step 2: making complex data retrievable

In his book *More Damned Lies and Statistics*, author Joel Best writes of graphical representations, “The basic idea is to represent numbers as pictures. The essential standard for judging graphs is remarkably simple: an accurate display should present visual proportions equivalent to the numeric proportions being represented” (Best, 2004). This section will focus on the best ways to display data so that it can be read and interpreted without extra effort or confusion. Especially when a website's target audience includes individuals with a wide range of education levels, it is important to recognize that data that may appear to be presented in a straightforward and understandable way may not seem so straightforward and understandable to everyone.

### WHEN HUMANS AND DATA INTERACT: STEPHEN KOSSLYN'S

**THREE MAXIMS** In his book *Elements of Graph Design*, Stephen Kosslyn describes three fundamental principles to remember when making good graphics; Kosslyn calls these the “Three Maxims.”

His first principle states, “The Mind is Not a Camera,” which he explains by saying, “we are not simply passive receptors, we actively organize and make sense of the world, and when we do so we are at the mercy of the wiring of our eyes and brains” (Kosslyn 1994, p. 3). Thus, in presenting data, especially through graphics, it is important to remember to review the information from the eyes of the audience – will they likely interpret the information in a way that accurately represents it, or are there ways in which the information may be distorted? For the most part, this problem is pinpointed and remedied by getting feedback from testers of the website. Asking users, “What do you see when you look at this information?” can be a huge help in determining any distortion.

Related to this, Kosslyn's second maxim states, “The Mind Judges a Book by Its Cover,” which he explains to mean that “Our visual system and memory system tend to make a direct connection between the properties of a pattern and the properties of the entities symbolized by that pattern” (Kosslyn 1994, p. 8). In other words, a graphic display should simply reflect what it is trying to display; an increase of something in the real world should be reflected by an increase on the graph meant to represent it. Similarly, a graph that includes dates as one of the variables should show the data organized chronologically, directly representing it.

Kosslyn's third maxim is that “The Brain is Willing, But the Mind is Weak.” He explains, “We can keep only a certain amount of information in mind at any one time. A graph should not require the reader to hold more than four perceptual groups in mind at once” (Kosslyn, 1994). This

relates to a rule covered in Chapter 6: do not require viewers to remember too much information at once. So, if a website is meant to allow users to make comparisons among data, it is important to organize the data so that points of comparison are close by to each other.

What do these three maxims have to do with information and website design? Based on Kosslyn's arguments, we derive the following guidelines:

- Make sure that the data do not elicit the wrong conclusions from its viewers
- Graphical or tabular representations of data must be reflective of the data themselves
- Place data meant to be compared in close proximity to each other to allow for easy comparison

So, given this information, what are the best means of portraying data to the masses? Using a table, bar chart, or pie chart is often the best route to take, and the following explanations of each should help clarify when each is the best option.

# tables

Most research agrees that there is a significant difference in the amount of time it takes people to extract information from tables versus graphical representations of the data. By and large, research indicates that individuals are able to extract information more quickly from tables (Lusk & Kersnick, 1979; Davis, 1989). In a study by Benbasat, Dexter, & Todd (1986), the researchers presented participants with data in the form of tables and line graphs and found that presenting the information on a table was better for extracting exact values, while the graphical representations were better for drawing general conclusions about the data for the purposes of decision-making. These findings agreed with research by Powers, Lashley, & Sanchez (1984), which found that providing tables increased participants' comprehension of the data on a multiple choice exam on which participants were asked to retrieve, compare, or calculate data. Additionally, they found that providing graphs in addition to the tables slowed comprehension time but increased the accuracy of participants' answers to the exam questions. Data "guru" Edward Tufte (Tufte, 2001) writes in his book *The Visual Display of Quantitative Information*, "Tables are clearly the best way to show exact numerical values, although the entries can also be arranged in semi-graphical form. Tables are preferable to graphics for many small data sets" (p. 178).

### WHEN TO USE A TABLE:

- A. when extracting exact numbers is important
- B. when readers need to make many comparisons within a matrix of data
- C. any time you are describing numerical information in a paragraph and it can be made into a table

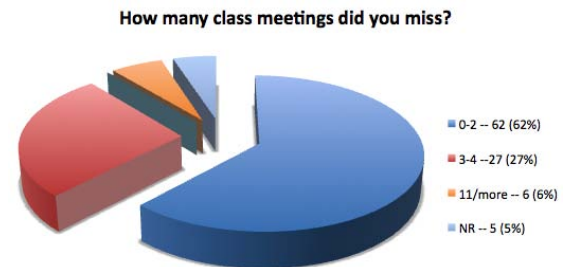
Professor J. Goodman, Econ 101, Spring 2008

N = 100														
<b>Demographics</b>	Seniors	15%	Females	62%							YES	NO	NR	Total
	Juniors	20%	Males	33%							76%	19%	5%	100%
	Sophomores	21%	NR	5%										
	Freshmen	39%	Total	100%										
	NR	5%												
Total	100%													
<b>Self Evaluations</b>	What grade do you expect to receive in this course?	A	B	C	D	F	Don't know			NR	Total			
		39%	39%	11%	0%	0%	6%			5%	100%			
	What is your approximate cumulative GPA at Trinity prior to this semester?	A+	A-	B+	B-	C+	C-	D	N/A	NR	Total			
		0%	11%	22%	45%	6%	11%	0%	0%	5%	100%			
<b>Professor Evaluations</b>	How many hours a week did you spend preparing for this course?	16+more	13-15	10-12	7-9	4-6	0-3			NR	Total			
		11%	12%	61%	11%	0%	0%			5%	100%			
<b>Professor Evaluations</b>	How many class meetings did you miss?	11+more	9-10	7-8	5-6	3-4	0-2			NR	Total			
		62%	27%	0%	0%	0%	6%			5%	100%			
	How clear were presentations?	Very	Fairly	Not Very	Not At All			NR	Total					
		80%	10%	5%	0%			5%	100%					
	How effective was teaching style?	73%	14%	6%	2%			5%	100%					
	How fair was grading?	50%	11%	26%	8%			5%	100%					
	How timely were assignments returned?	7%	13%	44%	31%			5%	100%					
	How helpful was feedback?	18%	31%	41%	5%			5%	100%					
	How available was professor?	68%	20%	7%	0%			5%	100%					
	To what extent was material challenging?	45%	33%	5%	1%			16%	100%					
How worthwhile were class sessions?	55%	16%	13%	11%			5%	100%						
How helpful were assignments?	46%	6%	8%	15%			5%	100%						
How able to demonstrate ability?	79%	7%	5%	4%			5%	100%						
Did professor encourage questions?	10%	5%	3%	77%			5%	100%						

NR = No Response

### Professor Evaluation Table

This table, designed by the author and fellow Trinity College student Sheila McGourty, '08, was presented to the Deans as an alternative option for portraying student feedback on professor performance. Currently, the school uses a series of pie charts, one for each question, which makes comparisons hard between questions hard and omits instances when the total for an option was 0%. Compare the table to the replication of the pie chart alternative below.



**HOW TO USE A TABLE:**

The following guidelines should be followed when using a table to represent information.

1. **Design the table for its use:** decide beforehand whether the table is meant to store data to be extracted or to show readers something interesting and order the data in a way that makes sense for what the readers need it for.
2. **Don't use unnecessary lines:** too many lines distract from the actual data
3. **Avoid decimals where you can:** more decimals make the table look sloppy
4. **Make any interesting parts of the data in the graph stand out:** In his article “Rudiments of Numeracy,” A.S.C. Ehrenberg (1977) explains the difference between an excellent and an acceptable table. He writes, “The Strong Criterion for a Good Table: The patterns and exceptions should be obvious at a glance. The Weak Criterion: The patterns and exceptions in a table should be obvious at a glance once one has been told what they are.” He adds that a table can be improved with simple reordering of the variables, rounding the numbers, improved labeling, and better spacing of the data displayed.

<b>A Bowl of Jelly Beans</b>	
<b>Green</b>	<b>67</b>
<b>Purple</b>	<b>46</b>
<b>Red</b>	<b>29</b>
<b>Orange</b>	<b>58</b>
<b>Yellow</b>	<b>42</b>
<b>TOTAL</b>	<b>241</b>

*Jelly Bean Inventory Table: BAD*

Above is a poor attempt at a table meant to portray the number of jelly beans of each color found in a bowl. Visually, the many dark lines are distracting and unnecessary and the bold font uses more space than needed to get the information across. The contents of the table appear to be organized alphabetically, which makes comparing the quantities more difficult and does not make exceptions stand out.

<u>A Bowl of Jelly Beans</u>	
Red	12%
Yellow	17%
Purple	18%
Orange	24%
Green	28%
TOTAL	100%

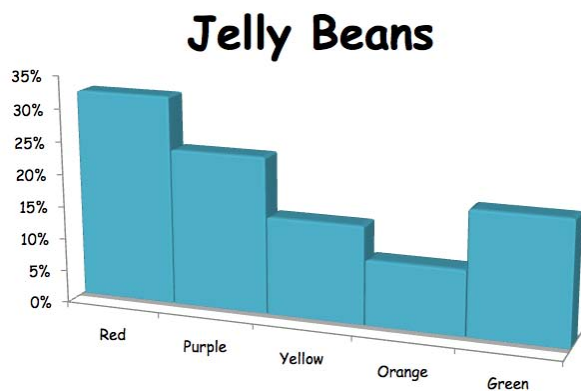
Source: Office of Campus Life Jelly Bean Bowl, recorded by Devlin Hughes, April 2009

*Jelly Bean Inventory Table: GOOD*

This version of the same table uses percents to portray the quantities of each color. Only two lighter-colored lines are used to mark the table's title and separate the total. The contents are ordered according to the quantity of each, from “red” with the fewest to “green” with the most, allowing viewers to see which color jelly bean appears most frequently and how it compares to the least common color.

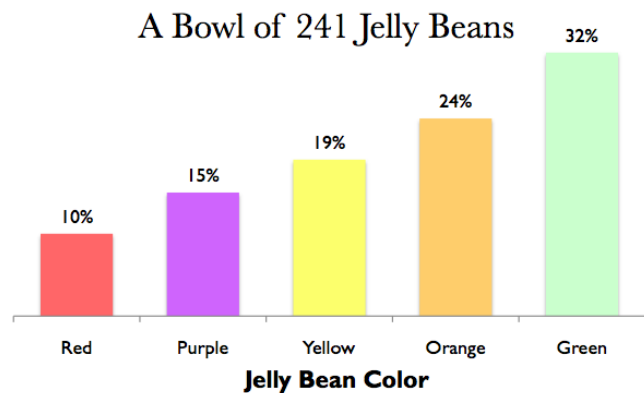
## bar graphs

Graphs also have benefits. As Benbasat, Dexter, & Todd (1986) explained, while tables were more useful for extracting exact values, graphs were better for making more general observations. Vaiana & McGlynn, (2002), agree that graphs are easier to use than tables when individuals want to make comparisons. When a graph allows a viewer to group the information visually, he or she is able to more quickly and accurately comprehend the information. Unlike pie charts and tables, a bar graph allows the human eye to quickly compare the relationship between the lengths of two lines – one can quickly discern which line extends furthest, which is next, and so on. People can more easily compare size differences between straight lines than angles, and vertical lines than horizontal ones, thus making the bar chart a better option for facilitating comparisons. Information visualization expert Stephen Few adds, “Despite the obvious nature of a pie charts message, bar graphs provide a much better means to compare the magnitudes of each part. Pie charts only make it easy to judge the magnitude of a slice when it is close to 0%, 25%, 50%, 75%, or 100%. Any percentages other than these are difficult to discern in a pie chart, but can be accurately discerned in a bar graph, thanks to the quantitative scale” (Few, 2007). Tufte (2001) writes of pie charts, “A table is nearly always better than a dumb pie chart; the only worse design than a pie chart is several of them, for the viewer is asked to compare quantities located in spatial disarray both within and between pies” (p. 178).



*Jelly Bean Inventory Bar Graph: BAD*

This bar graph, meant to highlight frequencies of different types of jelly beans, treats each jelly bean color as the same variable by making each bar the same color and flush with its neighbors. The 3D style and slanted x-axis makes comparing the bar heights difficult, defeating the purpose of using a bar graph in the first place.



Source: Office of Campus Life, Jelly Bean Bowl, recorded by Devlin Hughes, April 2009

*Jelly Bean Inventory Bar Graph: GOOD*

This bar graph spaces and colors each bar appropriately and places the percent value directly on top of each bar, eliminating the step of having to trace each height back to the y-axis. The simple 2D design makes comparisons between bars more accurately signify the quantities of jelly beans they represent.

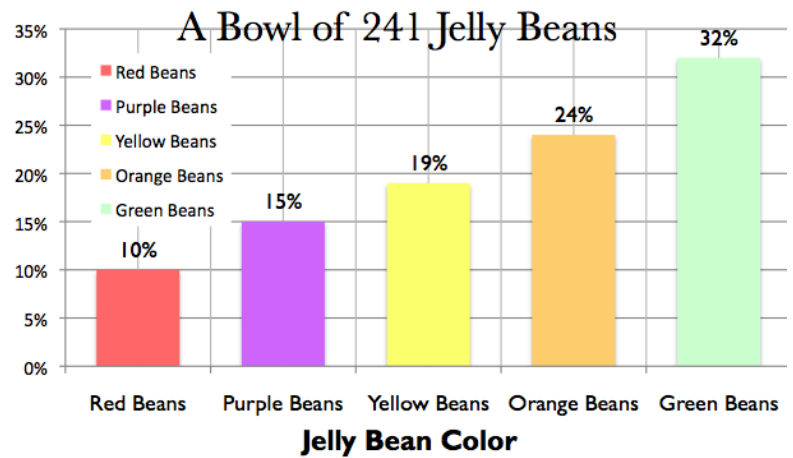
**WHEN TO USE A BAR GRAPH:**

- A. when the viewers need to use the information to make general conclusions (i.e., x is bigger than y), not specific ones (x is bigger than y by exactly 8.3 units)
- B. when the representation of the data is not meant as a storage facility for the data but as a stage for it to show something interesting

**HOW TO USE A BAR GRAPH:**

The following guidelines should be used when using a bar graph as visual representations of data.

- 1. **Never include more on the graph than you need to:** As the graphic at right shows, a few unnecessary additions make a table cluttered and overwhelming
- 2. **Start the y-axis at zero:** Graphs that do not start at zero over-accentuate differences between each bar (e.g., the difference between 92% and 96% looks much larger if the y-axis starts at 90% than if it starts at zero). As Stephen Kosslyn (1994) argues, the graph should represent the data as they are.



Source: Office of Campus Life Jelly Bean Bowl, recorded by Devlin Hughes, April 2009

- 3. **Never give in to the “fancy” graphs available on many graphing software:** Of the huge variety of graph options on programs like Microsoft Excel, only a few are actually worth using (and these are the simple versions shown in this chapter)
- 4. **Use color appropriately:** Many people confuse when to make the bar colors vary at each point and when to use the same color throughout. As in the jelly bean chart shown on the previous page, the colors should vary because each bar represents something different (different color jelly beans). If instead the graph represented how many jelly beans the bowl contained over the course of 5 days, it would have made more sense to make all the bars the same color, as each bar represented the same concept (total number of jelly beans each day). Obviously, in the case of the jelly bean graph, there is a logical way to decide what color to make each bar – in cases when the variable on the x-axis relates to color, remember to color the bars accordingly.
- 5. **Get the positioning right:** Related to the rules on color variation, the bars of a bar graph should touch *only* if the graph represents *consecutive years*. Otherwise, there should be at least some space in between.
- 6. **Give some thought to how you order the data:** ordering alphabetically rarely makes sense with graphs, as a bar graph is generally used for the sake of showing a trend, and that trend is

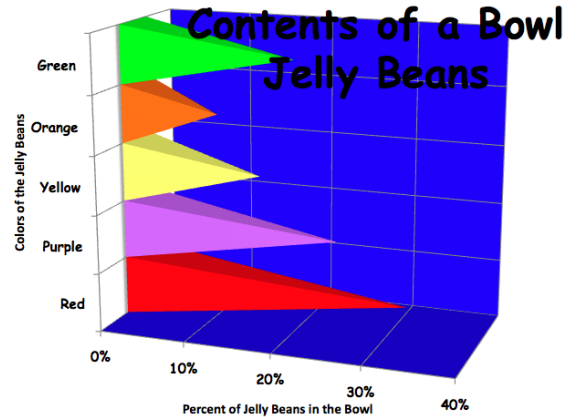
*Jelly Bean Inventory Bar Graph: CLUTTERED*

It only takes a few clicks of the mouse in programs like Excel to make a simple bar graph cluttered by additional “features”. In this example, the gridlines, y-axis, and even the word “beans” on the x-axis can be done away with for the sake of a clean-cut graphic.



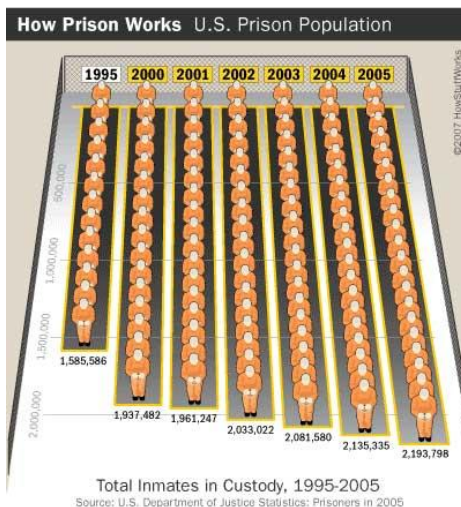
not likely related to the alphabet (show graph of when you would use the alphabet to order – e.g., the number of graham crackers received per child when they are always distributed alphabetically by first name and explain why it makes sense to order alphabetically in this case.)

7. **Don't use a legend:** If possible, it is best put the labels of each bar directly on the bar itself, as a legend requires the viewer to spend extra time scanning between the graphic and the legend to decode it. Placing labels directly on the graphic itself is ideal as it increases the reader's accuracy and speed of interpretation (Culbertson & Powers, 1959).
8. **Avoid “chartjunk”:** Edward Tufte, the award-winning author of seven self-published books on analytical design, coined the word “chartjunk” to refer to unnecessary embellishments on graphs. (show examples – comparison of 2 graphs)
9. **Add “evaluative” cues:** Research by Hibbard, Slovic, Peters, & Finucane (2002) revealed that when individuals were asked to interpret data on the quality of five health plans, those who were given the data in the form of graphs with accompanying indicators on whether the health plan was average, above average, or below average, interpreted the information much more accurately than did individuals using graphs without these cues. If appropriate, add these notations to your graph that explain what is shown.
10. **Remember the power of formatting:** As Stephen Kosslyn explains, the human brain assumes that properties of a graphical representation reflect properties of the data. A graph's formatting—for example, if the bars on a bar graph are clustered to form visual groups—can greatly affect how it is interpreted (Shah, Mayer, & Hegarty, 1999; Kosslyn, 1994). With this knowledge, be careful not to make any changes to aspects of the graph, such as spacing between bars or color differentiation, unless it is being used to represent something about the data.



*Jelly Bean Inventory Bar Graph: “CHART JUNK”*

Edward Tufte’s phrase “chart junk” describes much of the content of this bar chart. The bright colors are hard to look at and the 3D pyramids make comparing quantities difficult, if not impossible.



*“How Prison Works” Bar Chart*

This upside-down bar chart from an article by Ed Grabianowski makes several critical errors. The graph does not indicate a value as the starting point for its y-axis and evenly spaces nonconsecutive years on the x-axis (notice the jump from 1995 to 2000). The little orange-suited men almost create an optical illusion for someone studying the graph. The graph does, however, include the actual quantities at the top (or bottom, rather) of each bar and provides source information directly on the graphic.

## pie charts

In his installment of the Visual Business Intelligence Newsletter entitled, “Save the Pies for Dessert,” author Stephen Few outlines his thoughts on the use of pie charts. He writes, “Its simple charm is beloved by all but a few, welcomed almost everywhere; familiar and rarely threatening. Of all the graphs that play major roles in the lexicon of quantitative communication, however, the pie chart is by far the least effective. Its colorful voice is often heard, but rarely understood. It mumbles when it talks” (Few, 2007). However, pie charts do have a place in the world of graphical data representation.

### WHEN TO USE A PIE CHART:

#### A. when the data add up to 100%

This may seem obvious, but far too many data representers foolishly use pie charts for inappropriate data. Consider the pie chart shown to the right from a 2007 article entitled “How Prison Works” by Ed Grabianowski. The pie chart shows the recidivism rates of prisoners released in 1994 in a cute pie chart nested inside a handcuff. A closer look reveals that the pie chart not only adds up to a whopping 329.1%, but an additional 67.5% clings to the perimeter of the pie chart, representing the percent of all prisoners who are released (Grabianowski, 1998-2009).

#### B. when inter-pie chart comparisons are not necessary

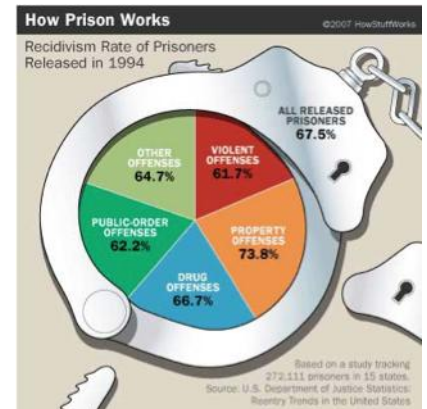
As Tufte (2001) explains, the only representation worse than one pie chart is many of them. If your data will ultimately require comparing the size of a slice in one pie to a slice in another, a bar graph should be used instead.

#### C. when combining the percentages is useful

Even the pie chart's harshest critics respect that pie charts allow viewers to quickly visually sum different pieces of the pie to make a comparison. Spence & Lewandowski (1991) measured the accuracy and speed of participants asked to answer a series of questions involving interpretations of visual representations of data. The pie chart proved its worth when participants were shown a pie chart with 4 slices and asked to determine which combination of two was bigger from the pictures shown at right (Few, 2007).

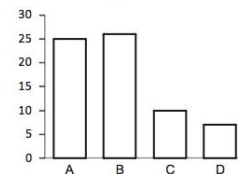
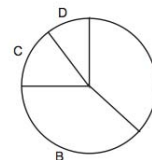
#### D. when you have 5 (or maybe 7) or fewer slices

Including more than 5 or 7 slices on a pie chart make the differences between each wedge very hard to determine.



“How Prison Works” Pie Chart

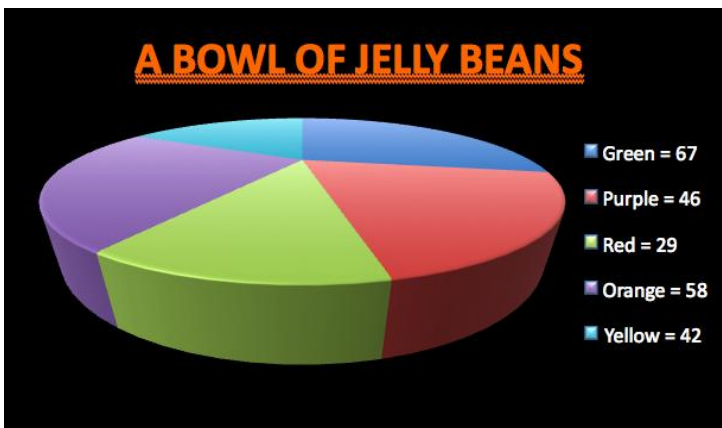
While this pie chart does vary colors appropriately by slick and avoids using a legend, the data do not add up to 100%, making a pie chart an entirely inappropriate option.



**HOW TO USE A PIE CHART:**

Pie charts are already rarely the best option to represent data (made evident by the numerous requirements that must be met before using a pie chart), so if you plan on using one, it is a good idea to make it as functional as possible. The following guidelines should aid in this process:

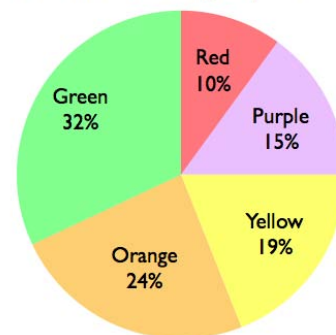
1. **Order the slices clockwise from smallest to largest:** Doing this allows for easier comparison of the wedges of comparable size.
2. **Avoid using a legend:** Legends require users to take additional time to decode the colors of the chart, a task that can be easily avoided by simply putting the labels directly on each slice. To the same end, **put the percentages directly on the wedges as well.**
3. **Never make the pie chart 3D:** The point of a pie chart is to allow people to compare the sizes of slices as representations of a percentage. When the pie chart is made 3D or “turned on its side” to look like it is lying flat, the size of the wedges are distorted, defeating the chart’s purpose.
4. **Don't include more than five (maybe seven) slices**
5. **Make the slices different colors, light to dark, with the biggest slice lightest and the smallest slice darkest:** Making the smaller wedges darker makes them stand out more, which is important when slices are particularly small.



*Jelly Bean Inventory Pie Chart: BAD*

Visually turning the pie chart on its side, as this one does, distorts the sizes of each wedge, thus making the pie chart’s purpose moot. Notice how the dark blue wedge in the back (representing 67 beans) takes up less space on the page than the light green one in the front (representing 29 beans). Using a legend, as this chart does, requires readers’ eyes to jump back and forth between the graph and the color coding (not to mention this graph’s author allowed Excel to choose the colors associated with each wedge instead of reassigning appropriate colors). The black background simply uses color and ink where it is not needed.

A Bowl of 241 Jelly Beans



Source: Office of Campus Life Jelly Bean Bowl, recorded by Devlin Hughes, April 2009

*Jelly Bean Inventory Pie Chart: GOOD*

This version omits the legend by putting names and values directly on each slice and orders the slices clockwise from largest to smallest, facilitating easy comparison. The 2D style keeps each wedge in proportion and appropriate color choices were made. The source information is also included directly on the graphic.

*case study:*

# SmartChoices

A significant amount of the creation of the SmartChoices site involved working with the data to make it as easy to read as possible. We wanted to make sure that parents were provided with as much relevant information as possible, without overwhelming them with too much data. This section includes pictures of the graphical representation we chose to use on the site and explanations for why we chose them.

## the results page

In its completed state, the results page presents SmartChoices' visitors with a table of personalized results based on their searches (shown in the next page). The content of the search page remains at the top of the page, in an attempt to keep users oriented on the website, while the results appear immediately below. The table of results itself is extensive; it includes both pie charts and bar charts *within* a table (utilizing all three forms of data representation discussed in this chapter). Presenting the results in the form of a table facilitated comparisons within rows of the table, while graphical representations within the table avoided having an entire page of numerical data, which we felt would discourage visitors from using the site.

### SCHOOL AND WEBSITE

In these cells, we simply included the name of each school, the organization that runs it (shown in parentheses), and a picture of the marker, colored either blue or green for District or Interdistrict schools respectively. The school name is also a link which, when clicked, brings viewers to the school's website.

[University of  
Hartford Magnet  
School](#)  
(CREC) 

### ADDRESS (NEXT SCHOOL YEAR)

These cells provide the schools' addresses, which, when clicked, zoom the map to the location of the address.

[196 Bloomfield  
Ave](#)  
West Hartford, CT

**DISTANCE**

These values show SmartChoices users the exact distance between the address they searched and the location of each school. In including these values, we hoped to provide parents with information regarding place, as author Courtney Bell (2007) emphasized as an important factor in her article described in Chapter 3.

3.9 miles

**GRADES**

In these cells we simply included what information we knew about what grades the school was currently accepting. In the example shown at right, the school in question accepts “PreKindergarten 3” (students 3 years old) to grade 5.

PreK3 to  
5

**MORE INFO**

To the extent that we could, we wanted to provide parents with information on how to apply to the school and what preferences the school had in accepting and enrolling students. In the example shown at right, the link “Apply to RSCO” brings users to the Regional School Choice Office’s application page, and the gray text beneath tells parents that most available seats are in the PreKindergarten 4 classroom.

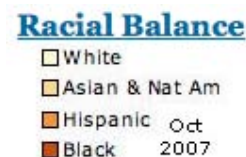
[Apply to RSCO](#)  
Most seats for  
PreK4 (age 4)

**RACIAL BALANCE**

This column (and the next one “Test Scores”) presented the most difficulty for us in terms of information design. We wanted to show the approximate racial balance of each school using a graphic, in the hopes of making the page more attractive and less filled-with-numbers. To do this, we decided to use pie charts, despite their shortcomings. However, we were then faced with another problem: how could we include the values and labels attached to each wedge of the chart without cluttering up the table as a whole?



Here, we committed our first infringement of the rules of data representation. Not only did we decide to use a legend, but we decided it was necessary to include the legend only once at the top of the page (shown at right), thus breaking a second rule of design and requiring that our viewers remember what colors corresponded with each racial group displayed in the pie charts. Our third violation of the rules was in requiring our viewers to compare data as shown in a matrix of pie charts – referred to earlier as “intra-pie comparisons.”



However, we felt that each of these deviances from the rules was carried out with good reason. While we did want to display the

data in the clearest way possible, we did not want to present our viewers with a complex and unfriendly looking table filled with numbers, nor did we want to use only bar charts to display our data. Also, for the sake of maintaining a simple and clean table and in an attempt to make easier the dreaded “inter-pie comparisons,” we chose to let each pie chart stand alone. Furthermore, we felt that because each pie had only 4 different slices, remembering which corresponded to which race would not be a problem for users. In addition, we considered at length what colors to use the wedges of the pie charts. This seemingly small consideration had us stumped, as we were unsure whether to use colors that corresponded with the race that each pie wedge represented. We were unable to find any information on the topic of race-related information and graphical displays, and ultimately decided that it made the most sense for the colors of the wedges of the pie charts to correspond with the races themselves, thus choosing the scale shown on the previous page.

### TEST SCORES

This section presented fewer problems. We knew that we wanted a graphical representation to show ConnCAN’s calculated statistic for each school entitled “Percent At or Above Goal,” which indicates what percent of the students at the school are performing at or above “grade level” according to the state administered exams (CMT and CAPT, discussed in Chapter 4). However, we wanted to provide a comparison between two years in an attempt to showcase improvement or decline in student performance at each school. For example, a school with a slightly below average performance in 2008 may have made a significant improvement from its performance the year before, which would be hidden if only one year was included. To show this, we utilized horizontal bar charts, so chosen because they facilitated comparisons among schools shown in the table as vertical bar charts could not. In an additional column to the right of the bar charts, we included ConnCAN’s calculated “One Year Gain,” simply the difference between the performance of the two years shown. We felt that including this would allow parents to more quickly compare schools based on their changes in test score performance from 2007 to 2008.

On the next page is an example of a search conducted using an address on Broad Street in Hartford. When conglomerated, the individual graphical representations make sense for comparison, although as individual graphics they may not be ideal.



SmartChoices: A Digital Guide to Public School Choice in the Greater Hartford Region

http://internet2.trincoll.edu/GMaps/SmartChoices.html

Most Visited Pandora Radio - List... Facebook Smart Choices Resident Assistant News Researching Data Representation Banking Welcome Barter Books

## A DIGITAL GUIDE TO Public School Choice IN THE GREATER HARTFORD REGION SmartChoices

HOME ABOUT THIS WEBSITE CONTACT US


• SEARCH FOR SCHOOLS •

Student's home address:   
 eg. 100 Main Street, Hartford, CT

Student's grade next Fall:

Show me public schools:   
 District schools   
 Interdistrict schools

Click the Search button to see/update the data.



School & Management <small>(click for website)</small>	Address (next school year) <small>(click to zoom)</small>	Distance	Grades	More Info	Racial Balance <small>White Asian &amp; Nat Am Hispanic Oct Black 2007</small>	Test Scores	
						Percent At or Above Goal <small>Dashed line is CT average</small>	One Year Gain
<a href="#">Breakthrough Magnet School</a> (Hartford Public Schools)	<a href="#">290 Brookfield St</a> Hartford, CT	1.3 miles	PreK3 to 8	<a href="#">Apply to RSCO</a> Most seats for PreK3 (age 3)		2007: 42 2008: 36 Avg	-6.3
<a href="#">Charter Oak Academy of Global Studies</a> (West Hartford Public Schools)	<a href="#">425 Oakwood Ave</a> West Hartford, CT	0.6 miles	PreK to 5	<a href="#">See also Opt Out policy to request other West Hartford elementary schools</a>		2007: 49 2008: 53 Avg	3.7
<a href="#">International Magnet School for Global Citizenship</a> (CREC)	<a href="#">656 Silver Lane</a> East Hartford, CT	6.2 miles	PreK3 to 1	<a href="#">Apply to RSCO</a>	No data opened fall 2008	No test scores below grade 3	n/a
<a href="#">Jumoke Academy</a> (CT Dept of Ed charter)	<a href="#">250 Blue Hills Avenue</a> Hartford, CT	4.0 miles	K to 8	<a href="#">Apply to Jumoke</a>		2007: 44 2008: 40 Avg	-4.5
<a href="#">Montessori at Annie Fisher</a> (Hartford Public Schools)	<a href="#">395 Lyme St</a> Hartford, CT	4.7 miles	PreK3 to 6	<a href="#">Apply to RSCO</a> Most seats for PreK3 (age 3); Preference given for attending open house	No data opened fall 2008	No test scores opened fall 2008	n/a
<a href="#">Montessori Magnet School</a> (CREC)	<a href="#">1460 Broad St</a> Hartford, CT	2.4 miles	PreK3 to 6	<a href="#">Apply to RSCO</a>		2007: 70 2008: 57 Avg	-12.6
<a href="#">Noah Webster MicroSociety Magnet School</a> (Hartford Public Schools)	<a href="#">5 Cone St</a> Hartford, CT	2.3 miles	PreK4 to 8	<a href="#">Apply to RSCO</a> Most seats for PreK4 (age 4); preference given for attending open house		2007: 35 2008: 38 Avg	3.2
<a href="#">Open Choice (aka Project Choice)</a> (CREC)	Schools across Greater Hartford	n/a	K to 12	<a href="#">Apply to RSCO</a> City-suburb transfer program ( <a href="#">click for map of participating districts</a> )	*30 districts	2007: 68 2008: 70 Avg *30 districts	1.6
<a href="#">R.J. Kinsella Magnet School of the Arts</a> (Hartford Public Schools)	<a href="#">245 Locust St</a> Hartford, CT	3.4 miles	PreK4 to 8	<a href="#">Apply to RSCO</a> Most seats for PreK4 (age 4)		2007: 11 2008: 23 Avg	12.1
<a href="#">Reggio Magnet School of the Arts</a> (CREC)	<a href="#">150 Fisher Drive</a> Avon, CT	7.5 miles	PreK3 to 1	<a href="#">Apply to RSCO</a>	No data opened fall 2008	No test scores below grade 3	n/a
<a href="#">University of Hartford Magnet School</a> (CREC)	<a href="#">196 Bloomfield Ave</a> West Hartford, CT	3.9 miles	PreK3 to 5	<a href="#">Apply to RSCO</a>		2007: 53 2008: 61 Avg	8.2

SmartChoices is an independent project, not affiliated with any school, district, or choice program.  
 Data are obtained from public sources and may be subject to change.  
 Contact individual schools or programs to confirm.  
 Last updated on January 15, 2009

When considered as a whole, our decisions for the look and format of the results page of the SmartChoices website make sense for its purpose. The tabular overall design allows viewers to make comparisons among schools, while the small graphics provide the necessary amount of information for understanding the basics of the racial balances and performance levels of each school for the sake of making school choice decisions.

While these kinds of data certainly do not provide a full description of each school – such as the effort put forth by teachers or resources provided by the school – they do give parents comparable performance data based on test scores, which our focus group interviews revealed was what parents were most interested in knowing (Parent and Administrator Interviews, 2008).

Beyond making the information accessible through thoughtful formatting and organization, it is equally, if not more, important to make sure that the viewers can easily access the site itself. The next chapter discusses issues related to website accessibility, which was a concern for us based on Internet access statistics in Hartford.



## 8 *Making a Website Accessible*

*introduction:*

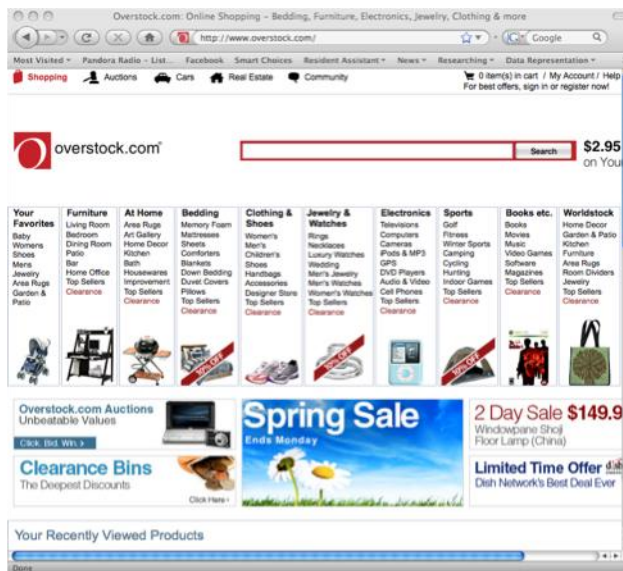
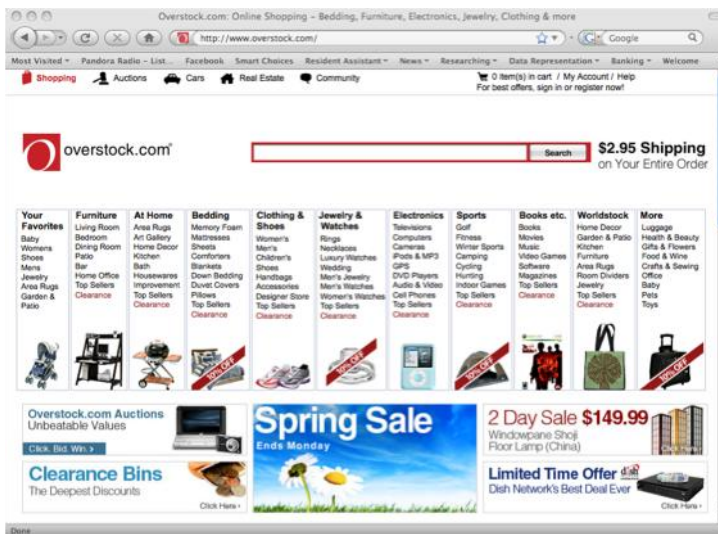
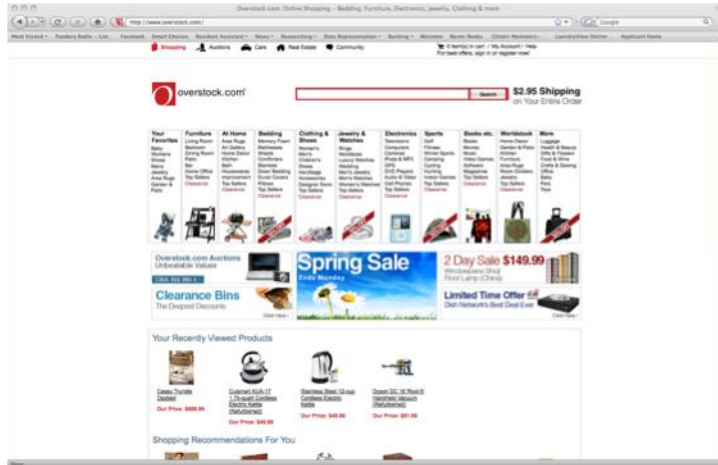
### an accessible website

This chapter will discuss the considerations that should be made in regards to a website's "accessibility." There are two primary considerations issues attached to ensuring a website's accessibility. First, there exist accessibility concerns in the technical sense; literally, are users able to gain access to the website? Second, website creators must consider issues of accessibility in regards to the abilities of its users; is the actual content of the site widely understandable?

**MAKE SURE USERS CAN ACCESS THE SITE** A website meant to help a community is useless if the community members do not have adequate access to it. Chapter 5 discussed the importance of considering a community's Internet access when determining whether or not a Google™ mashup website it a practical option to fit the needs of the community. However, even after concluding that members of a community have adequate Internet access, there are other critical factors to keep in mind regarding Internet accessibility, such as users' screen sizes, Internet speed, and browser types.

**SCREEN SIZE** Screen size is an often overlooked consideration when creating a website. Designers often neglect to consider the screen size of the average Internet user, which can cause many viewers to miss important information on a website. Take a look at the three displays of the *overstock.com* homepage. The first screen shot is shown in the aspect ratio of a Mac computer with a 20-inch screen, the second is the same website shown on a 13-inch screen, and the third is the website shown on a 10-inch screen (screen sizes are measured along the diagonal).

## CHAPTER 8: MAKING A WEBSITE ACCESSIBLE



### Overstock.com, in Three Screen Size Ratios

These three screen shots are taken from a 20-inch screen, a 13-inch screen, and a 10-inch screen (from top to bottom). The 20-inch screen shows the entire page width with some room to spare, and allows viewers to see that there is more content further down the page by showing some of the section below. The 13-inch screen also displays the entire page width, but hides the bottom portion of the page because the page cuts off at what appears to be a natural endpoint. The 10-inch screen also hides the bottom of the screen, but also hides the last section on the far right side of the page (labeled “More”). Users with 10-inch screens may end up missing a lot of information as a result of their screen size.

**INTERNET SPEED** It is also important to design a website that allows users with a wide range of Internet speeds to access it. In other words, although a complex website with many detailed graphics and other additions can be attractive, you will want to make sure that you do not sacrifice efficient page loading. Do not use many large photos that will make the page take a long time to fully load, as many viewers with slower Internet connections may become frustrated and give up.

**BROWSER TYPES** Given the many options available for Internet browsers, it is a good idea to test a site on a few of the more frequently used browsers. Internet Explorer, Mozilla Firefox, Chrome, Safari, and Opera are some of the Internet browsers commonly used by the public, and it is a good idea to design your website in a way that allows it to be viewed and used by most browsers.

**MAKE SURE THE SITE, ONCE ACCESSED, IS UNDERSTANDABLE** The other way in which a website can be inaccessible is in its content. If the information on the website is presented or explained in a way that is not clear to members of the target audience, the site's accessibility is not universal. As discussed in Chapters 6 and 7, it is important to explain things in ways that all viewers can understand. Specifically, a website that presents its viewers with unfamiliar and unexplained terminology will alienate individuals who are not already familiar with the subject, instead of inviting them to learn more. As the individuals involved in the creation and development of a website are likely to be quite familiar with the terms used on the website, it is a good idea to get feedback from external sources, ideally individuals who do not know much on the subject of the site.

# 9 Aesthetics: Useful Advice for Creating an Attractive Website

## *introduction:*

### laws of attraction

Once the content of a website is established, the site's creators must consider features of the website that will attract users and encourage them to revisit the site in the future. These features include providing easy navigation, displaying the names of people and organizations behind the site's creation, including pictures and other graphics, and making it overall aesthetically pleasing. Equally important to making the website attractive is taking the necessary steps to spread the word about the website. Even an easy to use, informative, credible, and attractive site will be underutilized if it is not well advertised. This chapter will discuss what research says about making a website aesthetically pleasing, as well as what the necessary supplements are for online map mashups for making sure those who will benefit from them know of their existence.

#### **FIRST IMPRESSIONS: IS THE WEBSITE AESTHETICALLY PLEASING?**

Whether or not a website is considered aesthetically pleasing is obviously a subjective judgment. Every individual has his or her own opinion on what is attractive (or unattractive) in website design, so attempting to formulate guidelines for creating attractive web pages is a difficult task. However, some research has been successful in helping us understand how and why individuals develop opinions on the visual characteristics of objects (including websites). Based on the findings of research on aesthetic preferences, we can derive a few basic guidelines to help instruct our attempts to create websites that are most universally attractive.

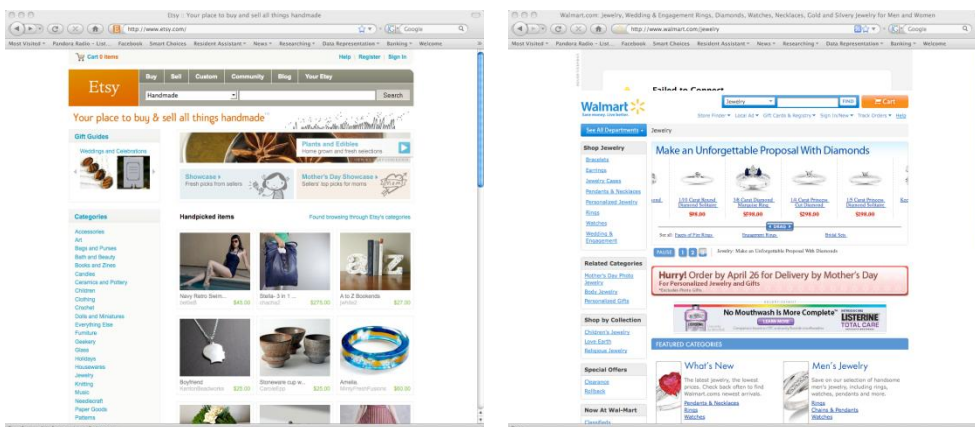
**GRAPHICS** Berlyne (1971) took a behaviorist approach and compared the arousal individuals' reticular systems on specific subcategories of aesthetics defined by Berlyne himself, such as complexity and novelty, to the Wundt curve (also referred to as the "arousal curve") to explain aesthetic preferences in psychological terms.

## SmartChoices



*Photograph from the SmartChoices Homepage*  
Loures Fonseca, of ConnCAN, felt that including a picture of a school-aged child would encourage parents to use school choice information sources like SmartChoices, by reminding them who the extra time they take to research schools will benefit: their children.

Other researchers criticized Berlyne's conclusion, including Crozier (1994), who claimed the explanation focused too much on the physical appearance of the objects and ignored their meanings and functions. As an alternative approach, Schenkman, B., & Jönsson (2000) explain that aesthetics can be considered through the science of evolutionary psychology, in which “the appreciation of beauty is seen as hard-wired into our genetic set-up and the aesthetic feeling fulfils an adaptive, biological function” (p. 368). Their research looked at web users' first visual impressions of websites, what the users' aesthetic preferences were, and what factors determined their overall impressions of the websites. They found that “aesthetic communication,” or how an individual feels about what they are looking at, involves not only its physical properties, but also syntactic factors, such as its function or the “decoding processes” used by the individual when looking at it. Like the early critics of Berlyne's (1971) claims, these findings support the notion that the degree to which an individual finds something aesthetically pleasing involves the object's function and interaction with the individual.



*Which Site is More Attractive?*

These two jewelry websites mean to serve the same purpose: to sell jewelry to online shoppers. The first, *etsy.com*, is a popular website that provides a place for individual artisans to showcase and sell handcrafted jewelry and other gifts. The second, *walmart.com/jewelry*, is a portion of Wal-Mart's larger website dedicated to jewelry sales. Notice that the Etsy site includes more pictures than text, whereas the Wal-Mart site includes more text than pictures. Which site is more attractive? (Etsy Inc., 2009), (Wal-Mart Stores Inc., 2009).

Based on the results of their research, Schenkman and Jonsson recommend improving the first impression of a website by including more illustrations than text (while also keeping in mind the amount of time needed for many graphics to load over different connection speeds, as discussed in Chapter 8).

Following this advice, our first two guidelines for aesthetics are:

- ① Use photographs and other graphics related to the topic of the website.
- ② Strike a balance between the number of graphics and the amount of text on each page – visually, they should be

balanced. Individuals should not have to be inundated with words as soon as they reach the website.

**FONT** In addition to graphics, font type also deserves consideration. In his 1963 publication *Interaction of Color*, Josef Albers, considered “one of the most influential artist-educators of the twentieth century” (Yale University Press, 2009), responded to the current fad of using “simplified” typeface, saying:

*The concept that “the simpler the form of a letter the simpler its reading” was an obsession of beginning constructivism. It became something like a dogma, and is still followed by “modernistic” typographers.*

*This notion has proved to be wrong, because in reading we do not read letters, but words as a whole, as a “word picture.” Ophthalmology has disclosed that the more the letters are differentiated from each other, the easier is the reading.*

*Without going into comparisons and the details, it should be realized that words consisting of only capital letters present the most difficult reading—because of their equal height, equal volume, and, with most, their equal width. When comparing serif letters with sans-serif, the latter provide an uneasy reading. The fashionable preference for sans-serif in text shows neither historical nor practical competence.”*

(Albers, 2006)

This fad continues today, with a plethora of available sans-serif fonts that come standard on Microsoft Word 2008.

From Albers’s advice, we derive our third guideline for website aesthetics:

- ③ Use a serif font for text that is longer than a few words, as serif fonts are easier to read. Sans-serif fonts are best kept for brief headings or titles.

**COLOR** Color, too, plays an integral role in the aesthetics of a website. Garishly colored webpages are perhaps aggravated by the effects of a glowing computer screen.

Psychologist David McClelland summarizes the effects of certain sensory stimuli, including color, on incentives in his book *Human Motivation*. He writes:

*Certain types of colors, sounds, and physical contact seem to be innately pleasing and sought, whereas others are displeasing. For instance, softness and smoothness are more pleasant than*

*Serif and Sans-Serif Fonts*

The two fonts shown above are examples of a serif and a sans-serif font. The first is Bookman Antiqua, a serif font so called for its little “wings” on the end of the strokes of the characters. The sans-serif font shown underneath is Arial, a ubiquitous font among consumer level word processors.

*stiffness, roughness, and coarseness (Berlyne, 1967). Aside from these qualitative differences, psychologists beginning with Wundt (1874) have long noted that as stimulus intensity in any modality increases from low to moderate levels the effect is pleasant, whereas if it increases to still higher levels the effect is unpleasant. Thus, tones and lights of moderate intensity generally are sought out over tones and lights of great intensity or very low intensity.*

(McClelland, 1988)

In his book *Envisioning Information*, Edward Tufte writes:

*Color can improve the information resolution of a computer screen. First, by softening the bright-white background, color calms video glare, the effect of staring at a light bulb... Color defines edges and allows a simple and elegant de-gridded design. For faming fields, the appropriate color should be light in value... and, at the same time, relatively intense and saturated (to give a strong visual signal for an active window. Yellow is the only color that satisfies this joint requirement. Thus, a two-dimensional display task is handled by two visual dimensions of a single color.*

(Tufte E. R., 1990)

From this, we derive our fourth, fifth, and sixth guidelines for pursuing aestheticism:

- ④ Use color to highlight boundaries and edges
- ⑤ Consider viewers who may be color blind by avoiding the use of colors of similar intensities placed atop each other, as is shown in the example at right.

**DID THE USERS GET WHAT THEY CAME FOR?** Generally, users who have not found what they are looking for after roughly two clicks, tend to move on (Waterson et al., 2002; Lazar et al., 2003; . To avoid this, a website should be tested by members of the target audience to check its navigational user-friendliness.

Additionally, Vaiana and McGlynn (2002) list four pieces of information that viewers need to know in order to successfully utilize top-down processing:

1. *what the information they are encountering is designed to do,*
2. *why they should be interested in it,*
3. *how the information “fits” with other pieces of information they have or need, and*
4. *how the information is organized*

(Vaiana & McGlynn, 2002)

So how do we ensure that users are able to easily find what they need?

- 1 make certain that the website homepage explains its purpose and what novel service it provides its users
- 2 make the structure of the website reflect the top-down processing. To do this, make sure that users can figure out where they are at all times, best done by including a consistent navigation bar at the top or left side of all pages
- 3 design the site so that the color of [links](#) that have already been visited appear in a [different color](#). Doing this takes any ambiguity out of what pages the viewers have already visited, which helps avoid revisiting the same page multiple times in search of the same information.
- 4 Follow the rules outlined in Chapters 6, 7, and 8 to promote the website’s intuitiveness, accessibility, and usefulness



**IS YOUR WEBSITE CREDIBLE? (AND IF SO, DID YOU REMEMBER TO TELL YOUR USERS?)** Website users want to be assured that what they are reading is credible. According to Ben Schneiderman's *Research-Based Web Design & Usability Guidelines*, the most important steps that website creators can take to ensure credibility are to:

- *Provide a useful set of frequently asked questions (FAQ) and answers;*
- *Ensure the Web site is arranged in a logical way;*
- *Provide articles containing citations and references;*
- *Show author's credentials;*
- *Ensure the site looks professionally designed;*
- *Provide an archive of past content (where appropriate);*
- *Ensure the site is as up to date as possible;*
- *Provide links to outside sources and materials; and*
- *Ensure the site is frequently linked to by other credible sites*  
(Schneiderman, 2006)

Readers want to know where the information they are reading is coming from – and they want to know without having to dig for it. A website that displays its sources and creators proudly and prominently exhibits not only a higher level of transparency, but displays greater confidence in the information you are providing.

## 10 *Getting the Word Out and Maintaining the Site*

### *importance of* getting the word out

It is always a good idea to use supplemental materials to advertise any online resource. This is especially relevant when reaching out to a community with lower rates of Internet access, as it is less likely that users will come across the website while browsing the Internet.

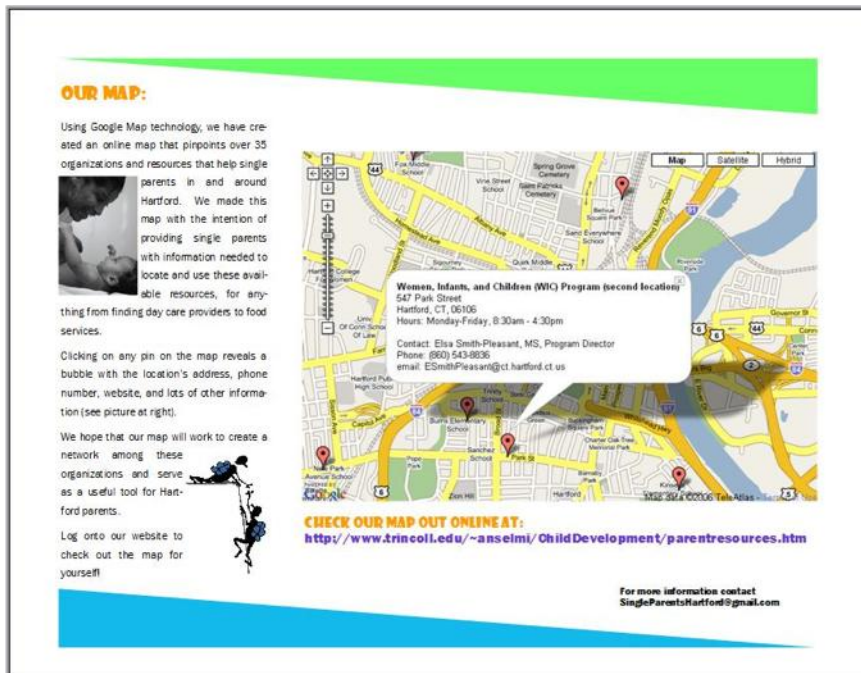
What form can such supplemental materials take? There are three primary options that serve the purpose of spreading the word about a new and useful resource.

**PRINT MATERIALS** Pamphlets, fliers, and other such print materials are great options for advertising a website because they allow the creators to select important information about the site and incorporate it onto a paper resource, which is a friendly and familiar form of advertisement for any member of a community. By delineating the contents of an electronic resource on paper, the site's existence is more likely to be learned about by members of a community who less frequently use computers, as well as those who do. Many individuals who are less well versed in technology experience a fair amount of anxiety upon encountering a map mashup for the first time, and a print handout can also help alleviate some of this apprehension. In short, a paper handout is a very inclusive and encouraging form of advertisement.

A print handout should include the following information:

- the website's name and URL, equally prominently displayed
- a friendly and brief but conclusive description of the site
- a picture of the map mashup (this provides an idea of what viewers should expect when they visit the site and makes the virtual map more relatable to a traditional, paper map)
- options for places to access the website (such as internet cafes, public libraries, community centers, etc.), particularly in areas where Internet access is less common

- ✓ information on how to contact the people behind the site
- ✓ if applicable, the handout should be printed in multiple languages



*Tri-Fold Pamphlet Used for the Single Parents in Hartford Mashup*

Shown here is the inside of the pamphlet distributed to local nonprofits to advertise the mashup of single parent resources in Hartford. The pamphlet includes a brief description, a screenshot of the map (with an example “bubble”), contact information, and the URL for the site itself. On the back panel of the pamphlet, the mashup makers also included a list of local places that offer free Internet access (Becker & Hughes, Single Parent Resources in Hartford, 2006).

It is, of course, important to provide your print advertisements in the right places so as to be noticed by members of the target audience. A few good locations for fliers and pamphlets are:

- ◆ organizations or events that serve members of the target audience
- ◆ internet cafes
- ◆ libraries
- ◆ any other high traffic areas that allow for the posting or distribution of fliers or pamphlets

**WORD OF MOUTH** By talking to the right people, knowledge of an online resource can be spread quickly. Pinpointing members of a community who are active, respected, and vocal can be a great way to advertise. These individuals obviously vary from one community to the next, and can often be located simply by asking around. Doing this can also gain powerful advocates and supporters of the site.

**PUBLIC SERVICE ANNOUNCEMENT**

Depending on the project's budget, it can be worthwhile to arrange for a public service announcement that publicizes the website. These may be in the form of a television advertisement, radio announcement, or newspaper ad. This form of advertisement should include the website's name and URL, a brief description, and information on the best way to learn more about the site (though this is oftentimes simply by visiting the site itself).



*TV Personality Maury Povich Announces SmartChoices' Release*

To advertise SmartChoices and encourage parents to become informed and make good decisions for their children, before the February 17<sup>th</sup> deadline, TV talk show host Maury Povich made a public service announcement that aired on Hartford's Fox 61 (ConnCAN, 2009).

*necessary*

## website maintenance

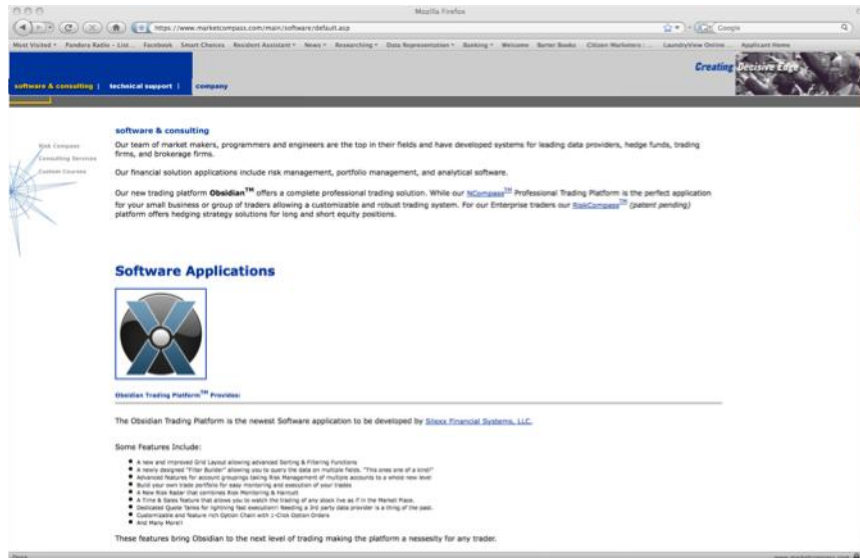
Once the website is up and running, it is critical to make efforts to keep it as up to date as possible. This is often especially true of mashup websites, which serve the purpose of providing users with relevant information. In the case of the “Problem Properties” map discussed in Chapter 2, outdated information could easily spark upset among individuals who are wrongly represented on the website as owning an abandoned property. The guidelines below will help you to ensure that your website is up to date in every sense:

**UNDERSTAND THE NATURE OF THE INFORMATION IT INCLUDES AND DETERMINE HOW FREQUENTLY IT NEEDS TO BE UPDATED** In the case of the SmartChoices website, it is most important that the information be updated at least once a year, particularly at the conclusion of the academic year. Because of the high turnaround rate of schools and their students in Hartford, with many new schools opening, others closing, and several undergoing managerial and name changes, the information on the SmartChoices website will change dramatically year to year. Additionally, because test score and racial balance data are two key features of the SmartChoices site, and because this information has a large

impact on parents' school choice decisions, it is of the utmost importance that the data be accurate.

**DESIGNATE A PERSON OR PERSONS TO BE IN CHARGE OF MAINTENANCE** Diffusion of responsibility can quickly add to a website being outdated. By appointing who specifically will spearhead maintenance of the website, the processes of updating will not fall through the cracks.

**MAINTAIN THE DESIGN OF THE WEBSITE** A modern and attractive website created in 2001 may lose its appeal eight years down the road. Along with updating your information, it is important to update the presentation of your website.



MarketCompass.com, © 2001

This website, although hopefully updated information-wise, appears to have maintained its same design since 2001 (according to the copyright notice at the bottom of the page). Its features also indicate an outdated design: low quality, slow-loading graphics and long pages of text in an unflattering font. (Market Compass Inc., 2001)

**DOUBLE-CHECK USABILITY ON NEW VERSIONS OF WEB BROWSERS** As discussed in Chapter 8, it is important to make sure that your website functions properly when viewed on different browsers. Equally important is to check that your website continues to function on these multiple browsers when they update their service.

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# Appendix

capitol region education council (crec)  
[www.crec.org](http://www.crec.org)

connecticut coalition for achievement now (ConnCAN)  
[www.conncan.org](http://www.conncan.org)

connecticut state department of education (csde)  
[www.sde.ct.gov](http://www.sde.ct.gov)

connecticut state department of education website  
[www.csde.state.ct.us/public/cedar/edfacts/enrollment/public.htm](http://www.csde.state.ct.us/public/cedar/edfacts/enrollment/public.htm)

hartford areas rally together (hart)  
[www.hartofhartford.org](http://www.hartofhartford.org)

hartford choice office  
[www.hartfordschools.org/about-your-choice](http://www.hartfordschools.org/about-your-choice)

hartford public schools website  
[www.hartfordschools.org](http://www.hartfordschools.org)

racial balance data source  
[www.ctreports.com](http://www.ctreports.com)

regional school choice office (rsc0)  
[www.magneteducation.org](http://www.magneteducation.org)

regional school choice office website  
[www.magneteducation.org](http://www.magneteducation.org)

source of test score data  
[www.csde.state.ct.us/public/cedar/edfacts/enrollment/public.htm](http://www.csde.state.ct.us/public/cedar/edfacts/enrollment/public.htm)

the cities, suburbs, and schools project at trinity college  
[www.trincoll.edu/depts/educ/css](http://www.trincoll.edu/depts/educ/css)

the sheff movement  
[www.sheffmovement.org](http://www.sheffmovement.org)

## mapping websites

map builder

<http://www.mapbuilder.net>

yourgmap

<http://www.yourgmap.com>

zeemaps

<http://www.zeemaps.com>

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