



SUPPORTING AGING SERVICES

at the City of Berkeley

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SUPPORTING AGING SERVICES AT THE CITY OF BERKELEY

UC Berkeley School of Information

Karen Braverman Bujanover

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Context

The Aging Services Division (ASD) at the City of Berkeley operates three senior centers around Berkeley. Currently, data on registration and attendance by seniors is collected on paper only and is not shared electronically across the centers. Tracking of this data would be extremely useful for the leadership of the ASD for purpose of grant applications. A secondary purpose would be better planning and improved operations, especially long-term planning.

The ASD faces two main challenges. First, the centers follow the “No Wrong Door” approach to aging, which means offering all necessary services under one roof. Those include recreation services (classes, trips, events), nutrition services (lunch), and social work (case management) services. Those services are heavily dependent on grants, and the ASD must meet the reporting requirement of the funding organizations. As each service must meet separate reporting requirements for funding, the ASD uses different information systems, and information silos develop over time.

Second, as baby boomers grow older, the US faces new challenges, mainly, providing senior citizens with a variety of services that would ensure their aging takes place in a safe, healthy and pleasant environment. Providing those services requires assessing service provision needs and planning accordingly, especially when funds are limited.

The City of Berkeley is expected to have 20% of its population over the age of 65 by 2020. The ASD would need to obtain increased funding and plan to accommodate the needs of this growing aging population. In order to obtain increased funding, the city must be able to present data on its current usage, both in terms of scale (how many are using) and composition (which services are used).

Project Proposal

My Master's final project team has been working with the ASD and the City of Berkeley IT department for the past few months, conducting business process analysis, qualitative research, prototyping and other design activities to make system design recommendations for the ASD. The proposed system will enable ASD leadership to look at the data regarding all services offered at the centers (recreation, nutrition, and case management) at once, regarding of external reporting requirements, thus overcoming information silos.

In my initial project proposal for this project, I envisioned a dashboard for the leadership of the Aging Services division (ASD) at the City of Berkeley. I intended for the visualization to demonstrate the reporting capabilities of the new information system to the director of the ASD.

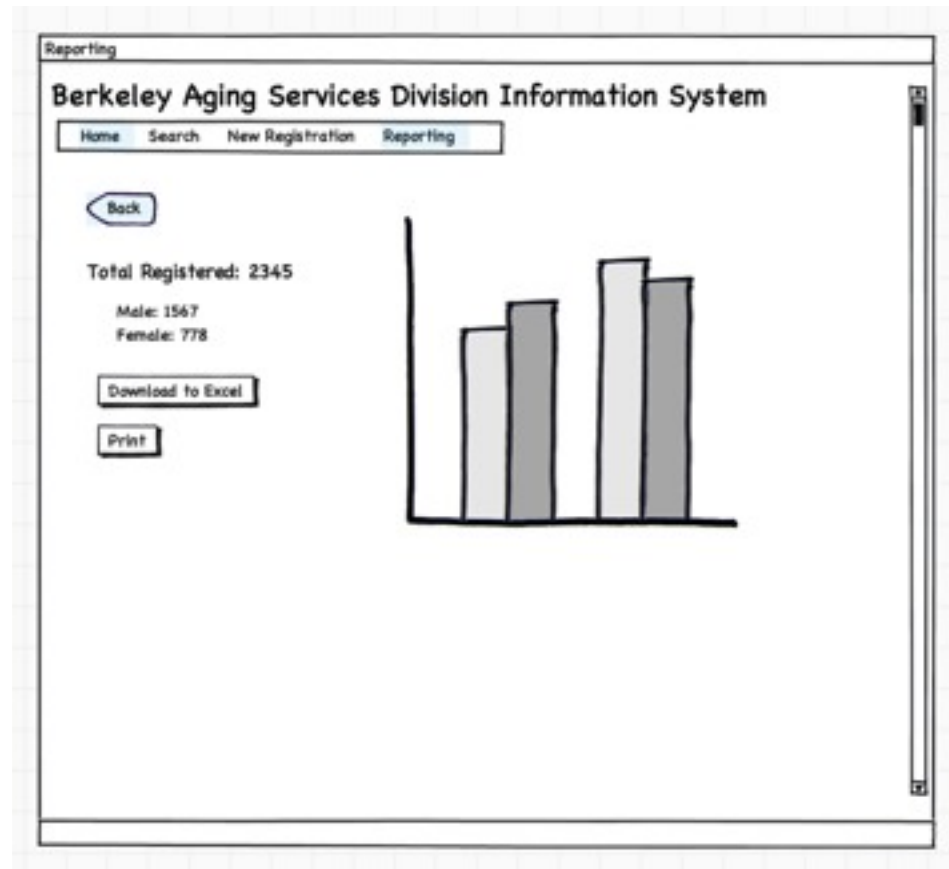
The proposed system will log attendance and usage of the facility and will enable the division to present data on usage of their services for grant writing purposes. The data will come from two sources: First, registration information will include demographic which is relevant for grant proposals, such as age, ethnicity, and residence zipcode.

The second source of information will be attendance at the centers and its activities. Seniors coming into the centers will be asked to sign-in and mark all activities they plan on attending. That will provide the center with data on general attendance, attendance per activities, per time of day and per each of the three center. I planned to test the visualization with the user group, composed of the director of the ASD and two center directors.

For the purpose of the class project, I was planning on using mostly fake data, since the current data collection is very limited and is not currently done at the level of granularity described above.

Initial Sketches

Initially, my team envisioned the director's screen to be fairly basic, following the director's expressed desire for simple representation of the data:



First Prototype Design and Mid-Term Presentation

Based on my proposal, I generated fake data for the fields that were relevant, based on the data-based fields my team had been recommending for the system: for seniors: age, zip code; for activities: attendance by activity (lunch, class, trip, case management) and attendance by class type and time of day. I also generated calculated fields to capture a significant variant for the ASD: the amount of time seniors were spending at the centers socializing, i.e., not engaged in any of the pre-defined activities listed above. The significance of capturing this information is that it will enable the social work case managers to prove that the centers provide service to the seniors' caregivers by allowing them to leave the seniors at the centers for a few hours. The case managers will then be able to apply for grants to fund that service to the caregivers.

Tools

I used IBM's ManyEyes (manyeyes.com) to generate the following visualization from my generated data:



In this prototype, I plotted attendance/usage of activity categories (top left), age by zip code (bar chart, top middle), socializing versus activities over a year, (top right), Activity categories per center by participant (bottom left), class attendance comparison across centers (bottom middle), and class attendance by category (bottom right). The legends are clickable and allow filtering the categories. The visualization enables hovering over to get data point information.

I combined current snapshots (weekly charts, bottom line) with visualizations over time (top line) since I still felt that I needed some clarification about the exact need that the visualization will serve. I felt that conversations I had with the users did not clarify that and that testing a prototype may provide the answer.

I presented my first prototype in the mid-term presentation on April 21.

User Testing of First Prototype

I tested the visualization with the ASD director and one of the center directors. They were both extremely pleased to see the possibilities of presenting data in this way. Having no electronic data collection and storage in place at the moment, though, their reactions im-

plied that they preferred simplicity of visualizations. One of them specifically noted that the line and bar graphs were clearer. As a result, I decided not to pursue the stacked bar charts (top and bottom left).

Testing also enabled me to further focus the purpose of the visualization for the users. They were interested in seeing more information regarding each of the charts. For example, for the class attendance comparison, they were interested in slicing and dicing it according to age group or zip code. I realized that their main purpose was not monitoring the centers, but rather analyze them.

Second Prototype Design

Tools

I used **Adobe Fireworks** to create an interactive prototype.

Approach Change: Focused Purpose of Visualization

Based on the user testing and the feedback I received in class on the first prototype, I decided to change the approach and make a faceted analytical display as defined by Stephen Few¹ instead of a dashboard. Based on their desire to compare age groups and compare service categories, I came to the realization that the directors needed a tool to analyze, rather than monitor. Perhaps in the future, when the number of seniors reaches its estimated 20% of the Berkeley population, a dashboard may be in place. However, for now, the ability to analyze the senior population and their usage of services is crucial for the primary priority of grant writing.

Design Changes

Brushing: I used the brushing technique to demonstrate the relative proportion of each age group in activities plotted.

Preattentive properties: I used color extensively based on the users' expressed preference throughout the testing sessions.

Simplicity: Sticking to the users' preferences, I included two bar charts.

Filters: I used filters to allow slicing and dicing based on age and activity category.

¹ Stephen Few, *Now You See It*, p.107.

Daily Activity Timeline: The bottom chart shows how the average day is spent at each of the three centers, highlighting the most popular activity per time of day.

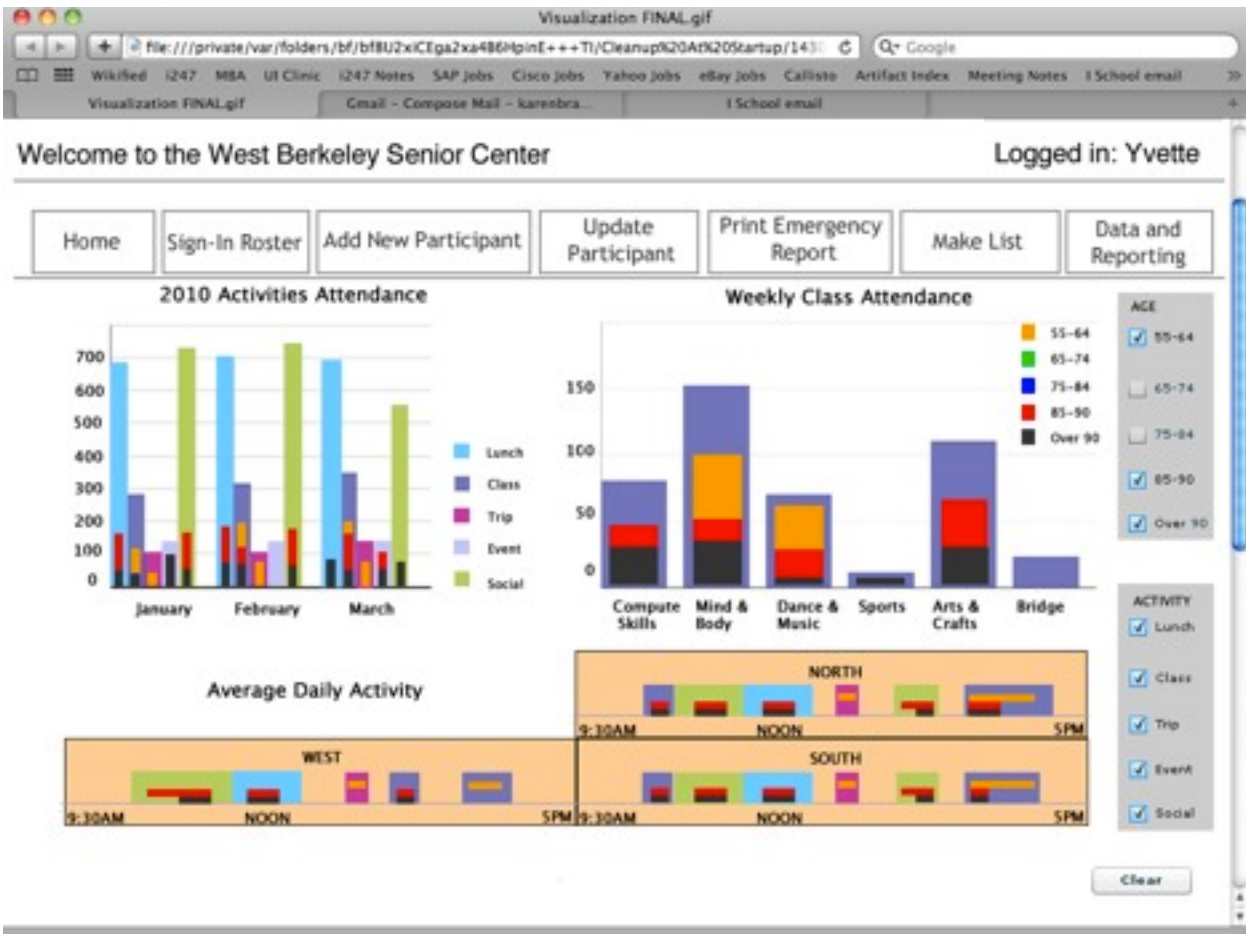
The initial screen when no age group is elected:



Checking one age group produces the following view, which is a result of brushing. The relative portion of the chosen age group is colored in the color assigned to that age group. In the screen shot below the Over 90 age group is highlighted in black:



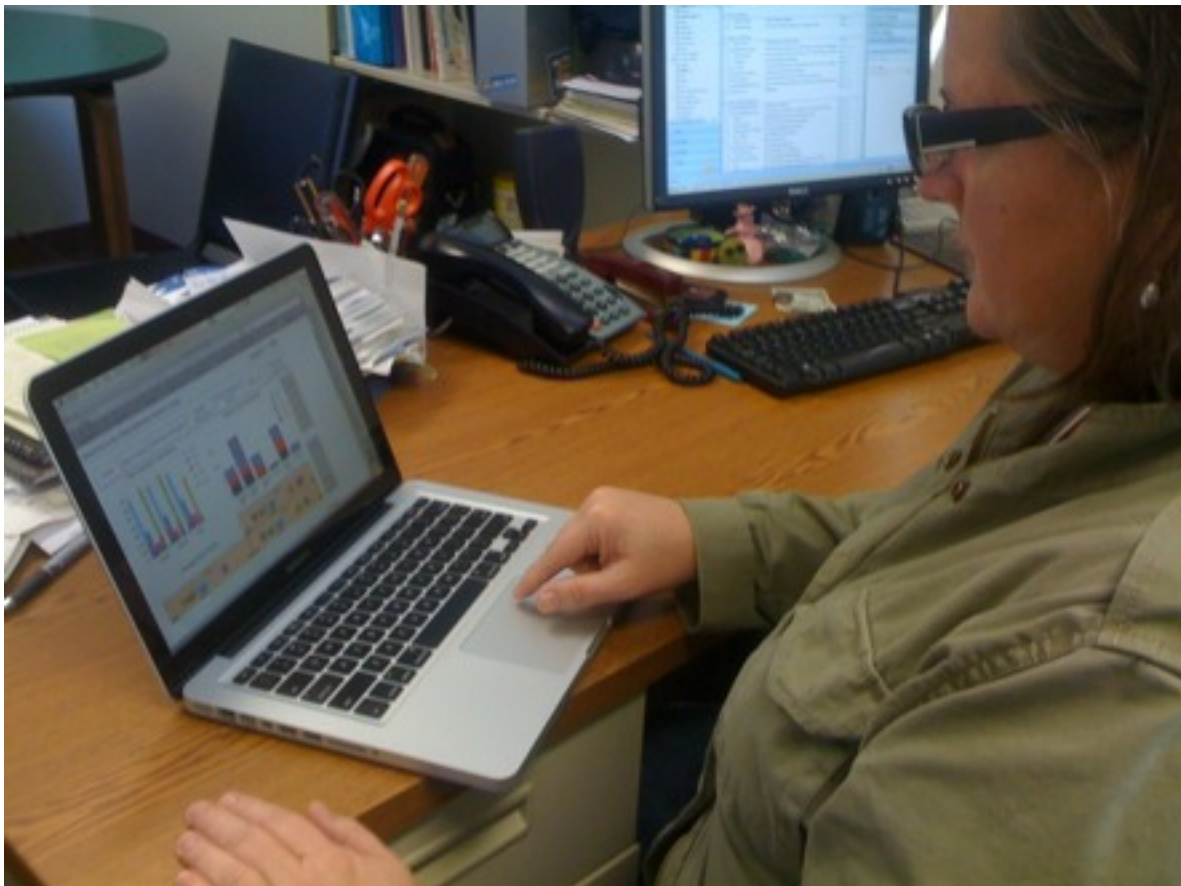
Checking additional boxes triggers additional brushing, with the added age groups stacked on top of the previous one:



The legend for the brushing is on the top right. The legend for activity categories is located next to the left bar chart, since it is used for both the bar chart and the Daily Timeline.

In the above screenshot, significant changes in the activities breakdown are noticeable between the age groups, mainly between the younger seniors (ages 55-64) and the seniors 85 and above (left bar chart). At the bottom timeline chart, only the younger seniors attend trips. Another significant finding is that at the West Berkeley Senior Center, the AM hours are spent mostly in socializing, compared to a mix of classes and socializing at the other two centers (bottom Timeline). Also, users notice quickly that the seniors in the 55-64 age group are very fond of two types of classes (Mind & Body, Dance & Music); this information may be useful when planning for additional classes in the future, when that age group constitutes a growing segment of the overall senior population:

User Testing of Second Prototype



I tested the second prototype with one center director. Her feedback included the following:

Use of Color: The director was excited about the use of color and found it easy to understand that the left bar chart and the Daily Timeline were using the same color legend. She also found the brushing very helpful. She preferred that the legend for the activity categories be closer to the Daily Timeline. As a result, I lowered the legend to be in between the left bar chart and the bottom Daily Timeline.

Timeline (risk of Data Distortion): The director commented on the Daily Timeline representation of time. She found it to be confusing that “Noon” did not appear in the middle of the timeline. Her argument was that she conceptually thought of noon as the middle her day, no matter how many hours it was away from the end of the day. I decided not to implement that recommended change, since it would violate one of the basic rules of data visualization, that of data distortion.

Summary

I designed the final prototype in Adobe Fireworks and it includes check box interactivity and button interactivity (the clear button takes the user back to the initial screen with no age group selected).