Red Ink:
Open Source Financial Analytics for People & Communities

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By

Ryan O'Toole

B.A., Interdisciplinary Computing in the Arts & Music
Minor, Computer Science & Engineering
University of California, San Diego, 2003

Submitted to the Program in Media Arts & Sciences, School of Architecture and Planning, in partial fulfillment of the requirements for the degree of Master of Science in Media Arts and Sciences at the Massachusetts Institute of Technology.

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Author_____
Program in Media Arts & Sciences
September 2010

Certified_____
Chris Csikszentmihályi
MIT Media Lab, Research Scientist
Director, Center for Future Civic Media
Director, Computing Culture Group

Accepted_____
Professor Patti Maes
Associate Academic Head
Program in Media Arts & Sciences

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Abstract

Red Ink is an open source social-financial web-service that enables people to share, aggregate, analyze, visualize and publish their financial transactions as individuals and ad-hoc groups, through data sharing campaigns. Virtual and geographic communities of financial data sharers can form on Red Ink to create new sources of information for self-knowledge and understanding of complex personal, community, economic, environmental, and civic concerns and how to better coordinate their solutions.

Red Ink posits that just like volunteering time or donating money, *personal financial data* is itself an asset that people can share to gain group leverage. Further, in the hands of everyday people, the data and tools of corporate scale consumer analysis will be reborn to serve larger and more personally meaningful goals.

Thesis Supervisor

Chris Csikszentmihályi
MIT Media Lab, Research Scientist
Director, Center for Future Civic Media
Director, Computing Culture Group

Thesis Advisor

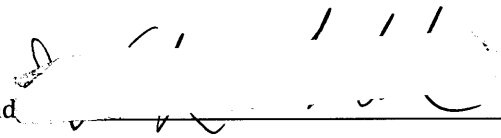
Chris Csikszentmihályi
MIT Media Lab, Research Scientist
Director, Center for Future Civic Media
Director, Computing Culture Group

Thesis Reader_____

Dr. Alex "Sandy" Pentland
MIT Media Lab, Toshiba Professor of Media Arts and Sciences
Director, Human Dynamics Group

Thesis Reader_____

Dr. David P. Reed
MIT Media Lab, Adjunct Professor
Co-Director Viral Communications Group

Thesis Read 

Thomas W. Malone
MIT Sloan School of Management, Patrick J. McGovern Professor of Management
Director, MIT Center for Collective Intelligence

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Inge Endter
Christina Xu
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The Computing Culture Group:

Josh Levinger
Adam Whiton
Noah Vawter

Media Lab Staff:

Jon Ferguson
Aaron Solle
Nicole Freeman
Stephanie Gayle
Michail Bletsas

Friends:

Joost Bonsen
J.B. Labrune
Micah Eckhardt
Phuong Nguyen
Richard The
Jonathan Ward
Scott Greenwald
Kathryn Payne
Jess Wheelock
Deborah Egloff
Catherine McMahon
Leslie Chung
& Everyone else who got me through 2 years of IHTFP

Development Team:

Mike Norman
Melva James
Britton O'Toole
Kwadwo Nyarko

Advisers:

Chris Csikszentmihályi
David Reed
Tom Malone
Sandy Pentland

Community Foundation of Greater South Wood County:

Kelly Lucas
Helen Jungwirth
Tim Krause
Liz Everson
Kristi Anderson
& Everybody from South Wood County who took time to speak with me.

Community Partners:

Journalism That Matters: Detroit
Matt Renner
Lou Rutigliano
Geoff Samek
Andrea Silenzi
Michelle Ferrier
& Mellissa Scott

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Introduction

The techniques of mass consumer analysis are broadly adopted in the industrialized world today.[1] Regularly used by corporations, they record the dynamics of market places, make predictions about future behaviors, and inform internal business decisions. These are powerful tools, but exclusively in the hands of a corporate elite they serve decidedly corporate agendas. Corporations feed their models with large databases of information collected from unaware customers or purchased from vendors. As such, people have very little say in what information is collected and how it is used. Privacy laws protect against certain types of targeting and exploitation, but are also outmoded, creating a negotiable labyrinth of legal risk as much as protecting privacy.

Corporations are not the only groups with uses for consumer data. Many personal and community interests can be addressed through such data and tools, which could support social causes with better information; track the flow of money through individuals, groups, communities, regions, businesses, etc.; bring collective perspective to bare on individual behavior; facilitate sharing financial information within private groups or for the public; provide user created tools for financial planning and literacy; and potentially many other purposes. Many kinds of problems require us to think in terms of these kinds of networks and groups to gain perspective, leverage power, or formulate solutions.

Just as personal computers transformed the format for working with financial data from pen and paper ledgers to digital spreadsheets, the Internet is transforming it again from spreadsheets to web services. Each step along this path was spawned by a technological or philosophical evolution.

---

[1] Wedel, Michel, and Wagner Kamakura. Market Segmentation: Conceptual and Methodological Foundations. 2nd ed. Boston: Kluwer Academic Publishers Group, 2000.

Computers made the data digital. Personal computers made it individual. The World Wide Web made it remotely accessible. And Web 2.0 has made it a service.

Web 2.0 financial services have proven to be compelling ideas for both consumers and business. Mint.com, a personal finance aggregation and analysis service, had roughly 500,000 members before being acquired by the financial software giant Intuit in 2009. And in 2010, Groupon.com, a company that organizes group discounts became the fastest growing Internet company in history.[2] Recent years have seen a glut of social media + consumer mash-ups, in fact. Others include, Twittering online purchases (Blippy[3] & Swipely[4]); organizing collective financial action (The Point[5], Carrot Mob[6]); understanding global logistics networks (SourceMap[7]); more reflective consumption (Merry Miser[8], Buy It Like You Mean It[9]). Clearly, financial data has grown past the boundaries of Excel, Quicken and TurboTax. This is the environment in which Red Ink was conceived, *the Age of Oversharing*.

Given this environment, Red Ink posits that financial data itself is another asset that people can conspicuously over share, but that personal, community, civic, and political concerns will provide the most compelling reasons to share. Further, tools open to definition by developers and users will result in novel uses for aggregate financial data towards these personal and community based ends, while respecting personal privacy and data ownership.

---

[2] Steiner, Christopher. "Meet the Fastest Growing Company Ever." *Forbes.* 12 August 2010. Web. 24 August 2010.
[3] http://www.blippy.com
[4] http://www.swipely.com
[5] http://www.thepoint.com
[6] http://www.carrotmob.com
[7] http://www.sourcemap.org
[8] http://web.media.mit.edu/~cfd/merrymiser/
[9] http://www.bilymi.org

To evaluate this idea, I developed a web service that worked with existing free software and data sources to enable users to share, filter, aggregate, analyze, visualize, and publish their bank information as individuals and ad-hoc groups, in what are called *Campaigns*.

Campaigns propose a purpose for sharing data and a means of presenting the collected information back to the participants or the public. An example campaign, "BPCoytt", aggregates purchases at several gas station chains, breaking down spending by chain, group and individual. For a community interested in carbon footprint (fossil fuel) reduction, automating regular measurement of their aggregated spending on gasoline would provide a financial metric for framing progress towards that goal. Since campaigns are open to definition by both developers and users of Red Ink, there are many other potential variations on this idea. Part of developing the project was to explore this uncharted territory, to understand what ideas are compelling when it comes to sharing private financial data.

During development, I met with users of money 2.0 services, non-profits, businesses, bankers, community groups, academics, journalists, developers, colleagues, collaborators and critics who helped to formulate the project and evaluate its principles. The rest of this document describes the environment and ideas that spawned Red Ink, provides an over-view and then evaluation of its technical architecture, and concludes with commentaries on the social dynamics feeding into its development and deployment.

Background

Red Ink is an Open Source Web 2.0 mash-up of financial web services and social networking that enables grassroots communities to produce aggregate scale financial data sources and analysis tools.

That sentence is a concise description of Red Ink that hits on most of the high-level concepts and technologies at play. It also communicates almost nothing about Red Ink to someone lacking a background in consumer analysis, online banking, Open Source philosophy and practices, and Web 2.0 paradigms. In this section, I will attempt to unpack some of these ideas and relate them to why and how people can share financial data to better inform themselves.

Consumer Analysis

The Industrial Revolution changed the means of manufacturing from manual to mechanical, creating advantages for companies with machines able to out-produce their competition. However, since the turn of the 20th century, economists have theorized that social factors also play into a company's growth and success. By the mid-1950's, this idea was widely understood, and eventually crystallized as a shift in corporate mindsets away from products and towards markets. Rather than solely considering the efficiencies of mass-production (product orientation), market oriented businesses consider the efficiencies of who is being sold to.[10] Companies who define themselves in harmony with the needs of consumers will have more success in the market than their competitors who do not.

---

[10] Smith, Wendell R. "Product Differentiation and Market Segmentation as Alternative Marketing Strategies" *The Journal of Marketing Vol. 21, No. 1.* July 1956. Birmingham: American Marketing Association. Pp. 3-8

The merit of this idea has made the practice of market segmentation "an essential element of marketing in industrialized countries." [16] And it is for this purpose that collecting and analyzing large volumes of consumer data has become an essential contemporary business practice.

Access to Data

Corporations feed their market models with large databases of consumer information collected from customers or purchased from data vendors. Every point of interaction with a consumer becomes an opportunity to capture more information about them. This applies equally to old media businesses and new media businesses. Many of the most popular sites on the Internet track users and aggregate their browsing data. The difference between old media and new media is in how they use the data to improve quality of service.

In a traditional business, consumers have very little say in what information is collected and how it is used. And no transparency on how data collection improves the quality of the service offered. A grocery store might use inventory information to calculate how much of what food to stock, but that could just lead to increased warehousing efficiencies for the grocery store. This may be an improvement to their business, but one that may only indirectly impact customers.

Occasionally, exchanging information directly impacts customers. A grocery store that offers discounts for swiping a loyalty card exchanges lower prices for data. In this model, the benefit to the store is additive; the more data the store collects the more it will know about its customers and their shopping habits. And for customers the benefit is finite; a one-time discounted price.

Contrast that old model with a Web 2.0 application whose utility is premised on the volume of data it captures[11] and the size of its membership.[12] GMail's collaborative spam filter has users flag what is and isn't junk mail. The crowd sourced data gets fed back into the spam filtering system to improve its understanding of spam. And the service becomes more effective.

Digg, Facebook, Delicious, GMail, Flickr, Amazon and many other web services use this same principle. The more users share/aggregate their information the more useful the services become. The usefulness of the services in turn creates positive incentives to share personal information.

Of course, old media forms of data collection have been ported to new media. Spying on the browsing habits of web surfers is a new growth industry. Advertising companies have partnered with many of the most popular sites on the Internet to track surfers as they browse the web. Tracking occurs on a massive scale and web surfers are largely unaware that it occurs.[13] As such, they have very little control over what is done with the information.

These examples of old business data collection and new media data collection illustrate two contemporary approaches to data collection. The relevant difference between them is that old media businesses generate and collect information as a byproduct of their other services, and new media businesses have the potential to collect and work with information itself as a personal service. As a consequence of the new media model, some of the old axioms of privacy no longer seem to apply.

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[11] O'Reilly, Tim. "What is Web 2.0.: Design Patterns and Business Models for the Next Generation of Software." OReilly.com. 30 September 2005. Web. 24 August 2010.

[12] Reed's Law on the utility of large networks; http://en.wikipedia.org/wiki/Reed%27s_law

[13] Angwin, Julia. "The Web's New Gold Mine: Your Secrets." *Wall Street Journal.* 30 July 2010. Web. 24 August 2010.

Privacy

Norms of privacy are changing. People have shown their willingness to share private / personal information, given a framework for understanding what it is being used for[14], though they don't like when that information is then exploited by 3rd parties.[15] This dynamic has shifted the discussion of personal privacy to a discussion of personal control. People want the ability to control whom sees and uses their information, and they are thinking more critically about the nature of privacy and the power of sharing.

It may be said that, today we have the illusion of privacy. In reality, our privacy is in the hands of corporations who have access to our private data and analytical tools for network analysis and behavioral modeling. Our information is divided into silos of access and shades of privacy. Access across many silos is possible for large organizations like corporations and governments. So, while many groups may not have access to the information, that does not mean no groups have access. Groups who conspicuously don't have access though, are perhaps some of the most capable of making compelling cases for personal data sharing.

New Audiences for Consumer Analysis

Corporations are not the only groups with uses for consumer data. Many personal and community interests can be addressed through such data and tools, which could support social causes with better information; track the flow of money through individuals, groups, communities, regions, businesses, etc.; bring collective perspective to bare on individual behavior; facilitate sharing

[14] Facebook had more than 500 million active members in July 2010; http://en.wikipedia.org/wiki/Facebook.
[15] "Facebook Beacon". *Wikipedia*. 26 June 2010. Web. 24 August 2010.

financial information within private groups or for the public; provide user created tools for financial planning and literacy; and potentially many other purposes. Many kinds of problems require us to think in terms of these kinds of networks and groups to gain perspective, leverage power, or formulate solutions.

Web 2.0

Just as personal computers transformed the format for working with financial data from pen and paper ledgers to digital spreadsheets, the Internet is transforming it again from spreadsheets to web services. Each step along this path was spawned by a technological or philosophical evolution. Computers made data digital. Personal computing made it individual. The World Wide Web made it remotely accessible. And Web 2.0 is making it a service.

Web 2.0 financial services have proven to be compelling ideas for both consumers and business. Mint.com, a personal finance aggregation and analysis service, had roughly 500,000 members before being acquired by the financial software giant Intuit in 2009.[16/17] And in 2010, Groupon.com, a company that organizes group discounts became the fastest growing Internet company in history.[18] Recent years have seen a glut of social media + consumer mash-ups, in fact. Others include, Twittering online purchases (Blippy[19] & Swipely[20]); organizing collective financial action (The Point[21], Carrot Mob[22]); understanding global logistics networks (SourceMap[23]); more

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[16] Perez, Sara. "Who Really Uses Mint.com (And Other Banking 2.0) Services Anyways?" *Read Write Web.* 9 October 2009. Web. 24 August 2010.
[17] Patzer, Aaron. "The Value of TechCrunch50: Mint Acquired by Intuit for $170m Two Years After Winning TC40." *TechCrunch.* 14 September 2009. Web. 24 August 2010.
[18] Steiner, Christopher. "Meet the Fastest Growing Company Ever." *Forbes.* 12 August 2010. Web. 24 August 2010.
[19] http://www.blippy.com
[20] http://www.swipely.com
[21] http://www.thepoint.com
[22] http://www.carrotmob.com

reflective consumption (Merry Miser[24], Buy It Like You Mean It[25]). Clearly, financial data has grown past the boundaries of Excel, Quicken and TurboTax.

[23] http://www.sourcemap.com
[24] http://web.media.mit.edu/~cfd/merrymiser/
[25] http://www.bilymi.org

Technical

Red Ink is an open source LAMP stack web server application that enables its users to share, filter, aggregate, analyze, visualize, and publish their personal bank information as ad-hoc groups. Its technical architecture is a combination of existing Open Source software, public web based financial data APIs, and the Red Ink source code release. Red Ink is a Free & Open Source Software project distributed under the Affero General Public License (AGPL)[26], a variation of the GNU General Public License for web services.

Users of Red Ink can opt-in to share aspects of their financial behavior to support social causes with data; understand the flow of money through social networks and geographic regions; gain collective perspective on individual and group behavior; make financially informed decisions; share information within a private group or for a public audience; and potentially many other purposes which are open to definition by the users and developers of the system. This openness is a fundamental principal around which the platform was designed.

3rd Party Web-Based Financial Data APIs

A description of Red Ink's technical structure needs to be prefaced with the knowledge of 3rd party services that automate access to personal financial data (NO data entry required). Today, Mint.com, Wesabe.com, and Yodlee.com are the most popular of these services, with Mint leading the pack at an estimated 500,000 user.[27] However, for development purposes, each was disqualified due to cost, reliability, technical overhead, or inaccessibility. Instead, I chose a fourth provider,

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[26] see Appendix D or http://www.gnu.org/licenses/agpl-3.0.html

[27] Patzer, Aaron. "The Value of TechCrunch50: Mint Acquired by Intuit for $170m Two Years After Winning TC40." *TechCrunch.* 14 September 2009. Web. 24 August 2010.

Expensify.com, because its API was public and free to use and its simple feature set met our authentication and data collection requirements. One downside, it did not provide an API for user registration, which makes registering for Red Ink a two-part process; register once with Expensify, then again with Red Ink. For the purposes of research and with no funding for per user data collection costs, that was a necessary sacrifice.

As an aside, when Red Ink began, it was possible to develop the project free of data collection costs using Wesabe or Expensify. In fact, the growing popularity of such services underpinned one of Red Ink's most compelling potentials, to broadly provide communities access to financial data previously inaccessible due to cost and other forms of disenfranchisement. As of this writing however, Wesabe has shuttered its business, and Expensify will soon discontinue its public API though continuing as a business. Today, the only way for small-time application developers to access bank data is through a pay service, such as Yodlee's, with fees running in the $5 per user/month range. Writing page scrappers for major banks and Mint is an option, or starting from scratch and re-inventing the Yodlee bank integration wheel is a third.

None of this negates the technical proof of concept outlined in the following sections, but it does factor into barriers to adoption. Free (as in beer) data could lead to free (as in ideas) adoption. Paying a steep linear growth cost per user, compared to the more acute growth of hosting and bandwidth costs per user, is a significant burden for potential providers. It presages the niche for an entity to pay the collection costs in order to specialize in hosting and mediating the data on-behalf of less technical or financially capable groups.

Technical Requirements

Functionally, the Red Ink web interface can share, filter, aggregate, analyze, visualize, and publish transaction data across users of the system. These capabilities are implemented by the system's core code, modular extensions to the core code, and front-end user interactions. The operational functionality is divided between these as follows:

First, the core code of the system handles user registration; authentication and access control; account management; module management and publishing; and integration with 3rd party financial APIs. These elements comprise the essential foundation of the platform.

Second, the core code provides a management interface of functions common to all modules (create campaign, add member to campaign, remove member from campaign, get members of campaign, etc...). This abstraction reduces code redundancy across modules, and enables developers of analysis and visualization extensions to focus on their core tasks rather than system integration. It also enables Red Ink to provide a variety of plug-n-play analytical and visualization options to its end users, depending on their needs.

Third, front-end users can create and customize data sharing campaigns through the web interface. This consists of defining the campaign, defining additional data points to capture, defining transaction filters for aggregation, and selecting the analysis and visualization module to represent the data with.

Fourth, front-end users control access to their transaction data. Campaigns define what data is collected from users, but users decide whether to opt-in to those campaigns and have their data

included in its analysis. Additional data points captured by a campaign are added to the user's profile for centralized management and control. Supplying additional data may be a prerequisite for membership in a given campaign, but additional data can be removed along with all other data, at any point.

Technical Components

The Red Ink hosting environment uses a LAMP[28] stack, typical of Open Source web development environments. In this case the stack is Debian Linux, the Apache web server, a PostgreSQL database, and PHP/Perl scripts (LAPPP stack is more accurate).

Perl scripts automate the process of securely authenticating users to their financial service provider and collecting their transactions. Perl was used for the automated scripting because it works well as glue between Debian's shell environment and Red Ink's essential applications; was quickly extensible to handle the encryption and HTTP handling requirements; and had robust regular expression capabilities, used to parse JSON objects returned from the web APIs into valid and safe SQL queries.

The server-side of the web interface was written in PHP using the CodeIgniter[29] web development framework and PostgreSQL database[30]. PHP/CodeIgniter was used because it emphasizes web applications and allowed development to begin quickly without significant technical overhead. PostgreSQL was chosen for its agility working with large volumes of data and many concurrent

[28] LAMP: Linux, Apache, MySQL, PHP; a general purpose web server;
[29] http://www.codeigniter.com
[30] http://www.postgresql.com

users. A single user would generate many entries in the transaction table over time, and fast simultaneous queries across many users' transactions was an operational requirement.

The client-side code uses the de facto HTML, CSS, and JavaScript using the Jquery[31] framework to support cross browser compatibility and reduce development time. Flot[32], a JavaScript graphing library, was used for its ability to render across a variety of computer platforms, in particular mobile devices.

On the network side of the environment, an Extended Verification SSL certificate was purchased from GoDaddy.com for securely encrypting HTTP sessions and verifying Red Ink as a MIT research project. GoDaddy was also the domain registrar and DNS host. This extra level of security and identity verification was a requirement for presenting the project to the public as a legitimate and secure service. Web hosting was provided by the Media Lab's Network & Computer Systems (NeCSys) team on a dedicated virtual machine running the Debian 5.0 "Lenny" operating system. Debian was chosen for its security, lightweight footprint, and easy extensibility.

[31] http://www.jquery.com
[32] http://code.google.com/p/flot

Data Collection

In principle, there are many potential sources of financial data; several of the most likely have already been mentioned. Each varies in the degree to which it provides services for machine interface. Mint.com has no API. Expensify.com has a free public API, but it offers limited functionality. Wesabe has a free API, but is unreliable and is now dead. Many banks provide means of digitally accessing bank account data, but not directly through APIs.

As a systems architect, this meant the authentication and collection code needed to account for an open-ended variety of developer implementations. Depending on the services registered with the user, a data collection driver needed to dynamically load libraries specific to those services. I designed the scripts to do so as follows.

Red Ink's data collection driver selects each user's authentication credentials from the database. Credentials are correlated with the name of an API, whose libraries are dynamically loaded and passed the credentials. The library itself is responsible for the details of connecting to the service; encrypting and authenticating credential data, requesting transaction data, and processing the returned data into database insert statements. The driver script is run once daily, and collects all new transactions for all users since the previous day.

The Expensify library for data collection is the only driver extension I wrote, and follows the just mentioned steps for collecting data. See Appendices A, B, and C for the source code and specific implementation details.

Only one collector was necessary to move on to other important development tasks, but with additional resources, I also would have written a screen scraper extension with an LWP-Robot.[33] This would have been useful for banks that do not integrate with the main data providers. At the time of this writing, *MIT Federal Credit Union* is an example of such a bank. Data can be collected from it in a number of machine-readable formats, but only through a web based graphical user interface, which requires a custom set of scripting operations to negotiate. This makes automating data collection difficult and prone to error.

Web-Based Graphical User Interface

Figure 1 shows an abstraction of the database models for Red Ink and their interrelationships. Note that *module* has the most relationships, with *user* coming in second. Modules are indeed the most complicated data structure in Red Ink. This is due to the requirement that campaigns be defined through the user interface. All campaigns are defined through a complex relationship between *user, module, filter, memo, and option* tables. In Red Ink speak, that means campaigns aggregate only specifically named transactions from their membership and can require additional data in order to become a member.

Since the front-end users define campaigns, several GUI interfaces provide the mechanisms for conglomerating data points and relationships into complex SQL queries. During development, I referred to this work as What You See Is What You SQL (WYSIWYS).[34]

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[33] automated web user agent; http://search.cpan.org/~marclang/ParallelUserAgent-2.57/lib/LWP/Parallel/RobotUA.pm
[34] This is a play on the popular HTML authoring paradigm, *What You See Is What You Get (WYSIWYG).*

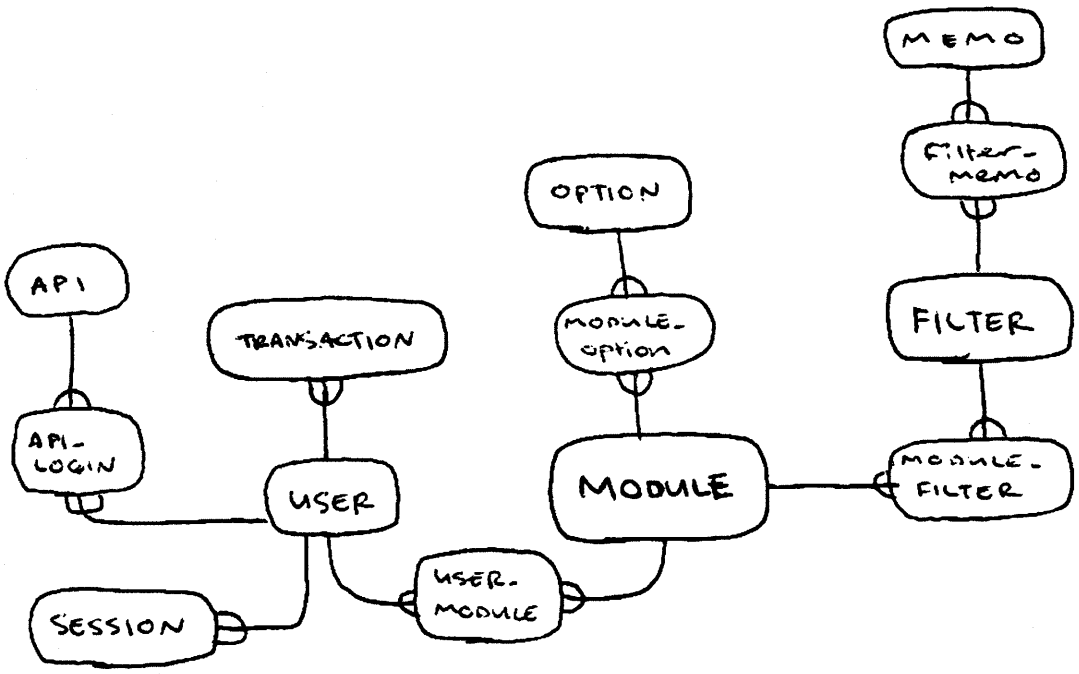


Figure 1: Red Ink Database Model Illustration

User Registration

First, the system must have user accounts and user's financial service credentials. Users register for user accounts by choosing a unique username, a secret password, and verifying the password. I require the username to be an email address, since it is a unique identifier and provides a necessary point of contact for the account. See Figures 2 – 5 for a sample registration workflow.

E-mail is then sent to that username to verify and activate the account. The e-mail contains a welcome announcement and a link to a URL that will activate the account (Figure 6). Once the account has been activated, the user may login and edit the rest of their profile. Adding an Expensify login and password to their profile adds their account to the queue for daily data collection (Figure 8).

Campaign Creation

Campaigns are created with a name and description (Figure 9). New campaigns have no members, no transaction filters and therefore no data to analyze. To begin collecting data from users, a campaign must define what kind of transactions it looks for. Filters are the abstractions responsible for this task.

Filters, Memos & Merchants

Filters are groupings of metadata and memo data related to a particular set of transactions. Filters were originally designed to represent businesses, though they are transforming themselves to encompass other characteristic types of data as well; neighborhoods, groups of businesses, types of businesses, and withdraws and deposits to name a few ideas. But to begin with they were just supposed to be businesses. Businesses have a name, address, contact information, and other metadata, as well as an open-ended number of ways they might appear as text representations in the memo or merchant field of a transaction.

An aside: Why do merchants appear in so many different incarnations in the memo strings? There are a number of factors throughout the transaction system that contribute to this. Irregularities in the merchant's self-defined identification across multiple POS systems (Point Of Sale) and across multiple credit, debit, and bank card types. Transaction providers have not standardized this information, though they typically capture additional identifying information that is not publicly

shared. It is also typical for a bank or another intermediary to "clean" the data. This usually involves an attempt to improve the quality of information for human legibility. In the end, the same transaction at the same store using different cards can appear differently on the other end of the pipe.

Filters are defined with basic business information and an open-ended number of memos (Figures 11 & 12). Memos are the text representations of a business (or any kind of transaction) in the transaction stream. Usually identifying information is stored in a field called *memo*, hence my name for this interface abstraction, but it can also appear in the *merchant* field, *mcc* field or any other field depending on your data provider. A future project would be to create an ontology of data providers correlated to their use of transaction fields, but for the purposes of discussion assume the memo field is all we care about regardless of the provider or implementation. Once bundled together, a filter exists publicly in the system and can be used by any campaign. Campaigns can have multiple filters to produce separate streams of information for individual or comparative analysis.

Options

Options are additional data defined by a campaign that are used in its display or analysis. For example, all Flot visualization campaigns have options for period, frequency, public/private, and stacked-data (a visualization option), and these settings effect how the visualization renders.

In the evolution of Red Ink, Options are the newest structure. In the initial versions of the software, such data was captured directly by the campaign. This was very simple to manage, but hard coded the extent to which a campaign could ask for additional fields of information. I wanted campaigns to

be extensible through the web interface, and to support settings per user for their dashboards, so eventually this design required an upgrade.

By the time of this writing, Options' data models have been re-implemented, but only per campaign and without a graphical user interface. In their current manifestation, Options define HTML form inputs, such as radio buttons, select menus, checkboxes, input fields, text areas, etc. A campaign defines an option by giving it a label, setting its default values, and storing its state. When rendering the edit interface of a campaign the option form fields will be automatically generated and populated. The data collected by options is available through the campaign management interface functions.

Campaign Membership

For the front-end user, becoming a campaign member means granting it access to their financial data stream. Campaigns only look at specific transactions and only across their own membership. NO members, NO data. So, gaining membership is the crux of a successful campaign.

Joining a campaign is a two-step process. First find it on the Campaigns Page, and then click the *Join* link. The user is now a member of the campaign, and it will appear in their profile's navigation bar and on their Dashboard Page. A campaign can be un-joined through the same process, but by clicking the *Remove* link.

What if campaigns could use data from other campaigns, not just users? A future project is to extend campaigns to publish machine-readable data feeds, in addition to their visualizations. Then they can plug-in to each other as additional streams of data. Imagine a campaign that compares

spending in different neighborhoods, as one campaign fed by several other campaigns each looking at one neighborhood.

Dashboard

The Dashboard is the user's landing page when they login to the site. A navigation bar on the left provides links to the site's various interfaces, and its body is tiled with visualizations from the campaigns the user is a member of (Figure 11).

Technical Evaluation

The Red Ink code base provides useful features for collecting machine-readable data from users via 3rd party services. It provides a structure for creating customized modules that can look at any data captured by the system. And it has the initial architecture for arbitrarily defining and associating simple data types with *users*, *modules*, and *filters*, which will provide additional points of information for its analysis. Some of these features and interfaces are still rough, but the core functionality previously outlined is in place.

Judging from the Google Analytics web statistics, general interest in the project has increased with the source code release and site launch. The website has seen 1,621 visits in the last year with marked increases in traffic volume and consistency post launch. Several traffic spikes correlate to public presentations of the work through classes, conferences, and news coverage (Figure 12).

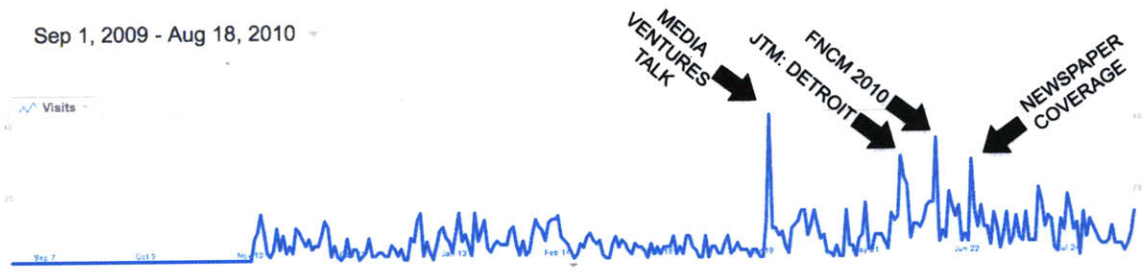


Figure 12: Web Statistics (1 Sep '09 – 18 Aug '10)

The majority of user registrations occurred in the beta and post-launch periods with 26 total registrations. 9 of these registrants took the additional step of registering for Expensify and granting access to their data. This low conversion rate of only 37% has several likely factors at play. A two-step registration process is not ideal, and may have contributed to the incompletion rate. Without access to Expensify's web logs, it is not possible to say if our registrants continued on to the Expensify step or where they stopped in that registration process, and no survey was conducted asking for explanation. So it may be true that two-steps are too burdensome, but I have no data to verify this assertion. However, I believe there is a more likely cause.

Considering general stigmas and privacy concerns about money, it seems more likely that interest in keeping up-to-date with Red Ink motivated registrants who were not actually willing to grant access to their data. These are people who just wanted to check out the project, without participating. 26 registrants is likely skewed high for this reason and because of the low barriers to Red Ink registration of providing just an e-mail and password. Once required to enter bank access credentials through Expensify, 9 users is likely closer to the real number of people who would have completed a full registration, one-step or two-step, than 26 is.

Neither of these assertions is mutually exclusive, and to a degree they likely both apply. With more resources a simple test could be devised to evaluate to what degree. When registering users,

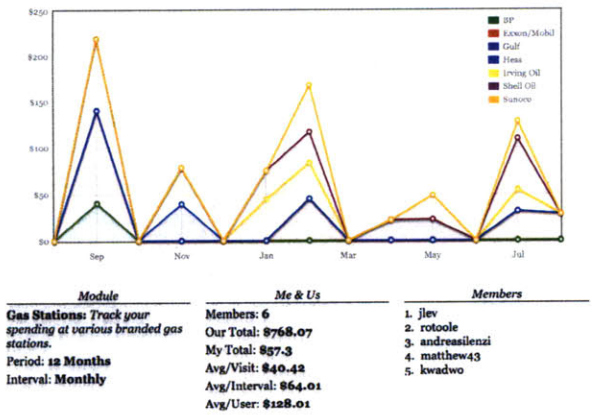
randomly assign them a one-step or two-step registration workflow. Then compare the completion rates. I predict the total number of complete registrations would be similar, but with partial registrations for the two-step process matching numbers for registration abandonment for the one-step process.

Today, 8 campaigns have been successfully created. Of the 9 users who could participate in a campaign, 8 have joined at least one campaign, with 6 users participating in 3 or more campaigns. The development team created 6 campaigns for testing and development, and my colleague, Josh Levinger (SM'10), created 2.

Josh used Red Ink in his research project, Boycott Toolkit.[35] Josh's Red Ink campaign called, *BPCoytt*, compared spending at BP branded gas stations to other gas station chains. This was one of our most popular campaigns with 6 members. Josh took the additional step of embedding BPCoytt's visualization into the Boycott Toolkit page about the recent BP / Gulf Coast oil spill during the spring and summer of 2010 (Figure 13).[36]

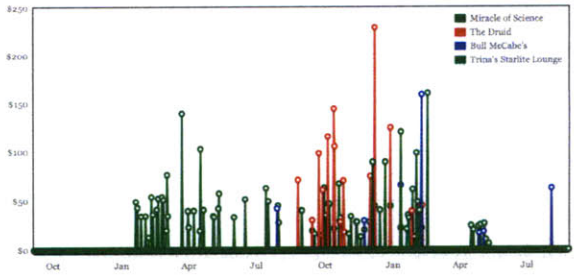
Josh also created a second campaign, which compared spending at a local liquor store to spending at a local grocery store; *Food vs. Booze*. This was a variation on a campaign the development team created called *Whisky Works Better Than Beer*, which compared users' spending at different bars and liquor stores (Figure 14).

[35] http://boy.co.tt/
[36] http://boy.co.tt/target/campaign/gulf-oil-spill/



Module	*Me & Us*	*Members*
Gas Stations: *Track your spending at various branded gas stations.* Period: **12 Months** Interval: **Monthly**	Members: **6** Our Total: **$768.07** My Total: **$57.3** Avg/Visit: **$40.42** Avg/Interval: **$64.01** Avg/User: **$128.01**	1. jlev 2. rotoole 3. andreasilenzi 4. matthew43 5. kwadwo

Figure 13: Gas Stations



Module	*Me & Us*	*Members*
Whiskey Works Better Than Beer: *Tracks your relative consumption of alcohol compared to the average user.* Period: **24 Months** Interval: **Daily**	Members: **5** Our Total: **84826.6** My Total: **$4794.12** Avg/Visit: **$49.76** Avg/Interval: **86.7** Avg/User: **$965.32**	1. jlev 2. rotoole 3. andreasilenzi 4. matthew43 5. matthew43

Figure 14: Whisky Works Better Than Beer

To conclude, Red Ink is not currently a polished platform, however, its operational requirements have largely been met, and the platform is becoming more robust as it is entering into its second evolution. Public release of the source code under an open source license (AGPL), has staged the way for future developers to make contributions to the work, and for 3rd parties to make free use of the software towards their own ends. The launch of the website has garnered an increase in traffic, user registrations, and developer interest, and these numbers are expected to grow with additional outreach and partnerships.

Figure 2: User Registration Form

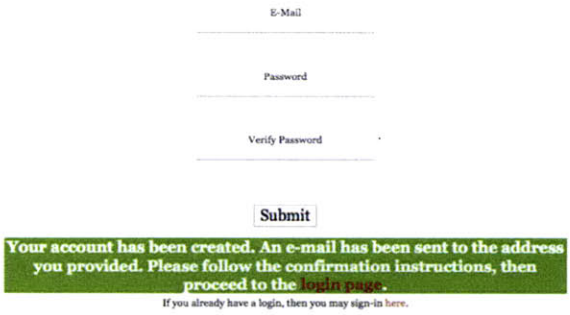


Figure 3: Successful Registration

Figure 4: Failed Registration E-Mail / Password Match Errors

Figure 5: Failed Registration; Required Fields

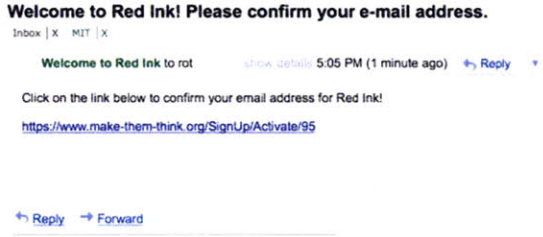


Figure 6: E-Mail Confirmation

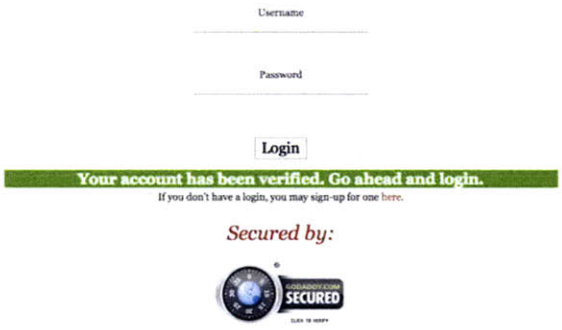


Figure 7: Account Activated

Figure 8: First Login

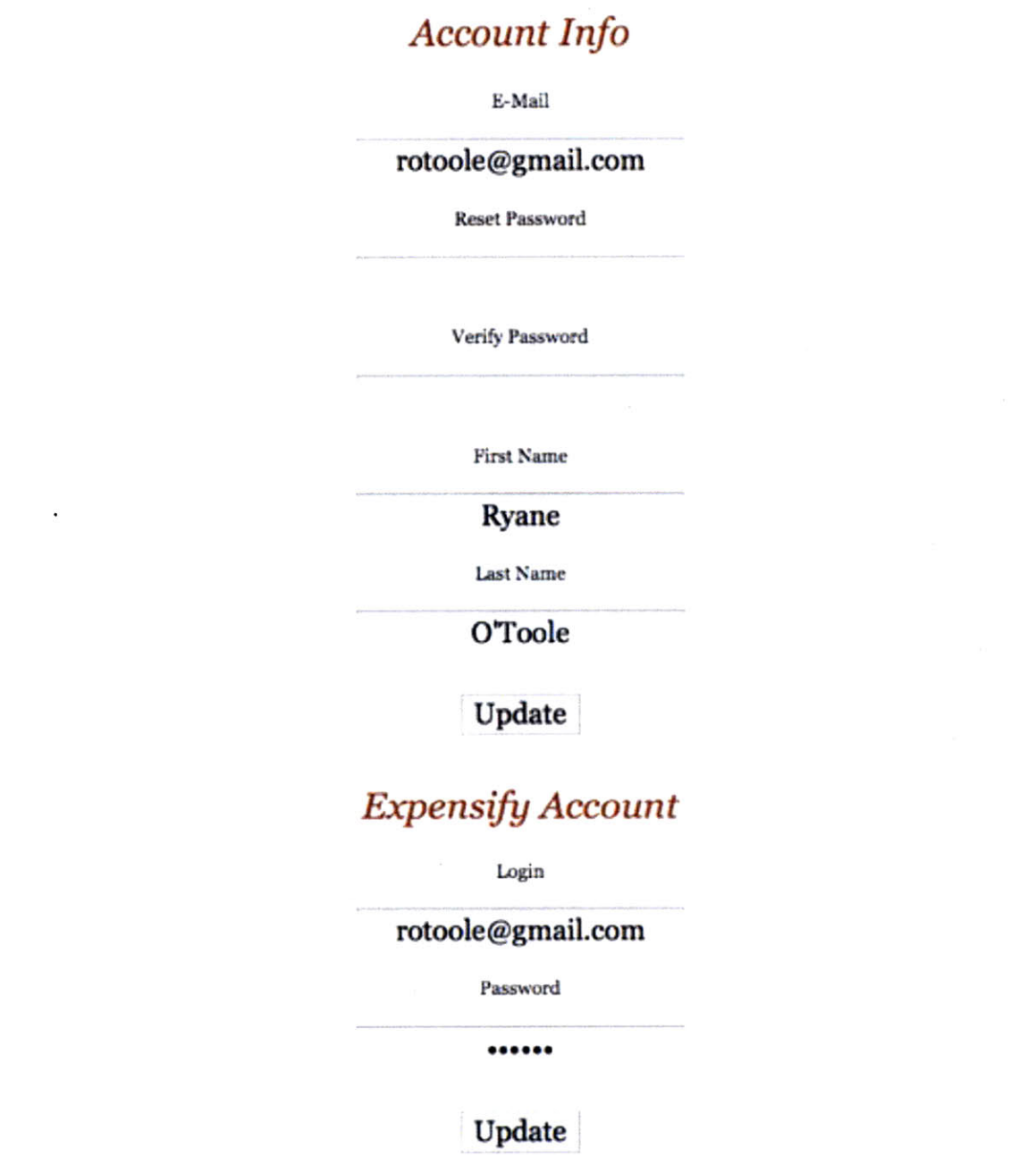


Figure 9: Account Management

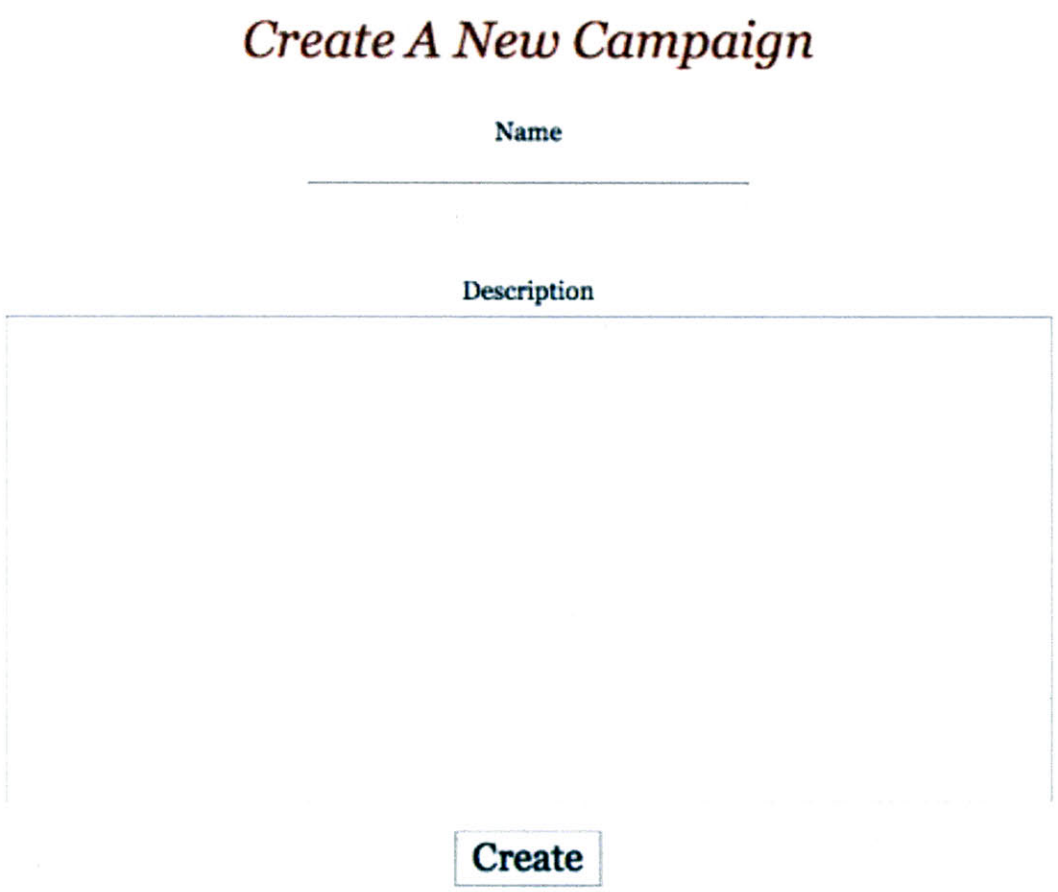


Figure 10: Campaign Creator

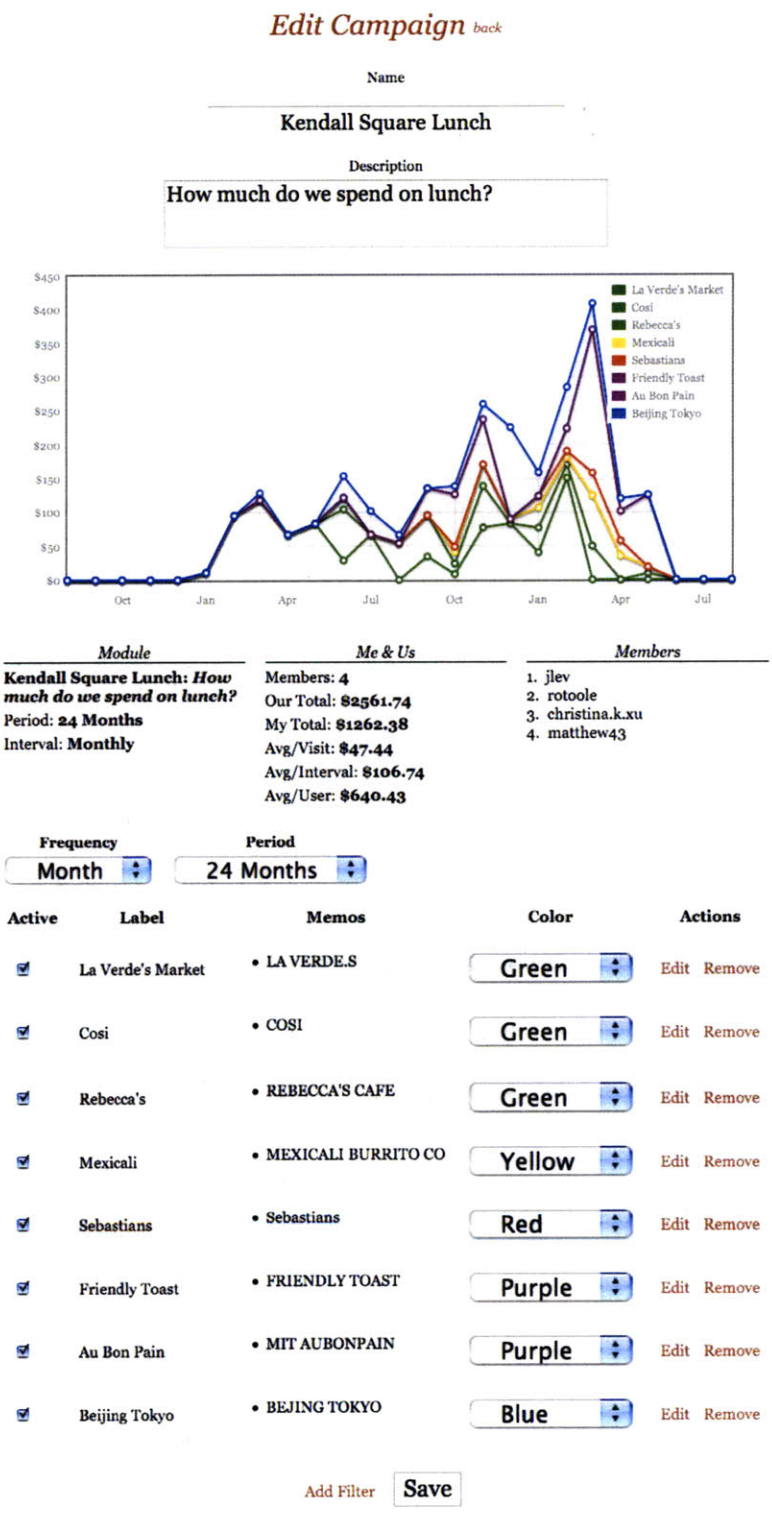


Figure 11: Campaign Editor

Social Commentary

Because of the Center for Future Civic Media's mandate that we engage with real-world communities, it was not enough for me to merely engineer a theoretical solution as my thesis. It was important that the technology must be evaluated in the context of a real-world community. To this end, I needed to find a physical community with significant problems that could be addressed through financial data and that would be willing to help evaluate Red Ink. In the following sections I describe the process, challenges, and outcomes of meeting this requirement.

Partners

As was pointed out in my thesis critique, to manage the tasks of engineering the project and deploying it to the real world would be a daunting challenge to handle alone. At the time, I countered that I would be working with a partner, Mike Norman ('10 DUSP/Sloan), who would handle the business and communications aspects of the project, while I'd deal with the technical and creative aspects. Mike had approached me earlier in the summer with the initial idea for the project, and was seeking a technical co-founder to continue working on it as a business venture. After some discussion between ourselves and with my adviser, we agreed to partner. This partnership would be the foundation from which Red Ink would sprout. The partnership remained in place and productive from September 2009 – March 2010, when it self-destructed do to differences in vision between the partners. At this point, Mike and I went our separate ways, each pursuing our own vision. Mike focusing on the potential of metering the flow of money, and I thinking about financial literacy, civic engagement, and Open Source practices.

After Mike's departure my outreach strategy became threefold. First, launch a public, secure, usable, beta of Red Ink. Second, seed the initial users of the system and produce the first analytics. Third, attend conferences to meet representatives from communities engaged in civic actions that could benefit from their supporters' financial data. In the following sections I will discuss the processes, problems, and insights gained by executing this plan of action.

Alpha Beta Soup

At the time of Mike's departure getting the demo publicly working was the highest priority task. I realized that a live demo would open up more doors for Red Ink than the strongest presentation ever would. Which is not to say that presentations are not important. I had good success with presentations, but the work of communicating the project had sucked away from actually making it. And even the most enthusiastic meetings typically ended with a "come back when you have something to show." Bringing the project online for real would be the first step to convincing potential partners and the general audience that the idea had more than just merit. That it was something worth putting time, energy, resources, and trust behind.

Up until now, I had developed a few alpha versions of the software as proof of concepts, and had spent the MIT's Independent Activities Period in the month of January hammering out the first version of our official code base. Largely operational, the highest priority development tasks left before the launch were, purchasing Extended Verification SSL certificates from GoDaddy for security and identity verification of the www.make-them-think.org domain name; completing the core infrastructure of the front-end site; re-factoring the campaign code to work with a system of visualization modules that I had recently devised; designing the website's identity; and getting the

development team up to speed and independently productive. Each of these tasks would have to be resolved before the site could be considered secure, public, usable, and on a stable path forward.

Over several months these goals and others were largely met, though not without set backs, challenges, and failures. The biggest challenge at this time was juggling the varied priorities of managing so many details: developing the idea, designing the platform, engineering the platform, managing the developers, business planning, grant writing, giving speeches, doing outreach. It was easy to let one thing slide while handling another, and being the master to none. In the end, completing the development and growing into my own as a project leader was essential to achieving the next steps of the evaluation strategy: seeding the system and finding a community partner.

Seeding the System

Red Ink needed to be seeded with its first users, so that the software would have something to chew on when spitting out its analytics. Red Ink truly is community based information technology. Without real users in the system, it fails to function. Its entire utility is premised around the notion of trust and adoption, which creates a chicken and egg dilemma when trying to convince people to join. It could have been filled with randomized data and users, but I felt it was important to avoid that pitfall, and go straight for the users, so there would be no confusion come demo time. This was live data, from real people, from real bank accounts.

Initially, I asked the members of my research group to join the service, and several did. We then created three campaigns to generate data relevant to our group's consumption habits, "BPCoyott"

and "How much do we spend on lunch in Kendall Square", and "Whisky works better than beer." Each focused on a different analytical potential of Red Ink.

"BPCoyott", was a module that Chris suggested during the BP / Gulf Coast oil spill, when the Center was generally engaged in that topic. A list of gas stations was drawn up, and memo strings matching those station names were setup in a transaction filter. The resulting time series data was then charted as an area graph using Flot and posted live on the Red Ink blog. This campaign was often useful when discussing the potential of Red Ink to address environmental concerns like pollution and energy conservation.

"How much do we spend on lunch in Kendall Square", looked at spending at restaurants popular with the group in the Kendall Square neighborhood of Cambridge, MA. We frequently went to lunch near there, because of its proximity to the Media Lab. Unknown to us at the time, it had also recently been the focus of local retail and restaurant development groups looking to improve their business.

The final campaign "Whisky Works Better Than Beer" filtered for transactions originating from local bars and liquor stores. The members of this campaign could see their alcohol consumption compared to the average other member and effectively rate their alcoholism. This campaign typically evoked a laugh from whomever I explained it to, and was good for breaking the ice and getting conversation flowing.

These initial three campaigns and this initial seed of users were the starting point for many presentations I gave, and are responsible for originating conversations and ideas about what

sharing financial data could do for individuals, communities, and businesses. It was the final key step, before officially going live, and attending conferences looking for community partners.

Finding A Community Partner

The final step towards conducting Red Ink's evaluation was to attend several conferences to meet representatives from communities engaged in civic actions that could benefit from their member's personal financial data. Presentations and networking at two such conferences, Journalism That Matters (JTM): Detroit and the MIT/Knight Future of News & Civic Media 2010, resulted in many new ideas for Red Ink, as well as many failed and a few successful collaboration attempts.

JTM: Detroit

Journalism That Matters (JTM): Detroit was a community focused journalism conference held on the Wayne State University campus in early June 2010. The conference brought together journalists, academics, radio/TV producers, activists, business people, and technologists to discuss successful examples of new and community based media and their potential to engage new audiences. The Center for Future Civic Media was invited to the conference by one of its organizers, Bill Densmore, after one of our group meetings where he was a presenter. He expressed his interest in our technical experience and our focus on journalism and civics. Chris committed Civic Media to attending and I asked to attend as well, so in the first week of June Christina Xu, Inge Endter, and I flew to Detroit to represent MIT to JTM: Detroit.

The conference was not large; there were roughly 70 people at its height. I was able to speak with many of the participants one-on-one about Red Ink. The conference was a series of ad-hoc meet up conversations scheduled on the fly at set intervals throughout the day. This was a great way to have many conversations happening in parallel and also allowed for people to vote with their feet. I soon discovered that many of the participants were not interested in "community information technology" when no one showed up to the session I posted for that topic. Clearly, I was not connecting with people's interests. This was a recurring theme of the conference for Red Ink. Reducing the message down to something that spoke directly to people's interests was challenging to do. Not talking through the Red Ink's problems then possibilities with someone left either confusion, revulsion, or disinterest in them.

Despite the challenges of communication and some disconnections on paper, many people I spoke with one-on-one liked the idea, and four potential collaborations arose from those conversations.

1) Journalists investigating predatory lending practices.
2) Carbon footprint reduction in Bucks County, PA.
3) Including Red Ink with the Detroit IPTV content package.
4) The JTM: Detroit grant to attend the Reynolds Journalism Institute's Innovate 100 Pitch Slam.

Besides these collaboration possibilities, Red Ink gained good word of mouth, useful connections to professional socially minded media producers, and practice honing its message to diverse audiences.

First, I met Kat S. on Saturday, she was the assistant to a pair of Washington D.C. financial investigative journalists. I told her about Red Ink, and she brought up the idea of using it to

investigate predatory lending practices. As an investigator, she found it difficult to access the key financial and geographic data that could help to reveal such practices. The lenders involved were not willing or legally able to share the information, and there were few other methods for accessing it outside of court documents. If the communities who are being preyed upon would share their "mortgage payments, their credit scores, and their zip codes, those are the three things you need to uncover mortgage fraud."

I often use Kat's example when thinking about the privacy thresholds for participation in Red Ink. Most people would describe their mortgage payment and credit score as private information. But, if used for a social good, like uncovering predatory lending in the community, that might be a compelling reason for people to be more thoughtful about the difference between keeping information private and controlling how its used.

Kat and I promised to stay in touch, but aside from a few intermittent e-mails our conversation has petered out and resulted in no further collaboration. Red Ink was too immature to be immediately useful to professionals like Kat, who recognized its potential but did not have the resources to support its development.

Second, Melissa S. was a TV producer for CBS Nightline who retired to Bucks County, PA. Melissa's progressive community has several ad-hoc citizen groups concerned with environmental issues. They are affiliated with a global carbon footprint reduction initiative known as, Transition Towns. Transition Towns' mission is to bring awareness to global energy issues and to support local economies so that goods can be sourced closer to where they are consumed and that energy will be saved by the reduced transportation efforts.

Melissa and I discussed using Red Ink to measure in dollars the ability of a community to reduce their carbon footprint by filtering for bills related to energy consumption like, natural gas, electricity, and gasoline. Melissa was also interested in using a similar approach to compare spending at locally owned businesses to spending at big box stores.

Her intention was to publish the visualization of this information on her OneIfByBucks.com community news website. Her audience was the local Transition Towns constituency and her graduate department at the Columbia School of Journalism where she was pursuing an advanced degree.

Melissa and I spoke several times after JTM: Detroit, and she arranged two conference calls with other members of her community. While these conversations started out with skepticism, they ended with interest. However, none resulted in any adoption or a deeper commitment to pursue an evaluation. One of the Bucks County community members had been the victim of identity theft, and was very sour regarding the privacy issues of Red Ink. Other community members understood the potential value, but found the idea too experimental. Ultimately, we were not able to gain interest from her community.

Third, Tim M. is a Michigan based entrepreneur launching and IPTV network out of Detroit. Tim and I spoke about using Red Ink to track the so-called, "Food Island". This is when a neighborhood, like a black community, will not have any quality sources for healthy food located nearby. Members of these communities need to travel outside their neighborhoods to get access to fresh produce and other healthy food options. By filtering for grocery store transactions and self-assigning their zip codes, community members could generate maps of the Food Islands. This is significant information for decision makers and stakeholders to see when framing the problems their

communities face. Tim and I have spoken several times since the conference, but the timing of his IPTV network launching and the timing of my thesis work did not line up. So, we have not been able to conduct an evaluation together. However, Tim is eager to incorporate Red Ink into the Detroit IPTV content offering, and we hope to reconnect in the beginning of September 2010.

Fourth, JTM: Detroit received $5,000 from Time/Life to give away as a grant at the conference. They decided to hold a pitch competition for the money, which they prefaced with "we want many flowers to grow." So, rather than trying to apply for the entire $5,000, I wrote a grant asking for $500 to cover my travel to an event the JTM organizers had been promoting, the Reynolds Journalism Institute Innovate 100 Pitch Slam. I ended up winning along with four other applicants and will be traveling to Missouri in mid-August 2010 for the Pitch Slam. Additionally, I was asked to work with an adviser, Michelle Ferrier an interactive media professor from Elon University, until the next year's JTM conference where I am expected to provide an update on Red Ink.

Finally, the most important connections to come out of the conference occurred offline and after hours in our informal discussions. Hanging out with the other conference participants, gaining their trust, and convincing them of the potential of the project, lead to three new registrations to the system. Each registrant expressed great interest in the project and its potential, and said they were registering as a sign of solidarity and support for the work. In general, I found this level of personal connection with potential users to be a pre-requisite to getting someone to register. This is inline with my expectation that strong social ties must be in place to gain adoption.

JTM: Detroit was a valuable trial for Red Ink, because it provided me with more experience pitching the project to non-MIT audiences and resulted in good word-of-mouth, potential collaborations, informal networking, and public acknowledgment through the Time/Life grant. Each of these

elements has proven to be a key building block in Red Ink's ascent. I was disappointed that the conference resulted in so few actual evaluation partners, but even as failed attempts each reveals its own legitimate hurdle to adoption, be it maturity of the platform, timing of agendas, or strength of engagement with the community.

Future of News & Civic Media 2010

In mid-June 2010 the John S. and James L. Knight Foundation held its yearly Future of News & Civic Media conference at the Media Lab with the Center for Future Civic Media as host. The centerpiece of the conference is the News Challenge grant, where Knight gives away millions of dollars to support innovative projects in the field of journalism. The grant announcement draws in press, current and past grant winners, and invited guests from industry, non-profits, and academia. Red Ink was featured at the conference in a 10-minute talk during a plenary session and in a workshop, "Dollars to Data"37, about the landscape of contemporary financial information technologies. This had several outcomes: good word of mouth for Red Ink amongst conference attendees; an article written in the San Jose Mercury News' Silicon Valley section, "The Case for Oversharing",38 which praised Red Ink's social agenda as a novel twist on the typical stigma of sharing too much information; finally, and most significantly, the Community Foundation of Greater South Wood County, a Knight Information Challenge winner, agreed to help me conduct an evaluation of Red Ink in their agricultural and industrial community of Wisconsin Rapids, Wisconsin.

Kelly Lucas, the CEO of the Community Foundation of Greater South Wood County, had visited the Center for Future Civic Media earlier in the year with the foundation's senior staff and advisers. At

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[37] http://civic.mit.edu/conference2010/event/workshops
[38] O'Brien, Chris. "The case for oversharing." San Jose Mercury News. 19 June 2010. Web. 24 August 2010.

the time, they were impressed by Red Ink, but felt it was unlikely that people in their rural community would adopt it. Months later, at the Knight conference, I learned that was not the end of the conversation though. Knight was pushing the Center and the Community Foundation to find ways to work together. Knight wanted Wisconsin Rapids to be a "lab" for civic media experimentation, and Red Ink was on the top of the list.

At dinner, Kelly told me that everyone from the foundation "really liked you." And that affinity, more than Red Ink itself, was why they wanted to work with me. I would be the first research ambassador to Wisconsin Rapids from MIT, because I was a good fit for their community.

However, questions still remained about the feasibility of Red Ink to find pick-up in the rural, disconnected, elderly-skewing, farmland of South Wood County. What would I do if no one used it? I countered this concern by saying that, even in failing to adopt Red Ink, the community could provide valuable insights into barriers to adoption and the potential of Red Ink to address real world financial needs. Kelly seemed pleased with this, and in e-mails over the next four weeks we outlined an agenda for evaluating Red Ink in Wisconsin Rapids in late July 2010.

Because the commitment to collaborate did not happen until late in my degree timeline, I would only be able to spend a week in Wisconsin Rapids before submitting my thesis and graduating. The short trip and late timing made it implausible to attempt any serious deployment then evaluation of Red Ink in the community. There was simply not enough time to evaluate in that manner.

So, early in our discussions, the Community Foundation and I decided to focus on meeting community members who would be the likely stakeholders in a real Red Ink deployment, or who could address specific questions regarding the viability of Red Ink in South Wood County. These

meetings with bankers, software developers, engineers, students, educators, academics, NGOs, and businesses people constituted my trip there, and in the following section I will discuss their content.

The Community Foundation of Greater South Wood County

The plan for South Wood County was to meet with community members who are involved with financial literacy and outreach, who use financial data as a part of their advocacy work, who work in the brick and mortar banking industry, or who are interested in contributing to Red Ink as a developer. These conversations would help me to formulate ideas about the community's needs and challenges regarding financial data and tools, and lay the ground work for a longer term collaboration with the Community Foundation of Greater South Wood County and the University of Wisconsin, Stevens Point's Computer Science and Digital Media program.

The trip for me was one of discovery, not conquest. I was not trying to solve everyone's problems with Red Ink or get them to become a user of the system right this moment. But I did come full of ideas about sharing financial data through open tools and networks, and I spent my days in a string of conversations discussing those ideas with the people who might actually make use of them on the ground. I've included my schedule for the 5 days I was in Wisconsin Rapids in Appendix F and the notes from my conversations in Appendix G. The general themes of our conversations, aside from skeptical curiosity about Red Ink and my obligatory explanations, were: financial literacy, banking information technology, and civic problems that could be framed through financial data.

Financial Literacy, Information Technology, and Civics

Everyone I met with was interested in financial literacy, information technology, and civics but for disparate reasons.

The school district was implementing a new financial literacy curriculum, and was interested in how that curriculum would be framed by class (economic, not academic). Modes of financial literacy are specific to class stratifications, so middle and upper class teachers and curriculum developers may not be teaching skills and concepts relevant to a lower class life experience. For example, teaching about checking and savings accounts to people who may never have one, does not speak to their daily experience. Discussion of credit debt, high interest rates and check cashing, would be more pertinent.

This notion of framing echoed sentiments from JTM: Detroit, where several people were concerned with the upper-class tech savvy white audience Red Ink may skew towards. Many kinds of problems may be financial in nature, but that doesn't mean the existence of financial data and tools will equally serve all audiences. For example, there are large populations explicitly excluded from the system, because they don't have bank accounts or access to and comfort with computers, the Internet, and online banking.

The Lowell Center, a local elderly community, brought a different perspective. Their public tax preparation program served a largely 50+ population, with very low rates of computer literacy and adoption (there was a computer lab at the center, usage of which underpinned this assessment). But, in their experience the elderly had both high adoption rates for online banking tools and for online tax submission. This was due to influences from the larger support networks surrounding

these people. Children often setup online banking for their parents, to keep tabs on their finances. Also, elderly people with winter and summer homes used online banking to keep tabs on their various accounts when out of town. Finally, the center had witnessed a 100% conversion of paper tax submission to online tax submissions within the last year, crashing their AARP hosted tax filing system. While the elderly population may not have been comfortable submitting online, the professional tax preparation volunteers were very comfortable.

These two examples provide an insight into the dynamics behind technology adoption. While it is true that many audiences have built in barriers surrounding them, it is also true that 3rd parties can bridge those barriers, mediating adoption.

Bankers were interested in financial literacy, because it made good business sense. Customers who were reliable, not over drafting, paying their debts, saving their money and knowledgeable about the other banking products being offered netted more money. Employees at all of the banks were trained in financial literacy and products to provide better customer service. But only two banks were involved with external training efforts. Bull's Eye Credit Union underwrote financial literacy training for two local public school teachers, and an executive at Pioneer bank authored a weekly column on personal finance aimed at local women, whom she felt were an under served audience. Both perceived these initiatives as being socially good and good for business.

Wood Trust did not have an external training program per-se, but noted the importance of people understanding the localness of their business. Their customers understood that money going into Wood Trust circulated directly back through the local economy where they had personal relationships. Having personal customer relationships was an essential part of their admittedly industrial, commercial, and high net-worth clients. Across the board, the external and community-

minded initiatives were spawned from the local and regional banks who viewed their relationship with the community as a part of their identity. The national chains were distinctly less engaged with the community. This also paralleled their information technology initiatives.

To some degree, all of the banks outsourced part of their technology, but the more local the bank, the more in-house development they took on. Both Pioneer Bank and Wood Trust had significant in-house development resources handling platform and back office services. Contrast this with U.S. Bank, who had no local information technology staff.

The difference between these two conversations was their tone. Without local IT knowledge or decision making power, there was considerable skepticism of Red Ink, to the point of incredulity. Banks with IT staff also had a good deal of skepticism, but typically the conversation would shift gears once they got the concept and skepticism turned to curiosity. Having a local IT staff was key to even beginning the conversation on the right footing, otherwise the idea was a non-starter.

The final example I will give is of the Wisconsin Economic and Housing Development Authority (WEHDA), which mixed the two interests of public education and business development. WEHDA worked with industry to find ways to locate lower-income workers near to their jobs in urban centers. They were basing their work off the success of St. Joseph's hospital in Milwaukee who wanted their nurses closer to work so they could be on call. The hospital put an incentive in to provide a down payment. The nurses then said "I don't have any savings etc..", so they put in financial education programs as well as the down payment. This program has become a model for other jobs; police, fire, teachers. These jobs don't necessarily have resources to provide the subsidy, but they can still do the educational outreach part. They are able to take advantage of their employees' financial education, but they must see the long-term benefits of why they should care. It

also applies to municipal government to understand why their community should care. This was the focus of an employment development project at the Community Foundation called Workforce Central.

Workforce Central is about developing relationships between workers, workforce services, and employers, by having them all sit at the table together and discuss common goals. The purpose is to create an environment of *Advanced Manufacturing*, where employers work with workforce services to overcome barriers to employment and provide their workforce with career training and advancement, not just jobs. This may sound idealistic, but the endeavor has a broad community mandate spurred by years of economic turmoil, layoffs, and joblessness. While not financial literacy per-se, this reflected broad consensus within the community that education about sharing resources and working together was a powerful methodology for facing their challenges. This kind of mindset is essential to Red Ink.

Workforce Central also used key financial metrics to frame poverty in the community to local and state stakeholders. Specifically, foreclosure rates were an important number. But access to that information though databases of court documents was awkward and time consuming. This led to a discussion of using Red Ink to track mortgage defaults as a leading indicator of vital signs in the community. Waiting to look at numbers for people who had already defaulted on their home loan is a reactionary approach. A community could preventatively think about mortgage defaults by sharing data on current mortgage payments. Are payments being made? Are payments being missed? At what rate? And for how long? This kind of information in the hands of Workforce Central could be a powerful lever for convincing local, state, and federal agencies to provide assistance to the region.

Conclusion

These examples illustrate potential hurdles and possibilities for Red Ink in the Community of South Wood County. While using financial data to frame problems may not be a solution that will reach out to all audiences equally, there is still the potential for a well-connected and trusted group like the Community Foundation to mediate adoption of the technology. Local banks varied in the quality and adoption rates of their banking platforms. But all of the banks provided an online banking platform and considered information technology to be important to their future growth. Banks with the most connections to the local community also seemed to have the largest IT staffs, which bodes well for future conversations and potential collaborations. Finally, stakeholders in the community of South Wood County are particularly well suited for understanding the potential utility of Red Ink as collaborative tool. They understand the importance of networks of collaborators and sharing resources to solve complex problems. Any adoption of Red Ink by a community has to be premised on a belief in this approach and a strong network of relationships across stakeholders.

Outcomes

In the coming year, I will continue to visit and work with the Community Foundation of Greater South Wood County through a collaboration with the University of Wisconsin, Stevens Point. Students from the Computer Science and New Media programs will spend their senior year developing on Red Ink, as a part of their thesis works. The exact scope of this work has not been defined yet, but conversations with Tim Krause, my faculty supporter, are ongoing, and two potential student developers have been interviewed. Our goal is to develop several modules for Red Ink that deal with issues specific to the South Wood community, but that could be generally useful

to other communities as well. Initial ideas are about showing off charitable giving in relation to income and sharing mortgage payments as a leading indicator of financial crisis.

Red Ink will continue to receive support from the Knight Foundation through the Center for Future Civic Media in 2010/11. After graduation I will continue to develop the software part-time, as a research at the Center. Goals for the coming year are to organize and execute the Stephens Point collaboration, apply for grant money to underwrite Red Ink's growing infrastructure costs, and continue general development of the platform along the lines of better tools for financial literacy.

Appendix A: Data Collection Driver; update.pl

```
#!/usr/bin/perl -w
## DRIVER: UPDATE ALL TRANSACTIONS
use strict;
use warnings;
use Data::Dumper;
use RedInk::Expensify qw(:DEFAULT);
use RedInk::SQL qw(:DEFAULT);

$ARGV[0] = 0 unless defined $ARGV[0]; # encryption flag
print $ARGV[0] ? "Mode: Encrypted\n" : "Mode: Plain Text\n";

# FOR EVERY USER LOGIN TO THEIR API(S)
# AND GRAB UPDATE THE NEWEST TRANSACTIONS
my $users = list_users();
my @ids = keys %$users;
foreach my $id (@ids) {
    my $user = $users->{$id};
    print "AAO User: $user->{email}\n";
    my $apis = list_user_apis($user->{id});
    print Dumper($apis);
    my @apiids = keys %$apis;
    foreach my $apiid (@apiids) {
      if($apis->{$apiid}->{api_name} eq " acebook ") {
          print "Authorizing AAO... $apis->{$apiid}->{username}\n";
          my $authToken =  acebook _auth($apis->{$apiid}->{'username'},
$apis->{$apiid}->{'password'}, $ARGV[0])
            or die("Login Failed\n");

          print "Load Profile...\n";
          my $profile =  acebook _get_account($authToken);

          print "Load Transactions...\n";
           acebook _load_transactions($profile,$authToken,$user->{id});
      }
    }
}
```

Appendix B: Data Collection Driver; Expensify.pm

```
package RedInk::Expensify;
use strict;
use vars qw($VERSION @ISA @EXPORT @EXPORT_OK %EXPORT_TAGS);
use Mcrypt qw(:ALGORITHMS :MODES :FUNCS);
use HTTP::Status qw(:constants :is status_message);
use JSON;
use Switch;
use RedInk::SQL;
use URI::Escape;
use Data::Dumper;
require HTTP::Request;
require LWP::UserAgent;

$VERSION = 1.00;
@ISA = qw(Exporter);
@EXPORT = qw( acebook _auth  acebook _get_account  acebook _get_json
 acebook _load_transactions);
@EXPORT_OK = ();
%EXPORT_TAGS = ( DEFAULT => [qw(& acebook _auth & acebook _get_account
& acebook _get_json & acebook _load_transactions)]);

## GLOBAL VARS
my $api = "https://api.expensify.com";

## METHOD:  acebook _auth
## PARAMS: $puid - partner user id
##         $pus - partner user seceret
## DESCRP: authenticate the user returning the authorization token
sub  acebook _auth {
    my $puid = $_[0];
    my $pus = $_[1];
    my $pn = "";
    my $pp = "";
    my $randnum = int(rand(100000));
    my $expires = time() + 60 * 5;
    my $aeskey = pack("H*","");
    my $aesiv = pack("H*","");
    my %sso;
    my $cmd = "";

    # BUILD SSO
    if($puid eq "" || $pus eq "") {
      die("ERR: login credentials missing puid: $puid pus: $pus");
    }

    # ENCRYPTED
    if($_[2] == 1) {
      $sso{"arandom"} = $randnum;
      $sso{"expires"} = $expires;
      $sso{"partnerPassword"} = $pp;
      $sso{"partnerUserSecret"} = $pus;
      $sso{"useExpensifyLogin"} = 1;
      my $sso = to_json(\%sso);
```

```
      my $td = mcrypt_load(Mcrypt::RIJNDAEL_128,'',Mcrypt::CBC,'');
      mcrypt_init($td,$aeskey,$aesiv);
      $sso = mcrypt_encrypt($td,$sso);
      $sso = pack("H*",$sso);
      print $cmd =
$api."?command=Authenticate&partnerName=$pn&partnerUserID=$puid&sso=$sso";
    }
    # PLAIN TEXT
    else {
      $cmd = $api."?";
      $cmd .= "command=Authenticate";
      $cmd .= "&partnerName=$pn";
      $cmd .= "&partnerPassword=$pp";
      $cmd .= "&partnerUserID=".uri_escape($puid,'\0-\377');
      $cmd .= "&partnerUserSecret=".uri_escape($pus,'\0-\377');
      $cmd .= "&useExpensifyLogin=true";
    }
    print $cmd."\n";
    my $json =  acebook _get_json($cmd);
    return $json->{'authToken'};
}

## METHOD:  acebook _get_account
## PARAMS: $authToken - token returned from login process
##
## DESCRP: returns json object containing account data
sub  acebook _get_account {
    return  acebook _get_json($api."?command=GetAccount&authToken=$_[0]");
}

## METHOD:  acebook _load_transactions
## PARAMS: $profile - hash reference to profile object
##         $authToken - login authorization token from  acebook
## DESCRP: update the users transactions, create new transactions
sub  acebook _load_transactions {
    my $profile = $_[0];
    my $authToken = $_[1];
    my $userid = $_[2];
    my $cards = $profile->{'cardList'};
    foreach my $card (@$cards) {
      my $cardID = $card->{'cardID'};
      print "Updating Card #$cardID\n";
      $card =
 acebook _get_json($api."?command=GetCard&authToken=$authToken&cardID=$cardID
");
      my $transactions = $card->{'transactionList'};
      foreach my $t (@$transactions) {
          my %t = %$t;
          $t{'userid'} = $userid;
          create_transaction(\%t);
          #print $t->{'memo'};
          #print "\n";
      }
    }
}

## METHOD:  acebook _get_json
```

```
## PARAMS: $cmd - request URL
##
## DESCRP: return json hash of response.
Sub  acebook _get_json {
    my $request = HTTP::Request->new(GET => $_[0]);
    my $ua = LWP::UserAgent->new;
    my $response = $ua->request($request);
    print "HTTP Response: ".$response->code." ".status_message($response-
>code)."\n";
    #print  $response->content();
    my $json = from_json($response->content());
    my $msg = "";
    print "JSON Response: ".$json->{'jsonCode'}." ";
    switch( $json->{'jsonCode'} ){
      case 200 { $msg = "OK"; }
      case 400 { $msg = "Unrecognized command."; }
      case 402 { $msg = "Missing argument."; }
        case 407 { $msg = "Malformed token."; }
        case 408 { $msg = "Token expired."; }
        case 411 { $msg = "Insufficient privileges"; }
        case 500 { $msg = "Aborted."; }
        case 501 { $msg = "DB transaction error."; }
        case 502 { $msg = "Query error."; }
        case 503 { $msg = "Query response error."; }
        case 504 { $msg = "Unrecognized object state."; }
      else { $msg = "Undefined Response."; }
    }
    print $msg."\n";
    return from_json($response->content());
}

1;
```

Appendix C: Data Collection Driver; SQL.pm

```
package RedInk::SQL;
use Data::Dumper;
use strict;
use Exporter;
use vars qw($VERSION @ISA @EXPORT @EXPORT_OK %EXPORT_TAGS);
use DBI;

$VERSION = 1.00;
@ISA = qw(Exporter);
@EXPORT = qw(list_users create_transaction list_user_apis);
@EXPORT_OK = ();

my $api = "https://api.expensify.com";
my $db_user = "redink";
my $db_transaction = "redink";
my $host = "localhost";
my $user = "";
my $pass = "";

## METHOD: create_transaction
## PARAMS: ref 2 transaction data hash
## DESCRP: insert a transaction record into the database
sub create_transaction {
    my $dbh = DBI->connect("DBI:Pg:dbname=$db_transaction;host=$host", $user,
$pass, {'RaiseError' => 1});
    my $trans = $_[0];
    my @keys;
    my @values;
    my @bind;

    while((my $key, my $value) = each(%$trans)) {
      # CLEAN VALUES
      if(defined $value) {
          if( $value =~ m/^-*\d+$/ ) {
                # INTEGER VALUE; DON'T QUOTE
          }
          elsif( $value =~ m/^$/ ) {
            $value = undef;
          }
          else {
            $value = "'$value'";
          }
      }
      else {
          $value = undef;
      }
      push @keys, "\"$key\"";
      push @values, $value;
      push @bind, "?";
    }
    my $query = "SELECT * FROM public.transaction WHERE
\"transactionID\"='".$trans->{'transactionID'}."' LIMIT 1";
    my $sth = $dbh->prepare($query);
```

```
    $sth->execute() or die $sth->errstr();
    my @row = $sth->fetchrow_array();
    #print $#row."\n";
    if($#row <= 0) {
      print "array:".$#row."\n";
      print $query = "INSERT INTO public.transaction (".join(", ",@keys).")
VALUES (".join(", ",@bind).")";
      $sth = $dbh->prepare($query);
      $sth->execute(@values) or die $sth->errstr();
    }
}

## METHOD: list_users
## PARAMS: void
## DESCRP: return a hash reference containing every user's data
sub list_users {
    my $dbh = DBI->connect("DBI:Pg:dbname=$db_user;host=$host", $user, $pass,
{'RaiseError' => 1});
    my $sth = $dbh->prepare("SELECT * FROM public.user");
    $sth->execute() or die $sth->errstr;
    my $hash_ref = $sth->fetchall_hashref("id");
    $dbh->disconnect();
    return $hash_ref;
}

## METHOD: list_user_apis
## PARAMS: userid
## DESCRP: return a hash reference containing all the apis logins for the
given user
sub list_user_apis {
    my $dbh = DBI->connect("DBI:Pg:dbname=$db_user;host=$host", $user, $pass,
{'RaiseError' => 1});
    my $sth = $dbh->prepare("SELECT t1.id AS id, t1.username AS username,
t1.password AS password, t2.name AS api_name FROM public.api_login AS t1,
public.api AS t2 WHERE userid=$_[0] AND t1.apiid = t2.id");
    $sth->execute() or die $sth->errstr;
    my $hash_ref = $sth->fetchall_hashref("id");
    $dbh->disconnect();
    return $hash_ref;
}

1;
```

Appendix D: GNU Affero General Public License

GNU AFFERO GENERAL PUBLIC LICENSE

Version 3, 19 November 2007

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Source. Regardless of what server hosts the Corresponding Source, you remain obligated to ensure that it is available for as long as needed to satisfy these requirements.
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Appendix E: "O'Brien: The case for oversharing"

by Chris O'Brien, San Jose Mercury News

There's been a lot of squealing of late over our rapidly eroding privacy on the Web, with the finger of accusation pointed directly at those sneaky Facebook folks. Founder Mark Zuckerberg is now the Snidely Whiplash of the Web, tying our privacy to the railroad tracks as he twirls his handlebar mustache and cackles with glee.

However, instead of making Zuckerberg the easy archvillain, I want to pause and rethink this privacy thing.

Let's remember that everything we share on Facebook is done so voluntarily. We do it because of the benefits we receive. We like to share because it allows us to connect and discover. Over time, our notion of privacy has changed dramatically — and not just because of some sinister plot by Facebook.

Even more important is where this trend is taking us. We've been hearing a lot about how oversharing is sucking us into a black hole where our various sins will haunt us forever. I want to balance that bleak scenario by offering the case for oversharing, and why the benefits and social good that may flow from that impulse may far outweigh the downsides.

The topics of Facebook, privacy, sharing and the power of crowds were front and center at a conference I attended last week called the Future of News and Civic Media at the Massachusetts Institute of Technology in Cambridge. The event, which was co-hosted by MIT's Center for Future Civic Media and the Knight Foundation, brought together more than Advertisement
200 programmers, entrepreneurs, journalists and academics to discuss the way technology is reshaping news and information.

Many of the discussions we had in various sessions reflected the ambivalence being experienced by growing numbers of Facebook users. Namely, that it's growing too powerful, that we're risking too much by ceding so much control over our identity and personal information.

And yet, I also saw numerous presentations and demonstrations of services, many still in the earliest of early stages, that offered compelling reasons for how oversharing might create a lot of social good.

To cite just one example, let's look at Red Ink, a Web site being developed by MIT graduate student Ryan O'Toole. Red Ink wants us to do something that many of us consider unthinkable: Share our most personal financial information.

Yes, there are for-profit services like Blippy that want you to post and share your purchases. Red Ink wants to do that, and then some. It wants you to share parts of your bank account, tax forms, mortgage records. Now, before you recoil in horror, consider the enticement: O'Toole wants to help you take this information, and aggregate the same information from your friends and community with the idea that the resulting data would make all of you smarter consumers with much greater economic clout.

You could see how your dollars flowed through your community, support local businesses, get the best deals and wield influence by collectively spending — or not spending — at certain businesses. Assuming he can develop the proper privacy protections, O'Toole argues that having this information would level the playing field between individuals and banks and businesses who already make use of their access to your financial information.

"They know quite a bit about how we spend our money," O'Toole said. "And they can mine a lot of this data. And they give that information to businesses and governments to support their agendas. We're really disenfranchised from really working with that same data."

This project is moving out of the ivory tower and into two pilot programs O'Toole is launching. The first is in South Wood County, Wis., where a local community foundation and O'Toole will create a site for people to share information about their income and their charitable giving. The hope is that by seeing what proportion of income people donate, others will be motivated to give more.

The second pilot is in Bucks County, Pa., where O'Toole and a local foundation will ask residents to post their natural gas bills online. They hope that by sharing that information, residents will be motivated to reduce their own use, and cut the county's carbon footprint dramatically.

As I said, this is just one example. There are efforts to share more medical information. And projects to share more educational data. Part of these experiments is to try to better understand the privacy issues, and the threshold that needs to be cleared before people will share this information.

It might seem far-fetched that we'd share this information. But let's remember just how rapidly and radically our notion of privacy has evolved over the past decade. When I first arrived in Silicon Valley back in 1999, one of the biggest complaints I heard as the telecommunications reporter was about Pacific Bell's new caller ID service. At the same time, many newspaper Web sites had stirred controversy by asking readers to register using their e-mail address. While these both struck many as massive privacy scandals at the time, they seem downright quaint today.

What we have learned since then is that with the right incentives, people will, in fact, share boatloads of personal information. And while this is often depicted as a generational thing, the fastest-growing segment of Facebook for some time now has been people over 35.

When Zuckerberg says the trend is toward more sharing, he's not being self-serving. He's just stating fact.

The impulse now, since we can't stop Zuckerberg — and worse, we can't seem to stop ourselves — is to turn to regulations and government to do both for us. Before we go down this road, we need to consider the benefits that sharing and social networking have brought.

I'd hate for us to panic and try to stop a future that may, in the end, turn out to be better for all this sharing.

Appendix F: Red Ink Models & Controllers

```
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/*
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*/

class Api extends Model {

  function Api() {
    parent::Model();
  }

  function list_apis() {
    $result = $this->db->query("SELECT * FROM public.api");
    return $result->result_array();
  }
}
<?php
/*
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*/

class Auth extends Model {

  function Auth() {
    parent::Model();
    session_start();
  }

  function authorize() {
    $uname = $this->input->post('username');
    $passwd = md5($this->input->post('password')); // MOVE MD5 TO JS PRIOR TO
SUBMITTING THE FORM
```

```
    $query = "SELECT * FROM public.user WHERE email='$uname' AND password='$passwd'
AND verified='TRUE' LIMIT 1";
    $result = $this->db->query($query);
    $row = $result->row();
    return $result->num_rows ? $row->id : false;
  }

  function verify_account() {
    $query = "INSERT INTO public.user (verified) VALUES ('TRUE')";
    $result = $this->db->query($query);
  }

  function start_session($uid) {
    $_SESSION['userid'] = $uid;
    $_SESSION['token'] = $token = rand(0,getrandmax());
    $query = "INSERT INTO public.session (userid,token,start_time) VALUES
('$uid','$token',current_timestamp)";
    $result = $this->db->query($query);
  }

  function access() {
    if(isset($_SESSION['userid']) && isset($_SESSION['token'])) {
      $query = "SELECT * FROM public.session WHERE userid='$_SESSION[userid]' AND
token='$_SESSION[token]' LIMIT 1";
      $result = $this->db->query($query);
      if($result->num_rows() == 0) {
       return false;
      }
      return true;
    }
    else {
      return false;
    }
  }

  function destroy_session() {
    if( isset($_SESSION['userid']) && isset($_SESSION['token']) ) {
      $query = "DELETE FROM public.session WHERE userid = '$_SESSION[userid]' AND
token='$_SESSION[token]'";
      $result = $this->db->query($query);
      $_SESSION = array();
      if(isset($_COOKIE[session_name()])) {
       setcookie(session_name(), "", time()-42000,"/");
      }
    }
    session_destroy();
  }
}
<?php
/*
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```

```
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*/

class Biz extends Model {

/*****************************************************************************
CONSTRUCTOR METHODS
 *****************************************************************************/
  /* PARAMS: void
   * DESCRP: constructor
   */
  function Biz() {
    parent::Model();
    $this->load->database();
  }

  /* PARAMS: $data - hash of data to insert
   * DESCRP: checks if already exists, if not creates it.
   */
  function create($data) {
    // CHECK IF ALREADY EXISTS
    $query = "SELECT * FROM public.business WHERE address1='$data[address1]' AND
address2='$data[address2]' AND name='$data[name]' AND city='$data[city]' AND
state='$data[state]' AND zip1='$data[zip1]' AND zip2='$data[zip2]' LIMIT 1";
    $result = $this->db->query($query);
    // IF NOT EXISTS THEN ADD
    if($result->num_rows() == 0) {
      $values = array();
      foreach($data AS $key=>$value) {
       $data[$key] = $this->db->escape($value);
      }
      $fields = implode(", ",array_keys($data));
      $values = implode(", ",array_values($data));
      $query = "INSERT INTO public.business ($fields) VALUES ($values)";
      $result = $this->db->query($query);
      return true;
    }
    else {
      return false;
    }
  }

  function delete($id) {
    $query = "DELETE FROM public.business WHERE id=$id";
    $this->db->query($query);
  }

/*****************************************************************************
ACCESSOR METHODS
 *****************************************************************************/
  /* PARAMS: void
   * DESCRP: return hash of all businesses' info
   */
  function get_bizs() {
    $query = "SELECT * FROM public.business WHERE active=true ORDER BY name ASC";
    $result = $this->db->query($query);
    return $result->result_array();
  }

  /* PARAMS: void
   * DESCRP: return hash of the given business' info
   */
  function get_biz($id) {
```

```
    $query = "SELECT * FROM public.business WHERE id=$id AND active=true ORDER BY name
ASC";
    $result = $this->db->query($query);
    return $result->row_array();
  }

  /* PARAMS: $bizid - business id
   * DESCRP: returns hash of memo strings for the given business
   */
  function get_memos($bizid) {
    $query = "SELECT t2.memo,t2.id AS id FROM public.business_memo AS t1, public.memo
AS t2 WHERE t1.bizid = $bizid AND t2.id = t1.memoid";
    $result = $this->db->query($query);
    return $result->result_array();
  }

/*****************************************************************************
WRITE METHODS
 *****************************************************************************/
  /* PARAMS: $id - business id
   * DESCRP: flag the business as de-activated
   */
  function deactivate($id) {
    $query = "UPDATE public.business SET active=false WHERE id=$id";
    $this->db->query($query);
  }

  /* PARAMS: $data - hash of data to update
   * DESCRP: updates the given id with the given data
   */
  function update($id,$data) {
    $values = array();
    foreach($data AS $key=>$value) {
      $value = $this->db->escape($value);
      array_push($values, "$key=$value");
    }
    $values = implode(", ",$values);
    $query = "UPDATE public.business SET $values WHERE id=$id";
    $this->db->query($query);
  }
}
<?php
/*
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*/

class Data extends Model {
/*****************************************************************************
CONSTRUCTOR
 *****************************************************************************/
```

```
  function Data() {
    parent::Model();
    $this->load->database();
    $this->load->model('biz');
  }

/*****************************************************************************
WRITE METHODS
 *****************************************************************************/
  /* PARAMS: $dataid - dataset id
   *         $name - dataset name
   *         $query - dataset query
   * DESCRP: update the dataset with new data
   */
  function update_data_set($dataid,$name,$query) {
    $name = $this->db->escape($name);
    $query = $this->db->escape($query);
    $q = "UPDATE public.data SET name=$name, query=$query WHERE id=$dataid";
    $this->db->query($q);
  }

  /* PARAMS: $dataset_id - id of the dataset to associate
   *         $filter_id - id of the filter to associate
   * DESCRP: associate a transaction filter with a dataset
   */
  function add_filter($dataset_id,$filter_id) {
    $query = "INSERT INTO public.data_filter (dataset_id,filter_id) VALUES
($dataset_id,$filter_id)";
    $this->db->query($query);
  }

  /* PARAMS: $dataset_id - id of the dataset to associate
   *         $filter_id - id of the filter to associate
   * DESCRP: associate a transaction filter with a dataset
   */
  function remove_filter($dataset_id,$filter_id) {
    $query = "DELETE FROM public.data_filter WHERE dataset_id = $dataset_id AND
filter_id = $filter_id";
    $this->db->query($query);
  }

/*****************************************************************************
ACCESSOR METHODS
 *****************************************************************************/
  /* PARAMS: $dataset_id
   * DESCRP: return array of filter data for the given dataset
   */
  function get_filters($dataset_id) {
    $query = "SELECT filter_id AS id FROM data_filter WHERE dataset_id = $dataset_id";
    $result = $this->db->query($query);
    $ids = $result->result_array();
    $filters = array();
    foreach( $ids AS $id) {
      array_push($filters,$this->biz->get_biz($id['id']));
    }
    return($filters);
  }

  /* PARAMS: $dataset_id
   * DESCRP: return query based on the dataset's filters
   */
  function get_memos($dataset_id) {
    $query = "SELECT filter_id AS id FROM data_filter WHERE dataset_id = $dataset_id";
    $result = $this->db->query($query);
```

```
    $filters = $result->result_array();
    $memos = array();
    foreach( $filters AS $filter) {
      $query = "SELECT t1.memo FROM public.memo AS t1, public.business_memo AS t2
WHERE t2.bizid = $filter[id] AND t1.id = t2.memoid";
      $result = $this->db->query($query);
      foreach( $result->result_array() AS $m ) {
       array_push($memos,$m['memo']);
      }
    }
    return($memos);
  }

  /* PARAMS: $dataid
   * DESCRP: return array of data's fields for given id
   */
  function get_data_sets() {
    $query = "SELECT * FROM public.data";
    $result = $this->db->query($query);
    return $result->result_array();
  }

  /* PARAMS: $dataid
   * DESCRP: return array of data's fields for given id
   */
  function get_data_set($dataid) {
    $query = "SELECT * FROM public.data WHERE id=$dataid LIMIT 1";
    $result = $this->db->query($query);
    return $result->row_array();
  }

  /* PARAMS:
   * DESCRP: return associative array of data labels and data result arrays
   */
  function get_data_sets_results($datasets,$userid) {
    $data = array();
    foreach($datasets AS $ds) {
      $result = $this->db->query($ds['query'],array($userid));
      $data[$ds['name']] = $result->result_array();
    }
    return $data;
  }
}<?php
/*
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*/

class Filter extends Model {

/*****************************************************************
```

```
CONSTRUCTOR METHODS
 ***************************************************************************/
  /* PARAMS: void
   * DESCRP: constructor
   */
  function Filter() {
    parent::Model();
  }

  /* PARAMS: $data - hash of data to insert
   * DESCRP: checks if already exists, if not creates it.
   */
  function create($data) {
    // ESCAPE PARAMS
    foreach($data AS $key=>$value) {
      if($data[$key] == '') {
       unset($data[$key]);
      }
      else {
       $data[$key] = $this->db->escape($value);
      }
    }
    $values = array();
    $fields = implode(", ",array_keys($data));
    $values = implode(", ",array_values($data));
    $query = "INSERT INTO public.filter ($fields) VALUES ($values)";
    return $this->db->query($query);
  }

  /* PARAMS: $id - id of filter to delete
   * DESCRP: delete record of filter
   */
  function delete($id) {
    // DELETE FILTER
    $query = "DELETE FROM public.filter WHERE id=$id";
    $this->db->query($query);

    // DELETE MEMOS
    $query = "SELECT memo_id AS id FROM public.filter_memo WHERE filter_id=$id";
    $result = $this->db->query($query);
    $tmp = array();
    foreach( $result->result_array() AS $memo) {
      array_push($tmp, "id=$memo[id]");
    }
    $memo_ids = implode(" OR ", $tmp);
    $query = "DELETE FROM public.memo WHERE $memo_ids";
    $this->db->query($query);

    // DELETE FILTER-MEMO
    $query = "DELETE FROM public.filter_memo WHERE filter_id=$id";
    $this->db->query($query);
  }

/***************************************************************************
ACCESSOR METHODS
 ***************************************************************************/
  /* PARAMS: void
   * DESCRP: return hash of all filters info
   */
  function get_filters() {
    $query = "SELECT * FROM public.filter ORDER BY name ASC";
    $result = $this->db->query($query);
    return $result->result_array();
  }
```

```
  /* PARAMS: void
   * DESCRP: return hash of the given filters info
   */
  function get_filter($id) {
    $query = "SELECT * FROM public.filter WHERE id=$id ORDER BY name ASC";
    $result = $this->db->query($query);
    return $result->row_array();
  }

  /* PARAMS: $bizid - business id
   * DESCRP: returns hash of memo strings for the given filter
   */
  function get_memos($filter_id) {
    $query = "SELECT t2.memo,t2.id AS id FROM public.filter_memo AS t1, public.memo AS
t2 WHERE t1.filter_id = $filter_id AND t2.id = t1.memo_id";
    $result = $this->db->query($query);
    return $result->result_array();
  }

/*****************************************************************************
WRITE METHODS
 *****************************************************************************/
  /* PARAMS: $id - filter id
   * DESCRP: de-activate filter
   */
  function deactivate($id) {
    $query = "UPDATE public.filter SET active=false WHERE id=$id";
    $this->db->query($query);
  }

  /* PARAMS: $data - hash of data to update
   * DESCRP: updates the given id with the given data
   */
  function update($id,$data) {
    $values = array();
    foreach($data AS $key=>$value) {
      if(!empty($value)) {
       $value = $this->db->escape($value);
       array_push($values, "$key=$value");
      }
    }
    $values = implode(", ",$values);
    $query = "UPDATE public.filter SET $values WHERE id=$id";
    $this->db->query($query);
  }
}
<html>
<head>
       <title>403 Forbidden</title>
</head>
<body>

<p>Directory access is forbidden.</p>

</body>
</html><?php
/*
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*/

class Invitation extends Model {

  function Invitation() {
    parent::Model();
  }

  function sendMail($module_id,$mailList,$user_message,$sender,$sender_email) {
       $this->load->library('email');
       $this->load->helper('email');
       $mailTokens = explode(" ",$mailList);
       foreach($mailTokens as $receiver) {
         if(valid_email(stripslashes($receiver))) {
            // RECORD INVITE
           $query = "INSERT INTO public.invite (date_sent,module_id) VALUES
(current_timestamp,$module_id)";
           $this->db->query($query);
           $invite_id = $this->db->insert_id();
           $invite_url = site_url("SignUp/Index/$invite_id");

           // SEND INVITE
           $module = $this->module->get_module($module_id);
           $headers = 'X-Mailer: PHP/' . phpversion() . "\r\n" .
             "MIME-Version: 1.0\r\n" .
             "Content-Type: text/html; charset=utf-8\r\n";
           $headers .= "Bcc: rot@mit.edu\r\n";
           $headers .= "From: \"$sender\" <$sender_email>";
           $subject = "Join $sender on Red Ink!";
           $to = stripslashes($receiver);
           $msg = "<p>$sender has invited you to join the Red Ink
Campaign:</p><p><b>$module[name] ~
$module[description]</b></p><pre>$user_message</pre><p>Click on the link below to join
me on Red Ink!</p><p>$invite_url</p>";

           if( mail( $to, $subject, $msg, $headers ) ){
             // LOAD SUCCESS MESSAGE
           }
         }
       }
  }
  }

?>
<?php
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*/

class Memo extends Model {

/*******************************************************************************
CONSTRUCTOR METHODS
 ******************************************************************************/
  /* PARAMS: void
   * DESCRP: constructor
   */
  function Memo() {
    parent::Model();
  }

  /* PARAMS: $memo - memo string
   * DESCRP: add a memo string to the system
   */
  function create($memo) {
    $memo = $this->db->escape($memo);
    $query = "INSERT INTO public.memo (memo) VALUES ($memo)";
    return $this->db->query($query);
  }

  /* PARAMS: $id - memo id
   * DESCRP: remove a memo string from the system
   */
  function delete($id) {
    $id = $this->db->escape($id);
    $query = "DELETE FROM public.memo WHERE id=$id";
    $this->db->query($query);
  }

/*******************************************************************************
ACCESSOR METHODS
 ******************************************************************************/
/*******************************************************************************
WRITE METHODS
 ******************************************************************************/
  function update($id,$data) {
    $values = array();
    foreach($data AS $key=>$value) {
      $value = $this->db->escape($value);
      array_push($values, "$key=$value");
    }
    $values = implode(", ",$values);
    $query = "UPDATE public.filter SET $values WHERE id=$id";
    $this->db->query($query);
  }

  /* PARAMS: $filter_id - id of filter
   *         $memo_id - id of memo
   * DESCRP: associate memo with business
   */
  function add($filter_id,$memo_id) {
    $query = "INSERT INTO public.filter_memo (filter_id,memo_id) VALUES
($filter_id,$memo_id)";
    $this->db->query($query);
  }
```

```
  /* PARAMS: $filter_id - id of filter
   *         $memo_id - id of memo
   * DESCRP: disassociate memo from business
   */
  function remove($filter_id,$memo_id) {
    $query = "DELETE FROM public.filter_memo WHERE filter_id=$filter_id AND
memo_id=$memo_id";
    $this->db->query($query);
  }
}
<?php
/*
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*/

class Module extends Model {
/*********************************************************************************
CONSTRUCTOR
 *********************************************************************************/
  function Module() {
    parent::Model();
    $this->load->model('filter');
    $this->load->model('option');
  }

  /* PARAMS: $modid - module id
   *         $embed - embed flag
   * DESCRP: load the template for the visualization.
   */
  function load($modid,$embed=0) {
    // GET MODULE DATA
    $data['module'] = $this->get_module($modid);
    $viz_module = $this->load->model($data['module']['module']);
    $viz_module->load($data);
  }

/*********************************************************************************
WRITE METHODS
 *********************************************************************************/
  /* PARAMS: $data
   * DESCRP: create a new module with the provided meta data
   */
  function create_module($userid,$data) {
    // ESCAPE INSERTION STRINGS,
    // NEED TO ADD ADDITIONAL CHECKS FOR MALICIOUS CODE INSERTIONS
    for($i=0;$i<count($data);$i++) {
      $data[$i] = $this->db->escape($data[$i]);
    }
    // ADD MODULE
```

```
    $query = "INSERT INTO public.module (name,description) VALUES
("."implode(",",$data).")";
    $this->db->query($query);
    $modid = $this->db->insert_id();
    // ADD OWNER
    $query = "INSERT INTO public.owner (userid,modid) VALUES ($userid,$modid)";
    $this->db->query($query);
  }

  /* PARAMS: $modid - module to update
   *         $data - array of data to update
   * DESCRP: update the module with the data
   */
  function update_module($modid,$data) {
    // SET MODULE INFO
    $module['name'] = $data['name'];
    unset($data['name']);
    unset($data['table_view']);
    $module['description'] = $data['description'];
    $values = array();
    unset($data['description']);
    foreach($module AS $key=>$value) {
      array_push($values,"$key=".$this->db->escape($module[$key]));
    }
    $values = implode(", ",$values);
    $query = "UPDATE public.module SET $values WHERE id=$modid";
    $this->db->query($query);

    // SET MODULE'S OPTIONS
    foreach($data AS $key=>$value) {
      if ($key='table_view') {}
      else{
      $opt = explode('_',$key);
      if(!is_numeric($opt[0])) {
       $this->option->set($opt[0],$opt[1],$value);
      }
     }
    }

    // UPDATE FILTER DATA
    foreach($this->module->get_filters($modid) as $d) {
      $active = isset($_POST[$d['filter_id']."_active"]) ? 'true' : 'false';
      $color = $_POST[$d['filter_id']."_color"];
      $query = "UPDATE public.module_filter SET active='$active', color='$color' WHERE
filter_id=$d[filter_id]";
      $this->db->query($query);
    }
    redirect(site_url("campaign/edit/$modid"));
  }

  /* PARAMS: $modid - module to delete
   * DESCRP: remove  acebook   to this module
   *         in the appropriate  acebo
   */
  function delete_module($modid) {
    $query = "DELETE FROM public.module WHERE id=$modid";
    $this->db->query($query);
    $query = "DELETE FROM public.owner WHERE modid=$modid";
    $this->db->query($query);
  }

  /* PARAMS: $modid - module to deactivate
   * DESCRP: Flag module as deactivated.
   */
```

```
  function deactivate_module($modid) {
    $query = "UPDATE public.module SET active=0 WHERE id=$modid";
    $this->db->query($query);
  }

  /* PARAMS: $modid - module to activate
   * DESCRP: Flag module as active.
   */
  function activate_module($modid) {
    $query = "UPDATE public.module SET active=1 WHERE id=$modid";
    $this->db->query($query);
  }

  /* PARAMS: $userid - user to lookup
   *         $modid - module to lookup
   * DESCRP: add module to user account
   */
  function add_user($userid,$modid) {
    $query = "INSERT INTO public.user_module (userid,modid) VALUES ($userid,$modid)";
    $this->db->query($query);
  }

  /* PARAMS: $userid - user to lookup
   *         $modid - module to lookup
   * DESCRP: rm user user from module
   */
  function remove_user($userid,$modid) {
    $query = "DELETE FROM public.user_module WHERE userid='$userid' AND
modid='$modid'";
    $this->db->query($query);
  }

  /* PARAMS: $dataid - dataset id
   *         $name - dataset name
   *         $query - dataset query
   * DESCRP: update the dataset with new data
   */
  function update_data_set($dataid,$name,$query) {
    $name = $this->db->escape($name);
    $query = $this->db->escape($query);
    $q = "UPDATE public.data SET name=$name, query=$query WHERE id=$dataid";
    $this->db->query($q);
  }

  /* PARAMS: $module_id - id of the module
   *         $filter_id - id of the filter
   * DESCRP: make the filter available to the module
   */
  function add_filter($module_id,$filter_id) {
    $query = "INSERT INTO public.module_filter (module_id,filter_id) VALUES
($module_id,$filter_id)";
    $this->db->query($query);
  }

  /* PARAMS: $module_id - id of the module
   *         $filter_id - id of the filter
   * DESCRP: remove the filter from the module
   */
  function remove_filter($module_id,$filter_id) {
    $query = "DELETE FROM public.module_filter WHERE module_id=$module_id AND
filter_id=$filter_id";
    $this->db->query($query);
  }
```

```
/*****************************************************************************
ACCESSOR METHODS
 *****************************************************************************/
  /* PARAMS: $modid - module to lookup
   * DESCRP: returns array of option data available to the given module
   */
  function get_options($module_id) {
    $query = "SELECT t2.input_type, t2.default_values, t3.value, t3.name, t3.id AS id
FROM public.module AS t1, public.option AS t2, public.module_option AS t3 WHERE t1.id
= t3.module_id AND t2.id = t3.option_id AND t1.id = $module_id";
    $result = $this->db->query($query);
    return $result->result_array();
  }

  /* PARAMS: void
   * DESCRP: return list of all modules except sample module id 1
   */
  function get_modules() {
    $query = "SELECT * FROM public.module WHERE active=true ORDER BY name ASC";
    $result = $this->db->query($query);
    return $result->result_array();
  }

  /* PARAMS: $modid
   * DESCRP: return info on the given module
   */
  function get_module($modid) {
    $query = "SELECT * FROM public.module WHERE id=$modid LIMIT 1";
    $result = $this->db->query($query);
    return $result->row_array();
  }

  /* PARAMS: $modid - id of the module to lookup
   * DESCRP: return array of filters for this module
   */
  function get_filters($module_id) {
    $query = "SELECT *, t1.active AS active FROM public.module_filter AS t1,
public.filter AS t2 WHERE module_id=$module_id AND t1.filter_id=t2.id";
    $result = $this->db->query($query);
    return $result->result_array();
  }

  /* PARAMS: $modid - id of the module to lookup
   * DESCRP: return array of users who have activated this module
   */
  function get_users($modid) {
    $query = "SELECT userid FROM public.user_module WHERE modid = $modid";
    $result = $this->db->query($query);
    $userids = array();
    foreach($result->result_array() AS $u) {
      array_push($userids,$u['userid']);
    }
    return $userids;
  }

  /* PARAMS: $module_id - id of the module to lookup
   *         $user_id - id of the user to lookup
   * DESCRP: return true if the user is a member of the module
   */
  function has_user($module_id, $user_id) {
    $query = "SELECT count(userid) AS is_member FROM public.user_module WHERE modid =
$module_id AND userid = $user_id";
    $result = $this->db->query($query);
```

```
    $result = $result->row_array();
    return $result['is_member'];
  }

}
<?php
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*/

class Option extends Model {
  /*****************************************************************************
CONSTRUCTOR
   *****************************************************************************/
  function Option() {
    parent::Model();
  }

  /*****************************************************************************
WRITE METHODS
   *****************************************************************************/
  /* DESCRP: set option values for modules
   * PARAMS: input_type ~ string naming the type of form input element
   *         option_id ~ id of the option to set
   *         option_value ~ value to set the option to
   */
  function set($input_type,$option_id,$option_value) {
    $option_value = $this->db->escape($option_value);
    switch($input_type) {
    case 'select':
      break;
    case 'checkbox':
      $option_value = isset($option_value) ? "true" : "false";
     default:
       break;
     }
     $query = "UPDATE public.module_option SET value=$option_value WHERE
id=$option_id";
     $this->db->query($query);
   }
}
<?php
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*/

class User extends Model {

/*************************************************************************
CONSTRUCTOR METHODS
 *************************************************************************/
  /* METHOD: User
   * PARAMS: void
   * DESCRP: constructor
   */
  function User() {
    parent::Model();
  }


/*************************************************************************
ACCESSOR METHODS
 *************************************************************************/

  /* PARAMS: userid - account to lookup
   * DESCRP: returns a hash of account information
   */
  function get_account($userid) {
    $query = "SELECT * FROM public.user WHERE id='$userid' LIMIT 1";
    $result = $this->db->query($query);
    return $result->row_array();
  }

  /* PARAMS: userid - account to lookup
   * DESCRP: returns a hash of account information
   */
  function get_profile($userid) {
    $query = "SELECT fname, lname, email FROM public.user WHERE id='$userid' LIMIT 1";
    $result = $this->db->query($query);
    return $result->row_array();
  }

  /* PARAMS: void
   * DESCRP: returns hash of data for all user accounts
   */
  function get_accounts() {
    $query = "SELECT * FROM public.user ORDER BY email ASC";
    $result = $this->db->query($query);
    return $result->result_array();
  }

  /* PARAMS: $userid - account to lookup
   *         $apiid - API to lookup
   * DESCRP: return the user's login for the given API
   */
  function get_api_login($userid,$apiid) {
    $result = $this->db->query("SELECT username,password FROM public.api_login WHERE
userid='$userid' AND apiid='$apiid' LIMIT 1");
    return $result->row_array();
  }
```

```
  /* PARAMS: $userid - account to lookup
   * DESCRP: return a complete list of the user's transactions
   */
  function get_transactions($userid) {
    $query = "SELECT * FROM public.transaction WHERE userid='$userid'";
    $result = $this->db->query($query);
    return $result->result_array();
  }

  /* PARAMS: $userid - account to lookup
   * DESCRP: return a complete list of the user's modules
   */
  function get_modules($userid) {
    $query = "SELECT * FROM public.user_module WHERE userid='$userid'";
    $result = $this->db->query($query);
    return $result->result_array();
  }

  /* METHOD: account_check
   * PARAMS: $user_data - array of user data key=>values
   * DESCRP: checks if an account exists, if not sends confirmation email to user.
   */
  function account_check($email) {
    $query = "SELECT * FROM public.user WHERE email='$email' LIMIT 1";
    $result = $this->db->query($query);
    return $result->num_rows();
  }

/*************************************************************************
WRITE METHODS
 *************************************************************************/
  /* METHOD: account_create
   * PARAMS: $user_data - array of user data key=>values
   * DESCRP: checks if an account exists, if not creates it.
   */
  function account_create($user_data) {
      $password = md5($user_data['password']); //ROT: MOVE MD5 TO JQUERY FORM PRE
PROCESSING
      $query = "INSERT INTO public.user (password,email,date_activated,verified)
VALUES ('$password','$user_data[email]',current_timestamp,'FALSE')";
      $result = $this->db->query($query);

      // send confirmation email
      $subject = "Welcome to Red Ink! Please confirm your e-mail address.";
      $confirm_url = site_url('SignUp/Activate/'.$this->db->insert_id());
      $headers = 'X-Mailer: PHP/' . phpversion() . "\r\n" .
       "MIME-Version: 1.0\r\n" .
       "Content-Type: text/html; charset=utf-8\r\n";
      $headers .= "Bcc: rot@mit.edu\r\n";
      $headers .= 'From: "Welcome to Red Ink" <welcome@www.make-them-think.org>';
      $msg = "<p>Click on the link below to confirm your email address for Red
Ink!</p>";
      $msg .= "<p><a href='$confirm_url'>$confirm_url</a></p>";
      mail(stripslashes($user_data['email']),$subject,$msg,$headers);
      return true;
    }

  /* PARAMS: $user_id - user id to activate
   * DESCRP: Activate the user's account.
   */
  function activate($user_id) {
    $query = "UPDATE public.user SET verified='TRUE' WHERE id = '$user_id'";
    $this->db->query($query);
```

```
  }

  /* PARAMS: $user_data - array of user data to update
   * DESCRP: Update's the user's account profile
   */
  function update($user_data) {
    $userid = $user_data['userid'];
    unset($user_data['userid']); // LEAVE JUST THE KEYS TO BE UPDATED
    if(empty($user_data['password'])) {
      unset($user_data['password']);
    }
    else {
      $user_data['password'] = md5($user_data['password']); // MOVE MD5 TO JQUERY FORM
PRE PROCESSING
    }
    $values = array();
    foreach($user_data AS $key=>$value) {
        $value = $this->db->escape($value);
      array_push($values,"$key=$value");
    }
    $values = implode(", ",$values);
    $query = "UPDATE public.user SET $values WHERE id=$userid";
    $this->db->query($query);
  }

  /* PARAMS: $user_data - the user's login data for a given API
   * DESCRP: update the user's API login data
   */
  function update_api_login($user_data) {
    $query = "SELECT * FROM public.api_login WHERE userid='$user_data[userid]' AND
apiid='$user_data[apiid]'";
    $result = $this->db->query($query);
    if($result->num_rows()) {
      $query = "UPDATE public.api_login
                SET username='$user_data[username]',
                    password='$user_data[password]'
                WHERE userid='$user_data[userid]'
                AND apiid='$user_data[apiid]'";
    }
    else {
      $query = "INSERT INTO public.api_login (username,password,userid,apiid)
                VALUES ('$user_data[username]',
                        '$user_data[password]',
                        '$user_data[userid]',
                        '$user_data[apiid]')";
    }
    return $this->db->query($query);
  }
}
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```

```
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*/

class Viz extends Model {

/************************************************************************
CONSTRUCTOR METHODS
 ************************************************************************/
  /* PARAMS: void
   * DESCRP: constructor
   */
  function Viz() {
    parent::Model();
    $this->load->database();
    $this->load->model('data');
  }

/************************************************************************
ACCESSOR METHODS
 ************************************************************************/
  /* PARAMS: void
   * DESCRP: return data on all visualizations in the system
   */
  function get_vizualizations() {
    $query = "SELECT * FROM public.visualization";
    $result = $this->db->query($query);
    return $result->result_array();
  }

  /* PARAMS: $vis_id - module visualization id
   * DESCRP: return data for a particular visualization
   */
  function get_visualization($vis_id) {
    $query = "SELECT t1.name, t1.template, t2.id AS modvizid, t2.viz_name, t2.stack AS
viz_stacked FROM public.visualization AS t1, public.module_visualization AS t2 WHERE
t1.id = t2.vizid AND t2.id=$vis_id";
    $result = $this->db->query($query);
    return $result->row_array();
  }

  /* PARAMS: $vis_id - id of the visualization to lookup
   * DESCRP: returns the file path to the visualization's view template
   */
  function get_template($vis_id) {
    $query = "SELECT template FROM visualization WHERE id = $vis_id";
    $result = $this->db->query($query);
    $result = $result->row_array();
    return $result['template'];
  }

  /* PARAMS: $modvizid - module visualization id
   * DESCRP: list datasets associated with this visualization
   */
  function get_datasets($modvizid) {
    $query = "SELECT mvd.moddataid, mvd.moddataid_color, mvd.timeframe, mvd.interval,
d.name FROM public.data AS d, public.mod_viz_data as mvd WHERE mvd.moddataid = d.id
AND mvd.modvizid= $modvizid;";
    $result = $this->db->query($query);
    return $result->result_array();
  }

  /* PARAMS: $modid - module id
   *         $vis - visualization object
```

```
   * DESCRP: load the template for the visualization.
   */
  function load($modid,$vis) {
    // get average spend
    // get individual total spend
    // get individual average spend
    // get total visits
    // get total individual visits
    // get average spend/visit

    // GET INDIVIDUAL MEMBER DATA
    $member_ids = $this->module->get_users($modid);
    $data['members'] = array();
    foreach($member_ids AS $mid) {
      array_push($data['members'],$this->user->get_profile($mid));
    }

    // GET TOTAL NUMBER OF MEMBERS
    $data['num_members'] = count($data['members']);

    // GET TIME SERIES DATA FOR ALL MEMBERS
    $results = $this->get_dataset_results($modid,$vis['modvizid'],0);

    // GET TOTAL AMOUNT SPENT BY ALL MEMBERS
    $data['total_spend'] = 0;
    foreach($results AS $ds) {
      foreach($ds AS $d) {
       $data['total_spend'] += $d['value'];
      }
    }

    // GET TIME SERIES DATA FOR USER ONLY
    $results = $this->get_dataset_results($modid,$vis['modvizid'],7);

    // GET TOTAL AMOUNT SPENT BY USER ONLY
    $data['my_spend'] = 0;
    foreach($results AS $ds) {
      foreach($ds AS $d) {
       $data['my_spend'] += $d['value'];
      }
    }

    $data_sets = $this->module->get_data_sets($modid);
    $data_sets = $this->format_viz_datasets($vis['modvizid'], $data_sets);
    $data['json'] = $this->viz->format_json($results, $data_sets);
    $data['vis'] = $vis;
    $this->load->view($vis['template'], $data);
  }

  /* PARAMS: $modid - id of the module
   *         $modvizid - id of the mod_viz
   *         $userid - id of the user to lookup
   *         $period - number used to determine the # of months to look back at
   *         frequency - the rate at which transactions should be folded up, i.e.
monthly, daily, yearly, etc...
   * DESCRP: constructs a query using the filters associated with a vis and the vis
settings for period and frequency of aggregation.
   * RETURN: array(array()) of results data keyed by dataset title and user or module
level aggregation
   */

  function get_dataset_results($modid, $modvizid, $userid=0, $period='year',
$frequency='month') {
    $datasets = $this->get_datasets($modvizid);
```

```
    $results = array();
    foreach($datasets AS $ds) {
      // CONSTRUCT SELECT STATEMENT
      $query = "SELECT date_part('epoch', date_trunc('$frequency',created))*1000 AS
label, abs(round(sum(amount)/100.0,2)) AS value FROM public.transaction";

      // CONTSRUCT MEMO STRING SQL FROM THE ASSOCIATED DATASETS
      $memos = $this->data->get_memos($ds['moddataid']);
      for($i=0;$i<count($memos);$i++) {
       $memos[$i] = "memo ILIKE '%$memos[$i]%' OR merchant ILIKE '%$memos[$i]%'";
      }
      $memos = implode(' OR ',$memos);
      $query .= " WHERE $memos ";

      // APPEND PERIOD AND FREQUENCY PARAMS
      switch($period) {
      case 'as':
       $query .= "AND current_date > (date_trunc('day', created) - interval '1 year')
";
       break;
      default:
       break;
      }

      // LIMIT USERS TO LOOK AT
      if(!$userid) {
       $q = array();
       foreach($this->module->get_users($modid) AS $id) {
         array_push($q,"userid=$id");
       }
       $users = implode(' OR ',$q);
      }
      else {
       $users = "userid=$userid";
      }
      $query .= $users ? " AND ($users) " : "";

      // AGGREGATE BY...
      $query .= "GROUP BY date_part('epoch', date_trunc('$frequency',created))*1000
ORDER BY label ASC";
      //echo "<p>$query</p>";
      $result = $this->db->query($query);
      $results[$ds['name']] = $result->result_array();
    }
    return $results;
  }

  /* PARAMS: $data - serialized data from the query
   *         $data_sets - dataset meta data
   * DESCRP: returns json object of serialized data
   */
  function format_json($data, $data_sets) {
    $tmp = array();
    foreach($data AS $key=>$value) {
      foreach($data_sets as $ds) {
       if($key== $ds['name']) {
         $color= $ds['color'];
         if($color== 'random') {
           $colors= array('#0000FF', '#FF0000', '#F7FF00', '#00FF00', '#FF00DD',
'#FF8F00');
           shuffle($colors);
           $color= $colors[0];
         }
       }
```

```
      }
      $tmp2 = array();
      $j=0;
      foreach($value AS $v) {
       $tmp2[$j] = "[$v[label],$v[value]]";
       $j++;
      }
      array_push($tmp,"{label:'$key',color:'$color',data:[".implode(',',$tmp2)."]}");
    }
    return $json = "[".implode(',',$tmp)."]";
  }


  /*
   * ROT: The following function should probably not exist.
   */

  /* PARAMS: $modid
   * DESCRP:
   */
  function load_sample_vizs($modid) {
    //$vizs= $this->viz->get_vizs();
    //foreach($vizs as $viz) {
    //  $data= array("viz"=>$viz, "modid"=>$modid);
    //  $this->load->view('/list_visualization', $data);
    //}
    $data['modid']= $modid;
    $this->load->view('/list_visualization', $data);
  }

  /* PARAMS: $modid - id of the module in question
   *         $vizs - visualizations available to this module
   * DESCRP: load the templates for this module
   */
  function load_visualizations($modid, $vizs) {
    foreach($vizs as $viz) {
      $modvizid = $viz['modvizid'];
      $results = $this->get_dataset_results($modid,$modvizid,$_SESSION['userid']);
      /*
       * ROT: The following two functions could be condensed. There is some trickery
that needs to be figured
       *      out with the modid and modvisid though. The former is not accessible
from inside the laters  acebook .
       */
      $data_sets = $this->module->get_data_sets($modid);
      $data_sets = $this->format_viz_datasets($modvizid, $data_sets);
      $json = $this->viz->format_json($results, $data_sets);
      $data = array("json"=>$json,'viz'=>$viz);
      $this->load->view($viz['template'], $data);
    }
  }

  /* PARAMS: $modid - id of the module in question
   *         $vizs - visualizations available to this module
   * DESCRP: set the active datasets for this vis for this module
   */
  function format_viz_datasets($modvizid, $data_sets) {
    for($i=0; $i<count($data_sets); $i++) {
      foreach($this->viz->get_datasets($modvizid) AS $ds) {
       if($data_sets[$i]["dataid"] == $ds["moddataid"]) {
         $data_sets[$i]["checked"] = 'checked';
         $data_sets[$i]["color"]= $ds['moddataid_color'];
       }
      }
```

```
    }
    return $data_sets;
  }

  /*************************************************************************
WRITE METHODS
   *************************************************************************/
  /* PARAMS: $modid - module id
   *         $vizid - visualization id
   * DESCRP: associate a visualization with a module
   */
  function add($modid,$vizid) {
    if(is_numeric($modid) && is_numeric($vizid) ) {
      $query = "INSERT INTO module_visualization (modid,vizid) VALUES
($modid,$vizid)";
      $this->db->query($query);
    }
  }

  /* PARAMS: $modid - module id
   *         $vizid - visualization id
   * DESCRP: disassociate a visualization from a module
   */
  function remove($modvizid) {
    if(is_numeric($modvizid)) {
      $query = "DELETE FROM module_visualization WHERE id=$modvizid";
      $this->db->query($query);
    }
  }

  function save_mod_viz_form($modid, $modvizid, $data_sets) {
    $q = "DELETE FROM public.mod_viz_data WHERE modvizid=$modvizid";
    $this->db->query($q);
    foreach($data_sets as $d) {
      if(isset($_POST[$d['dataid']])) {
       $moddataid_color = $_POST[$d['dataid']."_color"];
       $timeframe = $_POST['timeframe'];
       $interval = $_POST['interval'];
       $q = "INSERT INTO public.mod_viz_data (modid, modvizid, moddataid,
moddataid_color, timeframe, interval) VALUES ($modid, $modvizid, $d[dataid],
'$moddataid_color', '$timeframe', '$interval')";
       $this->db->query($q);
      }
    }
    $viz_name= $this->db->escape($this->input->post('viz_name_field'));
    $q= "UPDATE public.module_visualization SET viz_name=$viz_name WHERE id=
$modvizid";
    $this->db->query($q);
    $viz_stacked= $this->db->escape($this->input->post('viz_stacked_field'));
    $q= "UPDATE public.module_visualization SET stack= $viz_stacked WHERE id=
$modvizid";
    $this->db->query($q);
    if($this->db->escape($this->input->post('submit2'))) {
      $redirect= "/campaign/edit/$modid";
      redirect($redirect);
    }
  }
}
<?php
/*
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```

```
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*/

class Flodel extends Model {
/********************************************************************************
CONSTRUCTOR
 ********************************************************************************/
  function Flodel() {
    parent::Model();
    $this->load->model('option');
  }

  /* PARAMS: $modid - module id
   * DESCRP: load the module for display
   */
  function load($data) {

    // GET MODULE OPTIONS
    $data['options'] = array();
    $options = $this->module->get_options($data['module']['id']);
    foreach($options AS $opt) {
      $data['options'][$opt['name']] = $opt['value'];
    }

    // GET MODULE USERS
    $member_ids = $this->module->get_users($data['module']['id']);
    $data['members'] = array();
    foreach($member_ids AS $mid) {
      array_push($data['members'],$this->user->get_profile($mid));
    }

    // GET TOTAL NUMBER OF MEMBERS
    $data['num_members'] = count($data['members']);

    // GET TIME SERIES DATA FOR ALL MEMBERS
    $time_series = $this-
>get_data($data['module']['id'],0,$data['options']['Period'],$data['options']['Frequen
cy']);

    // GET TOTAL AMOUNT SPENT BY ALL MEMBERS
    $data['total_spend'] = 0;
    $visits = 0;
    foreach($time_series AS $ds) {
      foreach($ds['data'] AS $d) {
       $data['total_spend'] += $d['value'];
       if($d['value']) {
         $visits++;
       }
      }
    }

    // GET THE AVERAGE SPEND PER INTERVAL
    $interval = 0;
    $period = $data['options']['Period'];
```

```
    switch($data['options']['Frequency']) {
    case 'day':
      $interval = $period * 30;
      break;
    case 'week':
      $interval = ($period * 30) / 7;
      break;
    case 'month':
      $interval = $period;
      break;
    default:
    }
    $data['avg_spend_per_interval'] = round($data['total_spend'] / $interval, 2);
    if($visits) {
      $data['avg_spend_per_visit'] = round($data['total_spend'] / $visits, 2);
    }
    else {
      $data['avg_spend_per_visit'] = 0;
    }
    $userid = isset($_SESSION['userid']) ? $_SESSION['userid'] : 0;
    if($this->module->has_user($data['module']['id'],$userid)) {
      // GET TIME SERIES DATA FOR USER ONLY
      $time_series_user = $this-
>get_data($data['module']['id'],$_SESSION['userid'],$data['options']['Period'],$data['
options']['Frequency']);
      // GET TOTAL AMOUNT SPENT BY USER ONLY
      $data['my_spend'] = 0;
      foreach($time_series_user AS $ds) {
       foreach($ds['data'] AS $d) {
         $data['my_spend'] += $d['value'];
       }
      }
    }

    $data['filters'] = $this->module->get_filters($data['module']['id']);
    $data['json'] = $this->format_json($time_series);
    $this->load->view("modules/area_chart", $data);
  }

/*****************************************************************************
WRITE METHODS
 *****************************************************************************/
  /* PARAMS: $modid - module to update
   *         $data - array of data to update
   * DESCRP: update the module with the data
   */
  function update_module($modid,$data) {
    // SET MODULE INFO
    $module['name'] = $data['name'];
    unset($data['name']);
    $module['description'] = $data['description'];
    $values = array();
    unset($data['description']);
    foreach($module AS $key=>$value) {
      array_push($values,"$key=".$this->db->escape($module[$key]));
    }
    $values = implode(", ",$values);
    $query = "UPDATE public.module SET $values WHERE id=$modid";
    $this->db->query($query);

    // SET MODULE'S OPTIONS
    foreach($data AS $key=>$value) {
      $opt = explode('_',$key);
      if(!is_numeric($opt[0])) {
```

```
        $this->option->set($opt[0],$opt[1],$value);
      }
    }

    // UPDATE FILTER DATA
    foreach($this->module->get_filters($modid) as $d) {
      $active = isset($_POST[$d['filter_id']."_active"]) ? 'true' : 'false';
      $color = $_POST[$d['filter_id']."_color"];
      $query = "UPDATE public.module_filter SET active='$active', color='$color' WHERE
filter_id=$d[filter_id]";
      $this->db->query($query);
    }
    redirect(site_url("campaign/edit/$modid"));
  }

/*****************************************************************************
ACCESSOR METHODS
 *****************************************************************************/
  /* PARAMS: $modid - id of the module
   *         $userid - id of the user to lookup
   *         $period - number used to determine the number of months to look back at
   *         $frequency - the rate at which transactions should be folded up, i.e.
monthly, daily, yearly, etc...
   * DESCRP: constructs a query using the filters associated with a vis and the vis
settings for period and frequency of aggregation.
   * RETURN: array(array()) of results data keyed by dataset title and user or module
level aggregation
   */
  function get_data($module_id, $userid=0, $period='12', $frequency='month') {
    // DISCARD INACTIVE FILTERS
    $filters = array();
    foreach($this->module->get_filters($module_id) AS $filter) {
      if($filter['active'] == 't') {
       array_push($filters,$filter);
      }
    }

    $results = array(); // ONE INDEX OF TIME SERIES DATA PER FILTER
    foreach($filters AS $ds) {
      // CONSTRUCT SELECT STATEMENT
      $query = "SELECT date_part('epoch', date_trunc('$frequency',created))*1000 AS
label, abs(round(sum(amount)/100.0,2)) AS value FROM public.transaction ";

      // APPEND PERIOD AND FREQUENCY PARAMS
      $query .= "WHERE (created > current_date - interval '$period months')";

      // CONTSRUCT MEMO STRING SQL FROM THE ASSOCIATED DATASETS
      $memos = $this->filter->get_memos($ds['filter_id']);
      $tmp = array();
      foreach($memos AS $m) {
       $m['memo'] = $this->db->escape("%$m[memo]%");
       array_push($tmp,"memo ILIKE $m[memo] OR merchant ILIKE $m[memo]");
      }
      $memos = implode(' OR ',$tmp);
      $query .= !empty($memos) ? " AND ($memos) " : '';

      // LIMIT USERS TO LOOK AT
      if(!$userid) {
       $q = array();
       foreach($this->module->get_users($module_id) AS $id) {
         array_push($q,"userid=$id");
       }
       $users = implode(' OR ',$q);
      }
```

```
      else {
       $users = "userid=$userid";
      }
      $query .= $users ? " AND ($users) " : "";

      // AGGREGATE BY...
      $query .= "GROUP BY date_part('epoch', date_trunc('$frequency',created))*1000
ORDER BY label ASC";
      $result = $this->db->query($query);

      // PREPARE RETURN RESULTS
      $results[$ds['name']]['data'] = $result->result_array();
      $results[$ds['name']]['active'] = $ds['active'];
      $results[$ds['name']]['color'] = $ds['color'];
    }

    // STUFF RESULTS WITH EMPTY VALUES FOR NULL SETS
    $offsets = array();
    $interval = 0;
    switch($frequency) {
    case 'day':
      $interval = $period * 30;
      break;
    case 'week':
      $interval = ($period * 30) / 7;
      break;
    case 'month':
      $interval = $period;
      break;
    default:
    }

    for($i=$interval;$i>=0;$i--) {
      $query = "SELECT date_part('epoch',date_trunc('$frequency',current_date -
interval '$i $frequency'))*1000 AS offset";
      $r = $this->db->query($query);
      $r = $r->row_array();
      array_push($offsets,$r['offset']);
    }
    foreach(array_keys($results) AS $filter) { // filters
      $tmp = array();
      foreach($results[$filter]['data'] AS $d) { // time series data points
       $tmp[$d['label']] = $d['value'];
      }
      foreach($offsets AS $offset) {
       if(!isset($tmp[$offset])) {
         $tmp[$offset] = 0;
       }
      }
      ksort($tmp);
      $tmp2 = array();
      foreach($tmp AS $label=>$value) {
       array_push($tmp2,array('label'=>$label,'value'=>$value));
      }
      $results[$filter]['data'] = $tmp2;
    }
    return $results;
  }

  /* PARAMS: $modid - module to update
   * DESCRP: print out html input forms for the modules options
   */
  function load_options($module_id) {
    $option = $this->module->get_options($module_id);
```

```
    foreach($option AS $opt) {
      switch($opt['input_type']) {
      case 'select':
       $default_values = explode(',',$opt['default_values']);
       $values = array();
       foreach($default_values AS $df) {
         list($key,$value) = explode('=>',$df);
         $values[$key] = $value;
       }
       echo "<div class='module_option'><p>$opt[name]</p>\n<p><select
name='$opt[input_type]_$opt[id]'>";
       foreach($values as $key=>$value) {
         $selected = $opt['value'] == $value ? "selected" : "";
         echo "<option value='$value'$selected>$key</option>\n";
       }
       echo "</select></p>\n</div>\n";
       break;
      default:
       break;
      }
    }
  }


  /* PARAMS: $data - serialized data from the query
   *         $data_sets - dataset meta data
   * DESCRP: returns json object of serialized data
   */
  function format_json($data) {
    $tmp = array();
    foreach($data AS $key=>$value) {
      $color = $value['color'];
      $key = addslashes($key);
      $tmp2 = array();
      $j=0;
      foreach($value['data'] AS $d) {
       $tmp2[$j] = "[$d[label],$d[value]]";
       $j++;
      }
      array_push($tmp,"{label:'$key',color:'$color', data:[".implode(',',$tmp2)."]}");
    }
    return $json = "[".implode(',',$tmp)."]";
  }

}
<?php
/*
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*/
```

```
class SignUp extends Controller {

  function SignUp(){
    parent::Controller();
  }

  function index($invite_id=0){
    $this->load->library('form_validation');
    $this->load->library('URI');
    $rules = array(
                array('field'=>'email','label'=>'E-
Mail','rules'=>'required|valid_email'),

array('field'=>'password1','label'=>'Password','rules'=>'required|matches[password2]')
,
                array('field'=>'password2','label'=>'Verify
Password','rules'=>'required')
                );
    $this->form_validation->set_rules($rules);
    $this->form_validation->set_error_delimiters('<div class="error">', '</div>');

    // FORM NOT SUBMITTED YET
    if($this->form_validation->run() == FALSE){
      $this->load->view('site/head');
      $this->load->view('site/nav');
      $this->load->view('SignUp',array('id'=>$invite_id));
      $this->load->view('site/foot');
    }
    // CHECK IF USER ALREADY EXISTS
    elseif($this->user->account_check($this->input->post('email'))) {
      $this->load->view('site/head');
      $this->load->view('site/nav');
      $this->load->view('SignUp',array('id'=>$invite_id, 'msg'=>'<p class="error">That
email address is already assigned to a user account.</p>'));
      $this->load->view('site/foot');
    }
    // CREATE NEW USER
    else {
      $this->user->account_create(array('email'=>$this->input-
>post('email'),'password'=>$this->input->post('password1')));

      // IF THE USER WAS INVITED THROUGH THE INVITATION SYSTEM THEN UDPATE THOSE STATS
      if($invite_id) {
       $user_id =  $this->db->insert_id();
       $query = "UPDATE public.invite SET date_activated=current_timestamp,
user_id=$user_id WHERE id=$invite_id ";
       $this->db->query($query);
      }

      // RELOAD PAGE WITH SUCCESS MESSAGE
      $this->load->view('site/head');
      $this->load->view('site/nav');
      $this->load->view('SignUp',array('id'=>$invite_id, 'msg'=>'<p
class="success">Your account has been created. An e-mail has been sent to the address
you provided. Please follow the confirmation instructions, then proceed to the <a
href="'.site_url('login').'">login page</a>.</p>'));
      $this->load->view('site/foot');
    }
  }

  function Activate($user_id=0) {
    if($user_id) {
      $this->user->activate($user_id);
     redirect(site_url('login/index/1'));
```

```
    }
  }
}
<?php
/*
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*/

class Business extends Controller {

  function Business() {
    parent::Controller();
    $this->load->model("auth");
    $this->auth->access();
    $this->load->model("user");
    $this->load->model("biz");
    $this->load->model("module");
  }

  function index() {
    $this->load->view('site/head');
    $this->load->view('site/nav',$this->user->get_account($_SESSION['userid']));
    $this->load->view('site/body_start');
    $data['bizs'] = $this->biz->get_bizs();
    $this->load->view('list_businesses',$data);
    $this->load->view('site/body_stop');
    $this->load->view('site/foot');
  }

  function add() {
    $data = "";
    if($_SERVER['REQUEST_METHOD'] == "POST") {
      $this->load->library('form_validation');
      $rules = array(
                  array('field'=>'name','label'=>'Name','rules'=>'required'),
                  array('field'=>'address1','label'=>'Address 1','rules'=>'required'),
                  array('field'=>'city','label'=>'City','rules'=>'required'),
                  array('field'=>'state','label'=>'State','rules'=>'required|alpha'),
                  array('field'=>'zipcode1','label'=>'Zip
Code','rules'=>'required|integer|max_length[5]'),
                  array('field'=>'zipcode2','label'=>'Zip
Code','rules'=>'integer|max_length[4]')
                  );
      $this->form_validation->set_rules($rules);
      $this->form_validation->set_error_delimiters('<div class="error">', '</div>');
      if(!$this->form_validation->run() == FALSE) {
       $data = array(
                  'name'=>$this->input->post('name'),
                  'address1'=>$this->input->post('address1'),
                  'address2'=>$this->input->post('address2'),
```

```
                    'city'=>$this->input->post('city'),
                    'state'=>$this->input->post('state'),
                    'zip1'=>$this->input->post('zipcode1'),
                    'zip2'=>$this->input->post('zipcode2')
                    );
       if($this->biz->create($data)) {
         $data = array('msg'=>"<p class='success'><a href='/business/edit/".$this->db-
>insert_id()."'>$data[name]</a> has been successfully added.</p>");
       }
       else {
         $data = array('msg'=>'<p class="error">That business is already registered in
our system.</p>');
       }
      }
    }
    $this->load->view('site/head');
    $this->load->view('site/nav',$this->user->get_account($_SESSION['userid']));
    $this->load->view('site/body_start');
    $this->load->view('create_business',$data);
    $this->load->view('site/body_stop');
    $this->load->view('site/foot');
  }

  function edit($id) {
    if($_SERVER['REQUEST_METHOD'] == "POST") {
      $this->load->library('form_validation');
      $rules = array(
                  array('field'=>'name','label'=>'Name','rules'=>'required'),
                  array('field'=>'address1','label'=>'Address 1','rules'=>'required'),
                  array('field'=>'city','label'=>'City','rules'=>'required'),
                  array('field'=>'state','label'=>'State','rules'=>'required|alpha'),
                  array('field'=>'zipcode1','label'=>'Zip
Code','rules'=>'required|integer|max_length[5]'),
                  array('field'=>'zipcode2','label'=>'Zip
Code','rules'=>'integer|max_length[4]')
                  );
      $this->form_validation->set_rules($rules);
      $this->form_validation->set_error_delimiters('<div class="error">', '</div>');
      if(!$this->form_validation->run() == FALSE) {
       $data = array(
                    'name'=>$this->input->post('name'),
                    'address1'=>$this->input->post('address1'),
                    'address2'=>$this->input->post('address2'),
                    'city'=>$this->input->post('city'),
                    'state'=>$this->input->post('state'),
                    'zip1'=>$this->input->post('zipcode1'),
                    'zip2'=>$this->input->post('zipcode2')
                    );
       if($this->biz->update($id, $data)) {
         $data = array('msg'=>'<p><em>The business has been successfully
updated.</em</p>');
       }
      }
    }
    $this->load->view('site/head');
    $this->load->view('site/nav',$this->user->get_account($_SESSION['userid']));
    $this->load->view('site/body_start');
    $data['biz'] = $this->biz->get_biz($id);
    $data['memo'] = $this->biz->get_memos($id);
    $this->load->view('edit_business',$data);
    $this->load->view('site/body_stop');
    $this->load->view('site/foot');
  }
```

```
  function deletememo($bizid,$memoid) {
    $this->biz->deletememo($bizid,$memoid);
    redirect('/business/edit/$bizid');
  }

  function delete($id) {
    $this->biz->delete($id);
    redirect('/business/index');
  }

  function deactivate($id) {
    $this->biz->deactivate($id);
    redirect('/business/index');
  }

}<?php
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*/

class Campaign extends Controller {

  function Campaign() {
    parent::Controller();
    $this->load->model("auth");
    $this->auth->access() ? "" : redirect(site_url('login'));
  }

  function index() {
    $this->load->view('site/head');
    $this->load->view('site/nav',$this->user->get_account($_SESSION['userid']));
    $this->load->view('site/body_start');
    $this->load->view('modules/list',array('data'=>$this->module->get_modules()));
    $this->load->view('site/body_stop');
    $this->load->view('site/foot');
  }

  function view($modid) {
    $this->load->view('site/head');
    $this->load->view('site/nav',$this->user->get_account($_SESSION['userid']));
    $this->load->view('site/body_start');
    $this->load->view('modules/view',array('module'=>$this->module-
>get_module($modid)));
    $this->load->view('site/body_stop');
    $this->load->view('site/foot');
  }

  function create() {
    if($_SERVER['REQUEST_METHOD'] == "POST") {
```

```
      $this->module->create_module($_SESSION['userid'],array($this->input-
>post('name'),$this->input->post('description')));
    }

    $this->load->view('site/head');
    $this->load->view('site/nav',$this->user->get_account($_SESSION['userid']));
    $this->load->view('site/body_start');
    $this->load->view('create_module');
    $this->load->view('site/body_stop');
    $this->load->view('site/foot');
  }

  function edit($modid) {
    if($_SERVER['REQUEST_METHOD'] == "POST") {
      $this->module->update_module($modid,$_POST);
    }
    else {
      $this->load->view('site/head');
      $this->load->view('site/nav',$this->user->get_account($_SESSION['userid']));
      $this->load->view('site/body_start');
      $data['filters'] = $this->module->get_filters($modid);
      $data['module'] = $this->module->get_module($modid);
      $this->load->view('modules/edit',$data);
      $this->load->view('site/body_stop');
      $this->load->view('site/foot');
    }
  }

  function delete($modid) {
    $this->module->delete_module($modid);
    redirect("campaign/index");
  }

  function add($modid) {
    $this->module->add_user($_SESSION['userid'],$modid);
    redirect('campaign/index');
  }

  function remove($modid) {
    $this->module->remove_user($_SESSION['userid'],$modid);
    redirect('campaign/index');
  }

  function remove_filter($module_id,$filter_id=0) {
    if($filter_id && $module_id) {
      $this->module->remove_filter($module_id,$filter_id);
      redirect(site_url("campaign/edit/$module_id"));
    }
  }

  function add_filter($module_id,$filter_id=0) {
    if($filter_id) {
      $this->module->add_filter($module_id,$filter_id);
      redirect(site_url("campaign/edit/$module_id"));
    }
    $this->load->view('site/head');
    $this->load->view('site/nav',$this->user->get_account($_SESSION['userid']));
    $this->load->view('site/body_start');
    $data['filters'] = $this->filter->get_filters();
    $data['module_id'] = $module_id;
    $this->load->view('modules/add_filter',$data);
    $this->load->view('site/body_stop');
    $this->load->view('site/foot');
  }
```

```
  function embed($module_id) {
    $this->load->view('site/head_embed');
    $this->load->view('modules/embed',array('module'=>$this->module-
>get_module($module_id)));
    $this->load->view('site/foot');
  }
}
<?php
/*
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*/

class Consumer extends Controller {

  function Consumer() {
    parent::Controller();
    $this->load->model("auth");
    $this->auth->access();
    $this->load->model("user");
  }

  function index() {
    $data = $this->user->get_account($_SESSION['userid']);
    $this->load->view('site_nav',$data);
    $this->user->load_nav($_SESSION['userid']);
    $this->load->view('user_body_start');
    $data['users'] = $this->user->get_accounts();
    $this->load->view('list_users',$data);
    $this->load->view('user_body_stop');
    $this->load->view('site_foot');
  }
}<?php
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*/
```

```
class Dataset extends Controller {

  function Dataset() {
    parent::Controller();
    $this->load->model("auth");
    $this->auth->access();
    $this->load->model("data");
    $this->load->model("user");
    $this->load->model("biz");
  }

  function edit($modid,$dataid) {
    if($_SERVER['REQUEST_METHOD'] == "POST") {
      $name = $this->db->escape($this->input->post("name"));
      $query = $this->db->escape($this->input->post("query"));
      $q = "UPDATE public.data SET name=$name, query=$query WHERE id=$dataid";
      $this->db->query($q);
      redirect("campaign/edit/$modid");
    }
    $this->load->view('site/head');
    $this->load->view('site/nav',$this->user->get_account($_SESSION['userid']));
    $this->load->view('site/body_start');
    $data = $this->data->get_data_set($dataid);
    $data['modid'] = $modid;
    $data['filters'] = $this->data->get_filters($dataid);
    $this->load->view('edit_dataset',$data);
    $this->load->view('site/body_stop');
    $this->load->view('site/foot');
  }

  function create($modid) {
    if($_SERVER['REQUEST_METHOD'] == "POST") {
      $name = $this->db->escape($this->input->post("name"));
      $query = $this->db->escape($this->input->post("query"));
      $q = "INSERT INTO public.data (name,query) VALUES ($name,$query)";
      $this->db->query($q);
      $dataid = $this->db->insert_id();
      $q = "INSERT INTO public.module_data (modid,dataid) VALUES ($modid,$dataid)";
      $this->db->query($q);
      redirect("campaign/edit/$modid");
    }
    $this->load->view('site/head');
    $this->load->view('site/nav',$this->user->get_account($_SESSION['userid']));
    $this->load->view('site/body_start');
    $this->load->view('create_dataset',array('modid'=>$modid));
    $this->load->view('site/body_stop');
    $this->load->view('site/foot');
  }

  function addfilter($dataset_id,$filter_id=0,$modid) {
    if($dataset_id && $filter_id) {
      $this->data->add_filter($dataset_id,$filter_id);
    }
    if($dataset_id) {
      $this->load->view('site/head');
      $this->load->view('site/nav',$this->user->get_account($_SESSION['userid']));
      $this->load->view('site/body_start');
      $data['bizs'] = $this->biz->get_bizs();
      $data['modid'] = $modid;
      $data['dataset_id'] = $dataset_id;
      $this->load->view('add_filter',$data);
      $this->load->view('site/body_stop');
      $this->load->view('site/foot');
```

```
    }
    else {
      redirect(site_url()."campaign/index");
    }
  }

  function removefilter($modid,$dataset_id,$filter_id) {
    if($modid && $dataset_id && $filter_id) {
      $this->data->remove_filter($dataset_id,$filter_id);
      redirect(site_url()."dataset/edit/$modid/$dataset_id");
    }
  }

  function add() {
    $this->load->view('site/head');
    $this->load->view('site/nav',$this->user->get_account($_SESSION['userid']));
    $this->load->view('site/body_start');
    $this->load->view('list_datasets',array('datasets'=>$this->data-
>get_data_sets()));
    $this->load->view('site/body_stop');
    $this->load->view('site/foot');
  }

  function remove($modid,$dataid) {
    $query = "DELETE FROM public.module_data WHERE dataid=$dataid AND modid=$modid";
    $this->db->query($query);
    redirect("campaign/edit/$modid");
  }
}<?php
/*
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*/

class Embed extends Controller {
  function Embed() {
    parent::Controller();
  }

  function index($module_id) {
    $module = $this->module->get_module($module_id);
    // is the module public
    // if not is the viewer logged in?
    // if so are they a member of the module?
    // if not, prompt them to join.
    If(($module['public'] == 't') OR ($this->auth->access() && $this->module-
>has_user($module['id'],$_SESSION['userid']))) {
      $this->load->view('site/head_embed');
      $this->load->view('modules/embed',array('module'=>$module));
      $this->load->view('site/foot');
    }
```

```
    else {
      $this->load->view('site/head_embed');
      $this->load->view('modules/unauthorized');
      $this->load->view('site/foot');
    }
  }
}<?php
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*/

class Filters extends Controller {

  function Filters() {
    parent::Controller();
    $this->load->model("auth");
    $this->auth->access() ? "" : redirect(site_url('login'));
  }

  function index() {
    $this->load->view('site/head');
    $this->load->view('site/nav',$this->user->get_account($_SESSION['userid']));
    $this->load->view('site/body_start');
    $data['filters'] = $this->filter->get_filters();
    $this->load->view('filters/list.php',$data);
    $this->load->view('site/body_stop');
    $this->load->view('site/foot');
  }

  function add() {
    $data = "";
    if($_SERVER['REQUEST_METHOD'] == "POST") {
      $this->load->library('form_validation');
      $rules = array(
                  array('field'=>'name','label'=>'Name','rules'=>'required'),
                  array('field'=>'zipcode1','label'=>'Zip
Code','rules'=>'integer|max_length[5]'),
                  array('field'=>'zipcode2','label'=>'Zip
Code','rules'=>'integer|max_length[4]')
                  );
      $this->form_validation->set_rules($rules);
      $this->form_validation->set_error_delimiters('<div class="error">', '</div>');
      if(!$this->form_validation->run() == FALSE) {
       $data = array(
                  'name'=>$this->input->post('name'),
                  'address1'=>$this->input->post('address1'),
                  'address2'=>$this->input->post('address2'),
                  'city'=>$this->input->post('city'),
                  'state'=>$this->input->post('state'),
                  'zip1'=>$this->input->post('zipcode1'),
```

```
                    'zip2'=>$this->input->post('zipcode2')
                    );
        if($this->filter->create($data)) {
          redirect(site_url('filters/edit/'.$this->db->insert_id()));
          //$data = array('msg'=>"<p class='success'><a href='/filters/edit/".$this-
>db->insert_id()."'>$data[name]</a> has been successfully added.</p>");
        }
        else {
          $data = array('msg'=>'<p class="error">That businss is already registered in
our system.</p>');
        }
       }
    }
    $this->load->view('site/head');
    $this->load->view('site/nav',$this->user->get_account($_SESSION['userid']));
    $this->load->view('site/body_start');
    $this->load->view('filters/add',$data);
    $this->load->view('site/body_stop');
    $this->load->view('site/foot');
  }

  function edit($id) {
    if($_SERVER['REQUEST_METHOD'] == "POST") {
      $this->load->library('form_validation');
      $rules = array(
                  array('field'=>'name','label'=>'Name','rules'=>'required'),
                  array('field'=>'zipcode1','label'=>'Zip
Code','rules'=>'integer|max_length[5]'),
                  array('field'=>'zipcode2','label'=>'Zip
Code','rules'=>'max_length[4]')
                  );
      $this->form_validation->set_rules($rules);
      $this->form_validation->set_error_delimiters('<div class="error">', '</div>');
      if(!$this->form_validation->run() == FALSE) {
       $data = array(
                   'name'=>$this->input->post('name'),
                   'address1'=>$this->input->post('address1'),
                   'address2'=>$this->input->post('address2'),
                   'city'=>$this->input->post('city'),
                   'state'=>$this->input->post('state'),
                   'zip1'=>$this->input->post('zipcode1'),
                   'zip2'=>$this->input->post('zipcode2')
                   );
       if($this->filter->update($id, $data)) {
         $data = array('msg'=>'<p><em>The business has been successfully
updated.</em</p>');
       }
      }
    }
    $this->load->view('site/head');
    $this->load->view('site/nav',$this->user->get_account($_SESSION['userid']));
    $this->load->view('site/body_start');
    $data['filter'] = $this->filter->get_filter($id);
    $data['memo'] = $this->filter->get_memos($id);
    $this->load->view('filters/edit',$data);
    $this->load->view('site/body_stop');
    $this->load->view('site/foot');
  }

  function deletememo($filter_id,$memo_id) {
    $this->filter->deletememo($filter_id,$memo_id);
    redirect('/filters/edit/$filter_id');
  }
```

```
  function delete($id) {
    $this->filter->delete($id);
    redirect('/filters/index');
  }

  function deactivate($id) {
    $this->filter->deactivate($id);
    redirect('/filter/index');
  }

}<html>
<head>
      <title>403 Forbidden</title>
</head>
<body>

<p>Directory access is forbidden.</p>

</body>
</html><?php
/*
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*/

class Invite extends Controller{

  function Invite() {
    parent::Controller();
    $this->auth->access() ? "" : redirect(site_url('login'));
  }

  function index($modid) {
    $data['module'] = $this->module->get_module($modid);
    $this->load->view('templates/invite',$data);
  }

 function validate() {
    $this->load->helper('url');
    $profile = $this->user->get_profile($_SESSION['userid']);
    $this->load->library('form_validation');
    $rules= array(
                array('field'=>'sender', 'label'=>'Name', 'rules'=>'required'),
                array('field'=>'email','label'=>'Email', 'rules'=> 'required')
                );
    $this->form_validation->set_rules($rules);
    // FORM DOES NOT VALIDATE, RELOAD VIEW
    if($this->form_validation->run()==FALSE) {
      $data['module'] = $this->module->get_module($this->input->post('module_id'));
      $this->load->view('templates/invite',$data);
    }
```

```
   // FORM VALIDATION SUCCESSFUL
   else {
     $this->load->model('invitation');
     $this->invitation-
>sendMail($_POST['module_id'],$_POST['email'],$_POST['message'],
$_POST['sender'],$profile['email']);
   }
 }
}

<?php
/*
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*/

class Login extends Controller {

  function Login() {
    parent::Controller();
  }

  function index($status=0) {
    // VALIDATE FORM
    if($_SERVER['REQUEST_METHOD'] == "POST") {
      $this->load->library('form_validation');
      $rules = array(

array('field'=>'username','label'=>'Username','rules'=>'required|valid_email'),
                  array('field'=>'password','label'=>'Password','rules'=>'required')
                  );
      $this->form_validation->set_rules($rules);
      $this->form_validation->set_error_delimiters('<div class="error">', '</div>');
      // FORM DOES NOT VALIDATE...RE-PROMPT
      if($this->form_validation->run() == FALSE) {
       $this->load->view('site/head');
       $this->load->view('site/nav');
       $this->load->view('templates/login');
       $this->load->view('site/foot');
      }
      else {
       // FORM VALIDATES...CHECK IF USER EXISTS AND ACCOUNT IS VERIFIED
       if($uid = $this->auth->authorize()) {
         //USER EXISTS AND ACCOUNT IS VERIFIED...START SESSION
         $this->auth->start_session($uid);
         redirect('me');
       }
       else {
         //USER DOES NOT EXIST... DISPLAY ERROR
```

```
        $data = array('msg'=>'<p class="error">We were unable to find a matching
account. Perhaps the username or password is misspelled, or you have not activated
your account yet.</p>');
        $this->load->view('site/head');
        $this->load->view('site/nav');
        $this->load->view('templates/login',$data);
        $this->load->view('site/foot');
      }
     }
    }
    else {
      $data = array();
      switch($status) {
      case '1':
       $data['msg'] = '<p class="success">Your account has been verified. Go ahead and
login.</p>';
       break;
      default:
      }

      $this->load->view('site/head');
      $this->load->view('site/nav');
      $this->load->view('templates/login',$data);
      $this->load->view('site/foot');
    }
  }
}<?php
/*
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*/

class Logout extends Controller
{

  function Logout()
  {
    parent::Controller();
  }

  function index()
  {
    $this->load->model("auth");
    $this->auth->destroy_session();
    redirect('login');
  }
}<?php
/*
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```

```
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*/

class Me extends Controller {

  function Me()
  {
    parent::Controller();
    $this->auth->access() ? "" : redirect(site_url('login'));
  }

  function index() {
    $this->load->view('site/head');
    $this->load->view('site/nav',$this->user->get_account($_SESSION['userid']));
    $this->load->view('site/body_start');
    if($modules = $this->user->get_modules($_SESSION['userid']) ) {
      foreach($modules as $mod) {
       $this->module->load($mod['modid']);
      }
    }
    else {
      $this->load->view('modules/welcome_message');
    }
    $this->load->view('site/body_stop');
    $this->load->view('site/foot');
  }

  function account() {
    $user_data = $this->user->get_account($_SESSION['userid']);
    $apis = $this->api->list_apis();
    foreach($apis AS $api) {
      $api_login = $this->user->get_api_login($_SESSION['userid'],$api['id']);
      $user_data[$api['name'].'_username'] = count($api_login) ?
$api_login['username'] : '';
      $user_data[$api['name'].'_password'] = count($api_login) ?
$api_login['password'] : '';
    }
    $this->load->view('site/head');
    $this->load->view('site/nav',$this->user->get_account($_SESSION['userid']));
    $this->load->view('site/body_start');
    $this->load->view('templates/account_info',$user_data);
    $this->load->view('site/body_stop');
    $this->load->view('site/foot');
  }

  function account_update() {
    if($_SERVER['REQUEST_METHOD']=="POST") {
      // VALIDATE SUBMITTED DATA
      $this->load->library('form_validation');
      $rules = array(
                  array('field'=>'email','label'=>'E-
Mail','rules'=>'required|valid_email'),
```

```
array('field'=>'password1','label'=>'Password','rules'=>'matches[password2]')
                );
      $this->form_validation->set_rules($rules);
      $this->form_validation->set_error_delimiters('<div class="error">', '</div>');
      if($this->form_validation->run() == FALSE) {
       $user_data = $this->user->get_account($_SESSION['userid']);
       $apis = $this->api->list_apis();
       foreach($apis AS $api) {
         $api_login = $this->user->get_api_login($_SESSION['userid'],$api['id']);
         $user_data[$api['name'].'_username'] = count($api_login) ?
$api_login['username'] : '';
         $user_data[$api['name'].'_password'] = count($api_login) ?
$api_login['password'] : '';
       }
       $this->load->view('site/head');
       $this->load->view('site/nav',$this->user->get_account($_SESSION['userid']));
       $this->load->view('site/body_start');
       $this->load->view('templates/account_info',$user_data);
       $this->load->view('site/body_stop');
       $this->load->view('site/foot');
      }
      else {
       // UPDATE USER PROFILE
       $user_data = array(
                       'userid'=>$_SESSION['userid'],
                       'email'=>$this->input->post('email'),
                       'password'=>$this->input->post('password1'),
                       'fname'=>$this->input->post('fname'),
                       'lname'=>$this->input->post('lname')
                       );
       $this->user->update($user_data);

       // UPDATE API LOGINS
       $apis = $this->api->list_apis();
       foreach($apis as $api) {
         $user_data = array(
                         'userid'=>$_SESSION['userid'],
                         'name'=>$api['name'],
                         'apiid'=>$api['id'],
                         'username'=>$this->input->post($api['name'].'_login'),
                         'password'=>$this->input->post($api['name'].'_password')
                         );
         $this->user->update_api_login($user_data);
       }
       // SEND 'EM BACK
       redirect('me/account');
      }
    }
  }
}<?php
/*
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```

```
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*/

class Memos extends Controller {

  function Memos() {
    parent::Controller();
    $this->load->model("auth");
    $this->auth->access() ? "" : redirect(site_url('login'));
  }

  function index() {
    redirect("/filters/index");
  }

  function add($filter_id) {
    if($_SERVER['REQUEST_METHOD'] == "POST") {
      $this->load->library('form_validation');
      $rules = array(array('field'=>'memo','label'=>'memo','rules'=>'required'));
      $this->form_validation->set_rules($rules);
      $this->form_validation->set_error_delimiters('<div class="error">', '</div>');
      if(!$this->form_validation->run() == FALSE) {
       if($this->memo->create($this->input->post('memo'))) {
         $this->memo->add($filter_id,$this->db->insert_id());
         redirect("/filters/edit/$filter_id");
       }
      }
    }
    $this->load->view('site/head');
    $this->load->view('site/nav',$this->user->get_account($_SESSION['userid']));
    $this->load->view('site/body_start');
    $this->load->view('memo/add',array('filter_id'=>$filter_id));
    $this->load->view('site/body_stop');
    $this->load->view('site/foot');
  }

  function remove($filter_id,$memo_id) {
    $this->memo->remove($filter_id,$memo_id);
    redirect("/filters/edit/$filter_id");
  }
}<?php
/*
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*/

class Visualization extends Controller {

  function Visualization() {
```

```
    parent::Controller();
    $this->load->model("auth");
    $this->auth->access();
    $this->load->model("user");
    $this->load->model("viz");
    $this->load->model("module");
  }

  function add($modid,$vizid=0) {
    if($modid && $vizid) { // ADD VIZ 2 MOD
      $this->viz->add($modid,$vizid);
      redirect("/campaign/edit/$modid");
    }
    elseif($modid) { // LIST VIZS
      $data['modid'] = $modid;
      $data['user'] = $this->user->get_account($_SESSION['userid']);
      $this->load->view('site/head');
      $this->load->view('site/nav',$data['user']);
      $this->load->view('site/body_start');
      $this->viz->load_sample_vizs($modid);
      $this->load->view('site/body_stop');
      $this->load->view('site/foot');
    }
    else {} // NOTHING WAS PASSED, DO NOTHING
  }

  function remove($modid,$modvizid) {
    if($modid && $modvizid) { // ADD VIZ 2 MOD
      $this->viz->remove($modvizid);
      redirect("/campaign/edit/$modid");
    }
  }

  function edit($modid,$modvizid) {
    $data_sets = $this->module->get_data_sets($modid);
    if($_SERVER['REQUEST_METHOD'] == "POST") {
      $this->viz->save_mod_viz_form($modid, $modvizid, $data_sets);
    }
    if($viz_data_sets = $this->viz->get_datasets($modvizid)) {
      $data['timeframe'] = $viz_data_sets[0]['timeframe'];
      $data['interval'] = $viz_data_sets[0]['interval'];
    }
    else {
      $data['timeframe'] = 'year';
      $data['interval'] = 'month';
    }

    $data['user'] = $this->user->get_account($_SESSION['userid']);
    $data['modid'] = $modid;
    $data['modvizid'] = $modvizid;
    $data['data_sets'] = $this->viz->format_viz_datasets($modvizid, $data_sets);
    $data['viz'] = $this->viz->get_visualization($modvizid);  // get the info for this
vis for this module
    $data['model_viz'] = $this->viz;

    $this->load->view('site/head');
    $this->load->view('site/nav',$data['user']);
    $this->load->view('site/body_start');
    $this->load->view('mod_viz_data',$data);
    $this->load->view('site/body_stop');
    $this->load->view('site/foot');
  }

  function json($modid,$modvizid) {
```

```
    $data_set_results = $this->viz-
>get_dataset_results($modvizid,$_SESSION['userid']);  // NEW THE REAL TIME SERIES DATA
QUERY
    $json = $this->viz->format_json($data_set_results);
// FORMAT TIME SERIES DATA INTO FLOT JSON
    echo $json;
  }
}
```

Appendix G: CFGSWC Notes

Meeting w/ Trudy from the WRPS 7/27/10

Edgewood Financial Literacy

Credit Card literacy – the importance of making payments
Coles Department Stores –
Credit Unions vs Banks – differentiation in services
.5 credit requirement for financial literacy instituted this year = ½ a year
Credits can be fulfilled though econ, math, home/family ec.,

Push from the local/district government to improve financial literacy. The curriculum person next door was a big part of pushing it trhough. The board was very supportive of it.

Truck drive for Schneider national produced 401K software.

W.R. its amazing to find out how many progressive initiatives when the rees of the state is thinks of this place as paper mill and wrestling.

Large number of community groups make a large effor tot work together and share contributions. Try not to duplicate services more fficiently suse their reserouces. Good at this county wide. Marshfield is getting off a huge huge project from cradle to grave. Taking resources / agencies and putting them in the same place. Co-locating services. Lots of prominent supporters, funding assistance from somewhere...

Cohesion in the non-profits are county wide. A lot of the agencies are divided between north and south wood county. Out of limited resources comes the necessity of innovation.

Its fascinating. The constitution: is this a religious document, a government document, or a business document.

Some of us in the middle class education sector working with people without enogh cash flow to ever have a savings/account. Financial literacy of the poor. They'd never have enough to have a savings account. We assuming the middle class value that everyone will

Ph.D. Ruby K. Payne "a framework for understanding poverty" http://www.ahaprocess.com

Using these materials to educate staff to understand the hidden middle class values that they may bring to their teaching. Some things that have economic value change between divisions in class. Different value systems channel resources differently. What kind of development could help us eradicate the level of poverty we have, or is there a way to do that.

How was the curriculm developed: they took the state standards, took a look at existing standards and course materials to meet the required components for financial literacy. Wisconsin has had state standards, but has adopted the federal standards.

Math / Social Studies / Family Economics / Tech Education. There is a push, and strong community support. The school board is supportive, good cross section of the community. Very working class group of retirees. They spend a lot of time working with and talking to the community. The board has to approve the addition of curriculum.

Because of the local economics, roughly 1200 jobs lost, free and reduced lunch have reached 50% in some buildings (title 1). Businesses like pawn shops and check cashing poping up. To me that's almost the sign of changing neighborhood. It's a sterotype."". Too much for me has been associated with one of those going up. They almost don't stand a chance of elevating their level, without that understanding that they are just being taken advantage of. I mean even if we accomplish making them more educated consumers, cautios or wary, we'd be making progress. There is a different level of education and understanding that has to be targeted to lower economic classes than in middle classes. Too many of the educators and curriculm developers were born in the middle class and don't always get that training to understand what kinds of concerns are embedded in the lower class. That was like a dump of cold water on my head. When I got this a few years back, it was like no duh. You understand people's behavior differently, when you understand some of this stuff. And to get them to use these kinds of tools, you have to understand their behavior to get them to want to use it too.

Technical solution: same for us with this curriculm. We have the same concerns with teaching this material. Witout knowing all the underlying differences of values and cultures. If we only eteach from the middle class background knowledge we can teach them about checking/savings, but if they

Where are how are we going to get you to the point where you even use a checking and savings account.

I was in juvinile corrections for 8 years, and that was one of the things that I'd have to hit a few times, to see how long it would take to pay something off with compounding. It started to sink in a little more at that time. That was one of the pieces that was brought up at the financial literacy training, that some of these check cashing places are charging up to 500%.

Middle class people talk about money, wealthy people never talk about money. The culture of poverty doesn't talk about money because they don't have any.

Meeting with CFGSWC 7/27/10

Is there a good way right now to know what the impact of a festival on a community?

Credit card companies are starting to do this on your statement. "Till debt do us part"

If you could break down people's spending by category that would make a big difference in a community like this. An online tool that a family could use would be really helpful, and make a big impact.

Another barrier, would be the digital literacy, if they don't own a computer, or don't have broad band, they can't use it.

The information that we found from our survey last summer, a lot of people don't see the need for digital literacy. Maybe this could be a way for increasing the demand for digital literacy.

I think that there needs to be more education about the consequences of being inundated with credit card promotions, then you end up with hundreds of thousands of dollars worth of debt.

Earned Income Tax Credit

Income tax program for low to moderate income *working* families. There is a negative connotation to the program. The people who receive the credit are working, they just receive the credit. Its putting money back into the pockets of the low income families, then they will put the money back into the community.

We've done some research with john mullins from the aspen institute 1.5 million was available to south woods county families, but had not applied for. Another 500K of child tax credit that had not been claimed. This is for same group of people, with children.

There wasn't anyone in the community who was working with low income families to do something about this. VITA volunteer income tax assistance: we were too late in becoming a VITA site before the previous tax season, so we partnered with the local AARP's tax councelling program for the elderly. They are licensed tax return filers. We did taxes over at the library, it was a small beta program. We are hoping that mid-state technical college will become a VITA.

Why partner with Mid State?

They have an accounting program there. A big part of this is volunteer driven. They have a accounting program. Many non-traditional students who could use the program. Need to have computer work stations for submitting the taxes online. This year we use the library.

If you go to McMillin Library, check out their computer literacy courses. There were a number of mong families that came. There is a language barrier. They have no written language, and that's the largest barrier to getting the word out. That's something that we learned in the process; we put flyers out in the community; emailed it; placed them in different locations; library; community center; day care; email from local community action asking for a mong translation for radio broadcast. That's made us aware that we need to be aware of how we communicate.

Hispanic population is one of the highest growing populations in Wisconsin. There is a Latino newspaper that's distributed around central Wisconsin. Distribution of about 40K. He's growing by leaps and bounds.

The demographics here have changed since I was a kid.

The program did about 40 returns. The returns that we do for the low to moderate income are harder, because there are so many different issues. Two or three children, each had different dad, but they were married to a different one. They wouldn't have a lot of the paper work that they needed.

The worste thing you can have is checking account. It's a vicious circle. You over draw and it costs you $35/per check, and it's a vicious circle.

As a middle class person, we were very financially literate, yet we didn't do a good job of imparting that knowledge to our children. Its not even a subject that's approached at school. Its interesting where you are, and how you are socialized.

Crisis creates dialog. I don't think we are doing a good job of educating our children about finances. Credit cards add a whole new dynamic to what can happen when you don't manage your finances.

Do you think these crisis create more dialog?

When I went through a series of unemployment, it forced us personally to take a new look at our finances. In my opinion, more now than ever, people are more ripe for this kind of talk then they were five years ago. Young, naïve,

They selling of the paper company has had an effect on the thinking. The kind of jobs that have replaced the mill jobs are not family supporting.

There is a sense of entitlement around employment. If you get a college education your supposed to get a job.

Bulls Eye Credit Union

Community Chartered Credit Union
www.becu.net

Our community members put money in to provide services to other members. Equal in terms of voting right, one-person one-vote. 21K members. Annual report, is our main form of financial literacy. We came from consolidated paper credit union. The commissioners of credit unions in Wisconsin helps define the ecology of credit unions in Wisoncsin. The office of the commissioner houses our financial data. Quarterly call report is public knowledge. NCA – National Credit Union administration, they would insure account up to 250,000. This is a federal agency.

There are state chartered agencies, and federally chartered.

Teacher training:

Teachers approached the credit union about sponsoring their continuing their education. Dave the the president has been a supporter of partners in education, and heart of Wisconsin.

We have a student apprentice who for two years works at the credit union to gain awareness of the credit unions business. This relationship is with Lincoln HS. They also, look to the credit union to sponsor some of their activities.

The loan department has a connection with Catholic Charities. They'd help a person discussing repayment of loans. This goes from Bulls Eye to the charity.

Quarterly Newsletters provide advice to members. Written by Ameriprise and Catholic Charities.

Relationship with Ameriprise for financial planning.

With our senior members we try to educate the population about scams and how they might be taken advantage of.

The membership skews older and retired. The older people really jumped on the technology that the bank provided. PC Bank.

I have an opinion on that, I think because people are living longer, they need to find ways to get through life, their kids are helping them, giving them computers as presents, and 30 years olds helping their parents by giving them technology. They are getting older so they have to adapt. To keep fitting in society they have to fit in. Because society is changing, rather than sitting at home they are engaging with change.

They send out the newsletter with the monthly statements, or online statements through links.

What percentage of your membership uses your online banking tools?

4,819 out of 21,000 use the PC Banking (their online) 2,572 use e-statements. Bill Pay 1,503.

PFI, primary financial institution.

We do count number of services per member. Our goal is to have 3% of our membership using 4 or more of our services.

Over the last four or five years we think the nature of financial services have changed. Online banking, debit cards,

In the 80's we had a checking account start called premiere checking that had a lot of travel services associated with it. With the popularity of credit cards in the 90's and the rewards we better so we dropped that program.

We do provide credit card services through Elan.

Why do you use Elan?

We went through a vender analysis and their organizational service and structure was in line with what they were thinking. Customer service, fraud prevention, billing. Presence and reputation. They originate from first Wisconsin, but maybe not so much of presence here. They provided web b2b web services, and when they send mailing it appears to come from bullseye.

UltraData (data center) ⇔ Cavion (hosts the data).

Do you have a limit on the number of accounts?

100 / savings account.

There is a rate sheet on the website. We provide the ability to sort accounts. Its important to give them 24 hour service. When it goes down they expect it to be up. Whenit goes down our IT manager lets us know and in the meantime we get calls. People do expect it to be up and when its down we hear about.

Data?

Generally they'll see the date of posting. Ultra data determines the quality and format of the data. There are perhaps limits in the amount of data that put in. If a check had cleared we wouldn't say who its payable to, statements wouldn't have their full social security number or their member number. We do image based checking.

Say for example I sold a vehicle and got a check from an individual, we'd mask his signature for the payees privacy.

Where does the motivation come from to adopt new technologies?

Some times it comes from our vendors, sometimes from conferences, magazines or other materials. I would agree. We drive the newness to them. E-statements for example.

How long have you had online banking?

2001

In FSP, in hold maintenance, if I use my card and the payment is authorized but the money is not withdrawn. ATM withdrawls are pretty informative. I believe it has the address and indicates that its an ATM vs a store.

Point of sale is going to pull the money immediately, but I have to put in my pin.

Debit card, if I don't put in my pin, the balance will be held.

OnlineATM, meaing its live most of the time. Whereas other financials use positive balance files. Due to losses we did the switch over to online, because it made better business sense

Dairy state Cheese factory. Rusty's back water saloon. Portesee's. Sill is the owner.

Member security / fraud. These files that they use are stored all over the world. The whole TJ Maxxx catastrophe. I would say member security is .... Nothing is worse than having a bad experience, if someone has that happen then they think its bull's eye's fault.

How would improved data quality factor into that?

The more knowledgable the member is... the quality of data would help. 25$ vs 25$ at this seven eleven at this street corner.

Money HQ is the aggregation service provided by their online banking company;.

Erin Johnson – Lowell Center

We provide programs and activities for people over 50, exercise, recreation etc. The funding from our center is very interesting. The relationship that we have for funding the things that heppen here are very different from other places. The building comes from the city who is responsible for ½ of staff salary and the facilities, but our programs our funded by the Wisconsin Rapids Area Senior Center Association.

Is the WRASCA Lowell focused only?

It started off that way when the city had no programs for seniors, and they wanted to address those problems in the community. They moved into the Lowell school, and their founding documents established their interest in funding programs at the center.

A lot of people think the non-profit runs the center and aren't aware of the financial involvement of the city in running the center, which is significant. There is a need for clarity about who runs the center.

The problem we are running into is that the seniors who run the center face a lot of constant turn over their three year terms. It's a lot of work to clarify the situation for the incoming leadership.

For retired people they sometimes.

What kind of programming do you provide to your residence?

We provide AARP tax program to 1,000 people. Its open to members of the community, regardless of their age or income level. We try to enourage people who are over 60, but we do anyone. We work really hard to help anyone who needs assistance.

What are the demographics?

The majority are over 60, I don't know the percentage, but over 60 and low income or limited income. They will work with the earned income tax credit.

What are the challenges that low income people face when preparing their taxes?

An overall lack of knowledge about what paper work to bring. Lack on knowledge about the situation they are in. Who they receive money from, or why they are receiving money from an organization. They'd have to send people away to get more paper work, or call agencies to figure out why they were receiving support, in order to properly fillout the paper work and I credits they deserved.

What kind of out reach to the community do you do re: services?

We advertise through our newsletter, about 700, about 125 are direct mailed and the rest are here at the center. We don't do email outreach, but we list the opportunity in the Aging & disability Resource Center, they have a huge distribution through out the whole county, ask local churches to distrubute the information, and through radio broadcast media.

How do you measure response?

We definitely keep track of the numbers. This year was similar to last year. But last year was double the year before, because of the stimulus. Bush tax rebate drove a lot of people into the resource center to get the money. Without the stimulous, we still held constant on those numbers. So they obviously appreciated their services. Some people probably thought they might be getting another stimulous check.

Do you think there will be a drop off?

I think the tax preparers are building a strong report with the community, and are building trusted relationships with the community members and that's driving a lot of return.

What type of people are volunteering?

Mostly people with a background in finacnce or tax preparation. They are all retired, and they really just enjoy helping people with their income taxes. They are all over the age of 50. All retired. Not at this site, but the technical college may be involved at other locations.

The tax filings are online?

Yes. Last year they used desktop application and printed them out. This year they submitted the tax information online. It was an interesting change over. AARP provided the software, and I don't think they were prepared for the number of sites that adopted the technology. Adoption was pretty quick once it was available. The seniors themselves might have been confused, but the preparers themselves were much more comfortable in general and saw the value in the efficiency it provided.

What are the adoption rates of computing by seniors?

We have a computer room, and we find that our younger seniors make use of these facilities. Our older seniors seem leary of computers, every now and then we get a senior whose really tech savvy.

We have a website and we see that its getting traffic (www.wirapids.org) click government tab, click Lowell senior center.

Even though seniors themselves might not make use of the technology, familiy or other members of the support network make heavy use of it to understand services and perform research.

We also offer one on one computer tutoring lessons. If some is interested, we offer it. How do a turn it on. What do I do then. How can I use email. How can I shop online?

What drives this?

To stay in contact with family. To make purchases that they cannot make in town. A lot of these seniors have to change their behavior because of old age and this enables them to still engage in some activities remotely.

How open are seniors about their financial status?

Some people are open, some people are very closed. A lot of people are talking about the limited income they are on. Crisis or limited income seems to drive a lot of dialogue about finance. People who want to go on trips, even that are reasonably priced, creates conversation about budgeting or the ability to afford the travel.

Is there anything else you can tell me?

We had a new beginnings program for people who had a lost a spouse to help people with the transition of discovering what things the spouse did. Dishes, laundry, bills etc.. There was a financial component to this. We wanted to incorporate financial literacy into the program, and we wanted to partner with AARP, but right before we did that they discontinued

the program. The elderly started to use the program as a dating service. There are a lot of single ladies on the bus trip, why don't you go on a bus trip.

The population in Wisconsin Rapids is definitely older. The number of facilities are really growing. Some people are coming her to retire, they have family or they are returning, there dollar will go further here.

Vital Signs

Trying to work with Randy Cray at UW to pull together data from a variety of sources. The data is supposed to help community decision makers. Supposed to give an overview of the community.

Home foreclosure information, we go back as far as we can. It was archaic how we had to get the data. We only look at the southern part of this county. Places like Chicago or Milwakee have much more accessible data, than a place like this. It took about two months to find the information. We could only pull it every 30 days, which was a pain because for months with 31 days we'd have to. We only wanted information for the southern part of the county.

This project is kind of new, but whats exciting about it is that in Canada they are doing this, but we are the first rural community to be doing this. We are basing this on the Canadian model, but using metrics comparable to Chicago and Milwakee. In case there is a community that really needs help these are indicators that can help people make comparisons between the present and the past.

We didn't want to bombard the visitors to our site with way too much data, but we have a lot more than this. The goal eventually is to start measuring the gap between people who can access benefits and those who can't.

We specifically set it up so we could make comparisons between the urban areas that measure this same stuff.

Poverty in a rural area looks a lot different than poverty in urban area. When you come to a place like this its not always visible what the reality of poverty here is.

How do you make the case around this data?

Don's homelessness group. Maybe you don't see people sleeping under the bridge, but that doesn't mean these people aren't without homes. They are non-traditional, living with other families, or in shelters.

What are the main metrics that you follow?

Some of our sources are a little different than what Milwakkee was doing, because we didn't have the money, so we had to get a little creative.

One indicator is economically disadvantaged students. The number of students who apply for free lunch programs, people who qualify but haven't applied, homelessness, and enrollment.

Homelessness in this community is really hard to track

School enrollment: we wanted to get an idea about the number of young people in the community. So we looked at enrollment in the K-12 system. Why are youth leaving rural communities? Are youth leaving rural communities? When people graduate do they come back?

The job shortage will eventually shift to a worker shortage. This data will inform that we need to and why.

Homelessness: there was a reporter who followed a homeless person around for a day, which created a lot of awareness in the community, but resulted in some panic. People were creating illegal homeless shelters in their house.

Population: going back to 1970, we have the numbers by municipality.

Foreclosure: we get this data from a circuit court database, but its not easy to work.

Unemployment: the generic unemployment rate is something that a lot of poeople are looking at. The part that's interesting and new, is the unemployment insurance recipients rate. We are seeing major increases in the number of people claiming and taking unemployment insurance. This all comes from the office of economic advisers. That's something that's specific to WI.

We've gotten local interest in it from local banks and non-profits or whatever, they each have their chunk, but they don't want to take the time.

Can you speak to the power of having more quantifiable data?

When your talking about schools or whatever, when they're looking at their, budgets it really helps them make decisions. They can say homelessness is increasing or decreasing, and these numbers speak more clearly to the situation on the ground. The reason we have it such a simplified form, because if it were written by a stats person, I don' think it would be used. But in this format its more approachable for teachers, for grants from the state, and for Knight. Knight is all about having better information, and this plays right into this.

This really helps people with their discussion across a variety of fronts. "it was something that could be leveraged in a variety of different ways."

"It was something that gave us a lot of credibility in the community.... I think this is important and here's why. We see this as a real need in the community, here's the statistics to back it up. We collected it. Its legit. It helps every aspect of the community foundation"

Last summer when we were talking about the stimulus grants, they want to see numbers. How many less people are homeless. Here's what we did to address this need, here's what we did to address this need, and here are the numbers to back that up.

Liz: I get phone call from people from the community asking for this statistic or that statistic, and do some googling, and I don't know how to interpret what I'm getting. What I'm hoping is that the community, not just this organization, will embrace a learning culture.

It interesting how people are starting to feel more empowered. The possible can be possible when your partnering with people who believe in the same thing. When people know they need this information, just getting a few key stakeholders from the community makes that possible. There is other data available in the community that might feed into it, if they knew we needed it. Sharing this information, can be really powerful. These 5 orgs have food assistance, these 5 have transportation assistance, how can we coordinate across these organizations with respect for confidentiality. "Working together, learning together, sparking new solutions".

I know it wasn't always like that in this community can you talk about what it was like before, how you recognized this need, and what steps you took to get there?

This was a paper town, I didn't come here until 6 years ago, when I came here for an interview, they gave me directions, and I was driving through a part of town, and I realized wow WiRi has a ghetto. I realized that this town had been hit really hard with unemployment. In the 80's a lot of majore manufacturers just left town. The cranberry industry was hit very hard by a drop in the price of cranberries do to a huge surplus.

I was the marketing person for the company (Northland) and looking at our databases could see that sales were dropping off, what that meant for the community is that farmers who were frankly making a lot of money suddenly were barely scraping by. I remember seeing signs everywhere for a "community progress initiative" people where tired of feeling that this was a sad town, a dying town, this was lead by the CF and the Heart of Wisconsin. Then suddenly there was an attitude change. After another mill closed there was a huge community meeting. When the layoffs happened, they didn't happen at 20 at a time, they happened like 500 people at a time. There was no one in the community who was untouched by this. At one time it was a fine life path to graduate school and go work with your dad and brothers and uncles at the mill.

Getting people to sit at the same table were the first steps towards the shift.

Any community that could match their 20K contribution would get their support. It wasn't just one big donor coming in, everyone donated what they could, wheather it was ten dollars or whatever. People felt that they had a stake in it.

Another thing that came out of it was the Advanced Leadership Institute, and I think about 100 people from a lot of different sectors have gone through this 9 month training, which is a big commitment. A lot of these people that I was networking with that I never would have met before, we discovered that we had a lot in common about what we were passionate about. I think that made a big difference in transforming this from a ghost town to a community that cared about itself.

What could we do to make this a community that people wanted to live in. It took people saying the hard truths about the mills not coming back that were the first steps to starting a lot of these initiatives. It showed national funders like Ford, that this little community could do something amazing. So there became financial support for what we were doing as well.

How do you think about exporting this model to other communities?

Kelly does a lot of outreach to other communities. She's been invited to the white house to speak about it. She's done a lot of speaking about it with other communities. People ask to come and visit here to try and learn from what we've done. We have visitors, that's definitely a component.

Could you talk a little bit about work force central?

It working to meet the needs of employers and workers in the area. Our focus is on advanced manufacturing. Advanced Manufacturing is... there is opportunity for growth within the organization so that you don't just have the same job for 40 years. We bring together ceos who can talk confidentially about what the community can offer to them, and can share resources around developing advanced skills. West Central Initiative and their Workforce 20/20 program they've been doing this for 20 years, and they really showed us how we can engage employers and meet the needs of employers, while taking into account what our local workers need as we shift into a 21st century economy. It funded primarily by local funders, which is pretty unique, because of the diversity of the funders. These are poeople who didn't know much about the program before, but because they trusted the community foundation Kelly was able to get them to the table. Also because we were chosen as a national fund for workforces solutions, we were one of two rural sites. There are the funders, then our service providers network, that's a group of local service provices, social services, CAP services Community Action Program (they work with people on budgeting they work directly with people to overcome barriers to working) You dno't have a licenese or a car, or child care, people can't secure jobs if they don't have adequate child care or transportation. CEO peer council.

We are engaging funders, service providers, and employers, so all their needs are on the table before any action is taken. We have a four pager that explains this in more detail.

I think a community like ours is ripe for a project like yours because a we are already engaged in a lot of those types of activies, and a lot of what vital signs has taught us is how difficult it is to get access to this information.

Ryan: tracking mortgage payment may be a good leading indicator of foreclosure and another interesting vital sign. Is the bank allowed to share that kind of data with you?

We've never asked, but definitely. There are a lot of laws regarding data and privacy. But that's something that makes our situation unique. We are not a for profit business, so we don't have some of the public relation issues.

The challenge that I see with people sharing data, again goes back to knight and the whole access issue. Proving the need and the importance of it. The desire to not have a computers.

Talk about tax preparation done on behalf by elderly by people who were tech saavy leading to broad adoption of online systems.

Trusting the person whose guiding it.

Wood Trust Bank

Larry Haze – deposit and retail side of the bank. Anything customer focused. Used to run the IT area.

Matt – Heads up the IT department. A lot of the reporting for the bank. About 6 locations. "Heavy dose of outsourcing" Metavante, recently merged with FIS (Fidelity Information Systems)

Spencer – been here for about 7 years. Worked as a teller, recently moved to IT w/ Matt. Small project right now taking an old application porting to a web application. Turbo Gears w/ Python. Brewery, Health Risk Assesment Tool for UW continuation of work from other student, independent study where take the HRAT,

Jason Yates – investment side of the equation, investment SCI private trust company for all back office support and outsourcing. Heavily involved in customer databases, help manage wood trust.com. Very low turn over at the company.

When larry started at the bank they didn't have email or internet. We've gone through some dramatic technological changes in the last 10 years. Even thought a lot of our core systems are outsourced, we've still developed some internal systems ourselves, and that's brought us some good efficiencies. Big enough to invest in technology, but local enough to serve the needs of the community. Technology has really enabled us to compete with larger banks. We are really a commercial bank, and we have a lot of the cash management services that only larger banks can provide. Deposit to deposit, fraud protection services.

What has been driving this change?

Market place has driven a large portion of it. With internet banking... you have to have. There probably isn't a bank now that doesn't have internet banking. We started internet banking in 2003, we were probably one of the first community banks that provided internet banking.

From an investment side, we are revuing all of our processes over the last 20 years to access how technology, specifically making better utilization of databases.

Are you an MS shop or Open Source shop:

It's a mix, mostly due to cost, somethings which are customer facing are MS behind the scenes is open source.

Our internet banking platform integrates with Mint/Yodlee.

The thing you said that really struck a chord with me was financial literacy. To a large extent the brokers fault for exploiting their customers.

This is very similar to what we already do.

Should we as a community as whole or as community business have any reservations about this type of work? For example, the intuits of the world the yodlees of the world take money away from the community.

What kind of analysis do you do with your customer data?

From a trust side, the best way to market is word of mouth and customer referrals. We do very little at a marketing or a targeted communication model. We try to service our customers as best we can, and make them happy. We do try to ensure that they have the best products considering their account size and product needs. We spend a lot of times understanding who our customers are, we have done some pretty extensive data analytics about understanding better services our customers. If you make a mistake with this guy, he has 8 different accounts. We don't have an enormous number of customers in trust , something like 500, compared to other banks we have a very large commercial base.

What drives change?

A major factor this year has been regulatory changes? Things reg E, federal legislation. If you want over draft protection on an account you have to get confirmation ffrom the customer that they opt in to that. If they don't opt in and we still provide it, then we can't charge. Its been big because we. Reg Z is a lot related to credit cards, a lot of this is stuff that the larger credit card companies were doing, customers were having a chase card and x card rates would be changed when the left hand knew what the right hand was doing. Double billing cycle. Late payment fee can't be more. Federal Registery FFIEC, number of books related to information security.

www.FFIEC.gov

What is the nature of the trust?

We have your standard commercial bank just like any bank. Trust powers as chartered through OCC (office of comptroller) allows us to mange court appointed trusts, legal trusts, a little bit different than a broker dealer, we can make changes to a clients investment account without their a prior approval. Obviously there is paper work that is required to. We manage about 900M on the trust investment side, a lot of 1/3 retirement, 1/3 legal trusts, 1/3 investiment management accounts. We pay taxes, we are nationally chartered.

Initiatives: streamlining opporations, and client management, sale management in particular. Recording calls to be better about documenting procedures. When larry gets hit by a truck how do we transfer that institutional knowledge.

Access to data, mobile option or internet options, better access to data. Putting scanner at business, more remote access so they don't have to come into the bank.

The delivery channel is not either/or, its both.

What about data quality?

Data quality is pretty clean. WalMart pos system example. Remember the heartland systems breach.

Walmart data centers. Should check these guys out.

Mid State Technical Meeting 7-28-2010

Monica Kubiske, basic ed. For continuing ed students, academic support for the college students. Whoever comes in the door. Adults who are working to get a HS diploma, displaced workers, aspring college attendees, people working on their resume, tech college students who need academic help, students from other schools who need help. For anyone who walks in off the street. Some money from the school, some money from state/fed, its totally free. The academic support center.

Trey Turner – Literacy Coordinator for Wood County. Come along side of the English language learners who are taking lcasses at mid state. Adult basic skill learners that need to be paired with a tutor that are in the N/S county area. Literacy ESL / Adult Basic Education: people born in the US with lower skill levels reading / writing / communication.

Literacy Council, money comes from same federal grant, local donors, or foundations ie. Community foundation.

There are adults who are aware that they have learning disabilities w/ reading, and will come to the LC to improve those skills.

M.K. We like to rely on the literacy council.

Joan Slavey – started out as a tutor for the LC, then joined the board. Still a tutor. That is my primary interest in the council and the board is advocating for the learners. When I first began, I went to an individuals home, and it didn't work out, since then I've worked the the learning support center, or if mid state is not open ill use the library. Monica and the rest of the council have been very helpful. I've done one on one, in the class room, in the morning; at night; groups; etc.

The council partnership with mid-state is one of the things that move us towards success.

ESL has become ELL – English Language Learners. This came out of the fact that often these learners already know several languages. I'm doing a lot of work with the mong community, and I find them to be so motivated.

I heard the mong have no written language?

The French wrote it down in the 50's. It's a tonal language. Low medium and High intonatations change the meaning of a word/sound.

Some of these people have had no exposure to the alphabet whatsoever. One of the ways you can tell, because they copy, but don't understand. Some of these people have never held a pencil. The pencil is apiece of technology. Technology is anything that was invented after you were born.

Joan: we are in a state right now where we are trying to figure this out. Our 19 year executive director retired. A person came in for a short term to transition.

Troy: now I'm the one doing it.

Joan: This one person did everything. I've inherited everything, and discovered that the transition was not accomplished very well. One thing I'm very interested in in security. The logistics is just incredible. Our director is only on 20 hours a week, but obviously putting in many more hours than that. And we've just had an accountant whose joined the board. I'm

curious, about what your talking about... an online comprehensive tool for managing budget, and the ledger. We have two united ways doing funds, AEFLA Adult Education Family Literacy Act (Wi). You have to divide that into which fund or grant is supporting a partifular part of the program. I don't think I understand, or any of the board understood, how this really worked, because the board director really handled it all, and very much pulled back in her final year. Just finding records was a huge challenge.

We need to be able to work from home on these financial records, because the director, the accountant, and the CEO need to work together on these documents. We are a small non-profit, 40k, but security is still a big concern.

The Literacy Council is required to disclose a lot of its financial information already. If your platform could solve that problem of disclosing this information, and you have to pay a firm to perform an audit. If we could use that in lieu of an audit that would be huge. Then we could buy our own coffee. Your going to laugh at this, because we don't have internet at one of our offices, and I end up spending much more on coffee, because I have to go to the coffee shop.

As you can tell you can, we are trying to move into the 21st century with our technology. That would really be huge to provide ongoing transparency and reporting.

Joan: I see it only as an advantage. One of the thigns I worry about is that we are going to miss something. And we were missing things. We've solved those problems.

Troy: I know what Joan is talking about... Oh my goodness, did we meet all our requirements for this particular set of funding.

We have a student in here who needs to complete his HS diploma, and says he doesn't have the tools for planning ahead. He buys a mountain dew every day for $1.50, and if he just thought ahead a bit more and bought something cheaper at WalMart.

Joan: it is absolutely true what you are saying. A family in WiRa, lost everything.

Joan: Another thing that I would add, is that you need a community that is strong enough to admit that there is a problem.

Troy: I need to see what the benefit of this information. What are the costs? Where we can't afford any more costs is time. If something takes so much time that we can't invest so much into it.

Joan: and that is our biggest problem. You've talked about this kind of thing before, it has to become more efficient than is.

Troy: Absolutely.

Joan: the people in the community are meeting to understand how that business community can grow.

Education can be recognizing what you don't know and the tools to get what you need.

Troy: you and I being a member of the same voluntary community, Trey do you realize that you were spending 3x the amount of gasoline that any of our other users are. And we could have a conversation about that, or I could look.

Joan: You could take all the literacy counties in Wisonsin, and say how much do you spend on gas. It might allow you to look at or understand budget wise how one literacy council spends more on gas than the others.

Discussion of privacy:

Joan: in the future, I can see literacy councils dealing with some definitely financial problems around funding.

Trey: one of the things I wished the public would know and that grant givers would know is how cost prohibitive some of the disclusre rules are, that it prevents us from asking for the money in the first place. If someone could look at the bell curve of how much disclosure is helpful vs how much prevents action from taking place.

Don

You've really created a tool, and said here's how the blade is sharpened, here's how the pieces fit together. Then giving it to people and having them tell you well this is how I use the this, and make new builds of.

If I may say so, making my own applications in my own little world, that's one of the reasons I left church life in the way I did. Wanting to draw the circle bigger than I had. I would never had met Joan, and wanting to put tools into the hands of ordinary people outside the circle.

Is it a little bit like mac vs pc. Pc put the tools out there and took over the market because.. .

Talked about the banking idea:

Joan: we've always gone to credit unions because they were always associated with local. I always laugh at people who say that gas is 2.69 and I say no its 2.70. That 9/10th is a lot closer to a penny than not.

The utilization of this service to advertise their "localness" and say this many jobs are supported by Bank A Bank B Bank C. These people are heavily invested in my childs education because of XYZ.

Joan: we pay more to shop locally. Example, we just bought a GE washer to support local business. And we pay more for that.

Gave the global walmart example:

Trey: I really like that example.

WEHDA 7-28-10

Low Income Tax Credit, for developers – Equity Injection: ex. Cap services built a 2o units by the mall. That has weighted tax credits in it so that cap services didn't have to bare the entire costs. Because they are borrowing less money they can charge less rent.

Housing and Urban Development will subsidize rents. We subsidize projects. Part of our agreement is to ensure that the property is maintained. We require them to maintain capital for that. When the investor has a lower loan amount they don't have to have high payments, whereas when someone is directly subsidized and they leave they take that subsidy with them.

Agricultural / Business Guaratees: assets that last more than a year. If someone tries to get a loan and the bank says your short on equity they'll come to us and say, and if it meets eligibility.

New Markets Tax Credits: federal program so it relys on specific census tracks, instead of investing in housing, they invest in business so they recoup in a 7 year period as opposed to a 10 year period.

What is a census track?

The governmental design of every piece of land in the country. On taxes each municipality has census tracks that identify owners vs renters, income brackets, ethnicity, etc...

I don't know the background on how thiey set this up, my guess is its something to do with the economics of that neighbordhoo. WiRi does not have any qualified census track, because of the paper industry and the wealth that was generated because of that.

Discussion about the invalidity of data:

I liked your point that the datea doesn't tell all. Talk about enrollment in the free lunch program and people trying to admit.

It's a safety factor. Is it a safe environement to say what you need to say.

People are having a hard time mainiting the lifestyle that they've had. Rather than giving people money and saying spend it on whatever you want, saying how can we train you to manage what resources you have, rather than thinking they always have to have more more more.

Talk about crisis:

... or until its too late.

Bring the Workforec Home. We are working with employers to educate their employees on some of the financial options available to them. Direct deposit, is an example. People were not opting into these programs at tgreat numbers even thoguth that would have reduced costs for the company. 410K savings is another example.

We worked with realtors, lenders, and financial experts, to survey the employer to find out what their employees need, to try to conduct the education. How do you get people who don't think they need help, to get them there soon enough? One approach we've taken is to get them at their place of work, so they don't have to take time out.

For those that doing it, it makes a differernce. People that own their, own homes are more investedin their communities.

Getting the employer involved in some of these educational programs has worked?

Its working...

This started with St. Joseph's hospital in Milwakkee wanted their nurses closer to work, so they could be on call, so the hospital put an incentive in to provide a down payment. The nurses then said I don't have any savings etc.. so they put in educational programs as well as the down payment. This program has become a model for other jobs; police, fire, teachers. These jobs don't necessarily have resources to provide the subsidy, but they can still do they educational outreach part. They are able to take advantage of the financial education. You have to get an employer who sees the long term benefits of why they should care. It also applies to municipal government to understand why their community should care.

Is the attitude shift of sharing resources when solving common problems an attitude that you see as being pervasive?

Working together, you can build a lot of strengths. Wait a minute we don't have duplicate that, let's just build on it. Plus there, are no resources for people to do it all over again. There is nothing I do in this terrirotry, that I would do on my own. If I don't have partners with me its not happening.

I think this area was hit very hard by the paper industry leaving. This particular area has a bit more of a rash adjustment to make, other areas are going through different pais.

Janesville is facing the GM phase out. A lot of financial distress and loss of job. They are going through now.

Fondalack, Mercury Marine, is leaving:they make boat motors. Luckily they were a more diversified community, there was talk that community was going to leav, but they've convinced them to stay.

When it comes down to people helping people helping poeople you analogy of people having to rely on their own because I can't rely on my employer to help.

Its not taking care of any more, they aren't going to pay your taxes or give you a sense of entitlement, but support of educational programs and how they can help on a community level can be very helpful.

If they mayor says this a good idea and the city councel says education on these levels is a good idea, and employers can give verbal/social support/ encouragement. For the employers to say a kind word to their employees goes a long way. We'll bring in some financial experts to help with your taxes, savings, planning that goes a long way to show that an employer cares.

What is advanced manufacturing:

They were taking a group of manfucaters in the community who were engaged in the community and getting them to sit at the same table.

One of the things that would be advantageous would be to have UW extension engage more with our work force central group. Going back to financial education for individuals, to take advantage of opportunities that come up. One example is home buyer education, before buying a house people should be educated about what involved in home ownership and what that process is all about. After you have a home, continuing that education,

..ryan: it's a procsss not a one time thing:

I'd love to see a program that a safe place to go for advice and you're not going to be judged. Where do you turn when y ou just need a little assitance or a little advice some times. Sometiems it might be very peer to peer to have acalling tree, my furnace went out who did you use, what do you do in fall, how do you clear out the gutters.

What would that network have to look like that would engage with communities on a one-to-one or peer fashion.

To the best of my knowledge this area does not have a lot of associations for local support. We have the golf clubs, but...

Its in your backyard. Those are issues that exist, but I don't know how much.

We should be able to work on an educational system for that working class, we can't work with everyone, but we can work with that working poor who are struggling to make ends meet to help them make better choices.

What would happen if someone defaulted?

They'd try to do collection efforst, like normal, but if the business goes under, they'll try to recover assets. We'll make up the loss of the sale up to 80%.

Where do you make your money?

Federally Tax Exempt Bonds.

www.wheda.com this is a non-profit NGO. The state is not able to provide any housing loans directly or indirectly. These are the entities that are allowed to sell tax exempt bonds through state and federal regulation.

Regular business guarantees
New Market Tax Credit: Major business expantion

The major product that I'm involved in is financing for first time buyers.

U.S. Bank - 7-29-2010

We have some differences than the other banks. We are a national association that is in 20 states and something like 60K employees. When we do our technology we.

We have different divisions within the bank, we have three branches in our location. All the support we get from the technology side, we get a call center. Our call center is located in Milliewakke, but there are call centers all over the US. We are in similar footprint to Wells Fargo. Minneapolis is the HQ. As far as the innovations for upgrades, that doesn't happen at the branch level. If one of our competition is offering mobile banking, you can be sure we'll be offering mobile banking.

How long has U.S. Bank had internet banking?

I couldn't tell you that.

This branch has 4,300 checking accounts. Our office our clientel is younger, and we are closer to around 60% internet banking, and our downtown office is probably closer to 40%. For the older clientel.

I wouldn't say that customers came in demanding to have online banking, but now they expect a lot more from their online banking service. "We'll probably be better off in the end when people stop writing checks"

The European community seemed to be ahead of us in those things. I go back to the day when the first bank specific ATMs were issued. I think where we are going to see some real benefits are in mobile banking. I think it will be adopted widely, because who doesn't have a cell phone these days. I just got a acebook account, and if there is a social network that has seemed to embrace people.

If anything as a user of banking sources, and the explosion of banking sources, then once the moms got on it and the grandmas got on it, it became so much more. As an observer, I've found it amazing how it draws you in. Its interesting to see how many things have been drawn into it. I see that coming and you see it with other businesses. That's how I see the future changing becoming more socially networked.

I was at a bar and I told them you should be on acebook, because its own kind of advertising.

We didn't have internet available to us, we had intranet, but we had to change because government forms and bond information, and verification of address information, if your not in the telephone book and you have a cell, its difficult.

Yes I agree. You know customers don't ask for a whole lot, because they don't know what they don't.

Asked about financial literacy:

Savings today, rewards tomorrow. A US Bank inititative that was started in 2010. It encourages customers to put money away from their checking account and transfer it to a savings account. They can take their debit card transactions or their reward bonuses will be automatically transferred to their savings account. If their account gets to a certain balance, $1000 then we'll give them a $50. We really do need customers to learn to save. People are good spenders, people are not good savers.

Our growth has come from being such a strong bank, so we've witnessed growth in that, even though as an industry there's been drag down.

Within the company there is education programs for educating our workers on things like savings, 401k, etc. so they are better at providing services to the customers and for themselves. We need to do a better job. I don't know where the tide turned, but it is disheartening to see the total lack of responsibility, then its not there problem, its someone elses problem. We hand ever person when they open an account a register, but if I told you how many people use it, it would be like winning the lottery.

Ryan: I wonder if the online banking itself enforces some bad practices?

It does. A customer doesn't see the same things that I see.

When you say that you don't mean you get more data than other people, but that your able to bring insight into those transactions that those users can't.

Pinoneer Bank

How long have you had online banking?

Since 2004,

Can you give me sense of how you came about these decisions?

We saw it as competeitive. We had a slow start, and by other people's paramter we probably don't have the pentration that they do. We have about 15% adoption of that about 80% are heavy users of the. Our bank is 100 years old this year, and we've always been very conservative and our demographics are such that 20-25% of our customers are 70 or older. We know we have some work to do, and as that older generation is in demise we see these changes coming to out industry.

Do you outsource your own technical infrastructure?

No, actually its all in house. Its not 100% in house, but most of it. It's a banking software Jack Henry; it provides the online banking and back office services the whole picture.

Why did you go that direction?

We went that way in 1995, our outsourcing contract was out at that time, some of it was that we were doing the bulk of the work anyway, and technology was a whole lot different than it is today. Were doing the bulk of the work anyway, and when we've looked at that since, we haven't found that the costs have outwayed the benefits. We've liked being self-sufficient. My IT people work every weekend, but your right I think it is [part of the culuture].

Are you an open source shop or MS?

We are open source, we are not keen on MS because of the security holes and my IT guy looks for open source software because we are on a limited budget.

What drives IT changes?

A good example is mobile banking, we haven't even explored it because our customers haven't even asked for it. Our customer base isn't technologically saavy enough to move to a different bank if we didn't provide it. Every time we add a service we have a technology steering committee that evaluates the human costs and financial costs of providing a new service. Often it will come from someone on the Board or from our IT team (2 people).

Can you tell me about a recent tech innovation within the business?

E-statements, of the people who have the online banking product, we have 37-38% of our customers switching to it. This area the mid-west does not embrace change as quickly as other areas of the country.

I loved what you said about financial literacy. There are so many women who don't have a clue about finance and they are not being addressed by our business.

I don't think yet, a lot of banks yet have understood how many women control the wealth. I listen to people who haven't saved a dollar for retirement, and its women. Maybe they've worked part time, and its just a niche that needs to be filled.

Ryan: Financial literacy makes good business sense.

Exactly. You get a phone call and they are over drawn they don't know their balance they don't know have any understanding of their finances.

It takes generations to change what you've learned, but someones got to make that change.

I don't think we can afford it to be true any longer, that so many people just don't understand the basics. Some people just don't care about learning. People who want to know will find a way to learn about it, but the ones who don't just expect it to be done for them.

As a community bank, because we live and work with our neighbors, we are not about to take advantage of them. They are not just a name and a number to us.

As a bank we are under such heavy regulation, we are doing very well because we were so conservative, because no one is going to be out there now in this kind of regulatory environment because of taking those kinds of chances.

"Loan participations" getting a bunch of people to gather together to lend. We can only give away a certain amount of loan money based on our assets and to make up the difference they'd partner with other banks to handle the difference and spread the risk. This didn't work and is now illegal.

What IT initiatives do you see ahead of you?

Fraud, our President has brought a lot of bigger bank perspective to our business. He recognized the needs to to address this even in our business. We've done a very good job educating our customers base on fraud, we've had a lot of our customers bring in checks saying they've won they lottery in Canada. Talking about debit cards and that sort of thing we have 53% of our customer base using debit cards, and we've had to go through a lot more diligence regarding this. Its sad that you have to be that way, but in these economic conditions you have to be much more saavy on the frontline.

God has given us enough brains to destroy ourselves. He's made us so smart and tech savvy, but there is still this dark side.

In terms of improving data?

I think its time that banks stop taking the hit for transactions that merchants approved because they were under the floor limit, why isn't the merchant the one taking the hit. There is something wrong there, as an industry we have complained, but it hasn't been enough to make mastercard and visa change those rules. I don't understand as an industry why financial instutitions have not been able to do something.

Can you describe the transaction process?

My daughter is a front line manager at Manards. No one even checks the signature. That should be their job on the frontline not ours on the backend.

What about overdrafting?

We've gotten better at that by pulling down those files more frequently.

Interchange fees. The federal government is putting a cap on the interchange fees that banks will receive for processing debit card transactions, and the concern of the community banks and credit unions. Specific merchants, ie walmarts can ask for a different card at the point of sale, because the bigger banks can afford to bare the cost of those ceilings, when it doesn't make financial sense for us. That legislation just passed federally about a month ago.

The law of unintended consequences. Right now being a banker is about as bad as being a terrorist. It used to be lawyers now its bankers.

We have a fraud detection program and it identifyies high risk merchants, and its based on history of that card and risk of the merchant. "Hot Card" that's when we disable the card.

I think we've done a good job educating our customers, so when they get that fraud call they wonder if the call itself is fraud.

Community Foundation Wrap Up

There is a an evaluation happenig at wake forrest for the ford foundation next week. Have Kelly send your report.

MIT Site Visit – Ryan O'Toole Monday - July 26, 2010 Agenda	
9:00 a.m. to 10:30 a.m. CFGSWC	**Welcome, Introductions & Tour: Community Foundation of Greater South Wood County** • ***Linda Schill,*** *Community Foundation of Greater South Wood County* • ***Tim Krause,*** *Assist Professor, University of Wisc-Stevens Point* *CFGSWC is located just across the street from your hotel: 478 E Grand Ave. Wisc Rapids*
10:30 – TBD (lunch w/ Tim)	**Community Tour & Univ of Wisconsin-Stevens Point Visit** • ***Tim Krause,*** *Assist Professor, UWSP*

Tuesday – July 27, 2010 Agenda	
9:00 a.m. to 10:00 a.m.	**Wisconsin Rapids Public School – Financial Literacy with students** • ***Trudy DeSimons****, Dir of Pupil Services-WRPS* *Location: WRPS – Administration Building, 510 Peach Street*
10:00 a.m.	**CFGSWC- All Staff Meeting (optional- Ryan you're welcome to join us.)**
11:00 a.m. to 11:30 a.m.	**EITC** (Earned Income Tax Credit work in south Wood County) • ***Mary Wirtz****, VP Donor Services -CFGSWC* • ***Liz Everson****, Knowledge Management Officer – CFGSWC* *Location: CFGSWC, Mary Wirtz's office*
11:30 – 1:00	*Lunch @ Andy's Grille (CF, Tim) - Open Invite*
1:00 p.m. to 2:30 p.m.	**Bulls Eye Credit Union** • **Sharon Riebe**, Admin Assistant (715-424-6479) • **Brenda VandeLoop**, Operations Branch Manager • **Susan Jackan**, Marketing Director • **Ryan Hartman**, Human Resources Manager

	Location: Bulls Eye Credit Union, 241 4th Avenue North – Board Room (enter through back door, use phone system to contact member services for access)
3:00 pm to 4:00 pm	**Financial Literacy – Lowell Center, Seniors Discussion** • ***Erin Johnson**, Program Coordinator & Information Revolution-Digital Divide Forum participant (Erin is also involved in AARP Tax Prep & computer training for Seniors)* *Location: Lowell Center, 220 3rd Avenue South Suite 3*
Wednesday – July 28, 2010 Agenda	
8:30 a.m. to 9:30 a.m.	**North Central Community Action Program, Inc.** Cancelled • ***Karen Fleischman,** Client Services Specialist (Karen works one-on-one with local residents who have financial challenges)* *Location: CFGSWC – Barker Mead Conf Room (2nd Floor)*
9:30 a.m. to 10:30 a.m.	**Vital Signs Discussion** (Community indicators as a key component to an informed community.) • ***Liz Everson**, Knowledge Management Officer – CFGSWC* • ***Kristi Anderson,** Workforce Central Intern – CFGSWC* *Location: CFGSWC – Barker Mead Conf Room (2nd Floor)*
10:30-11:30	**Break**
11:30 a.m. to 1:30 p.m. ***Lunch provided by Renaissance Learning***	**Renaissance Learning Advanced Technology Group/Software Engineering Tour, lunch & group discussion** • ***Pete Jungwirth,** Director of Hardware Engineering* *Location: 2321 West Grand Avenue, WR (sign may say Northland/Cranberries Limited, entrance to offices on westside of building)*
1:30-2:00	**Break**
2:00 p.m. to	**WoodTrust Bank** • ***Matt Everson** , AVP-Information Systems* • ***Larrie Hayes,** VP Deposits*

3:00 p.m.	• ***Jason Deitz,*** *AVP-Investment Research* • ***Spencer Schill,*** *Information Systems Intern* *Location: WoodTrust, 181 2nd Street S*
3:00 - 4:30 p.m.	**Break**
Starting at 5:30	**Dinner – (hosted by Tim & Kim Krause)** (Invite being sent by Tim to CF MIT & Knight teams) *Address: 190 Shore Acres Drive, Wisc Rapids* *(From 54: Turn left on 32nd St., left on Biron Drive, Right on Shore Acres Drive)*
Thursday – July 29, 2010 Agenda	
9:00 am to 10:30 am	**Literacy Council & Mid State Technical College** • Monica Kubiske (MSTC – Basic Education Faculty- Instructor) • Joan Slaby (Literacy Council of Wood County) • Dr. Shores Franklin Turner III (Trey) – Executive Director, Literacy Council of Wood County *Location: Academic Support Center (ASC) at MSTC-Room E-121* *500 32nd Street North, Wisconsin Rapids Campus* *Note: As you drive in the main entrance, head towards the far right hand back corner of campus. Head for the fire tower. Parking in the southeast lot and entering door E-2 will bring you right to the ASC in E-121.*
10:30-11:30	**Break**
11:30 am to 12:30 pm	**WHEDA – Economically Disadvantaged** • **Arlene Scalzo**, WHEDA (Wisconsin Housing & Economic Development Authority) *Location: CFGSWC, Conference Room (1st floor)*
12:30-1:45	**Lunch with Kristi Anderson & Bridget Koeshall (CF staff, young adult perspective)**
2:00 p.m.	**US Bank** • ***Karen Kienert****, Branch Manager*

to 2:45 p.m.	*Location: US BANK, 3520 8th Street South*
2:45 -3:30	**Drive time: 35 minute drive to Aurburndale** (see meeting address below)
3:30 -4:30	**Pioneer Bank** • **Claudine Konrardy**, Chief Financial Officer- Pioneer Bank *Location: 5758 Main Street, Auburndale (Claudine's direct ph: 715-652-3714)*
Friday – July 30, 2010 Agenda	
8:30 a.m. to 10:30 a.m.	***Breakfast & Recap of Ryan's meetings w/community groups Potentially includes Helen Jungwirth & Carol Davis*** • ***Kelly Lucas,*** *CFGSWC* • ***Linda Schill,*** *CFGSWC* • ***Mary Olson,*** *CFGSWC* • ***Liz Everson,*** *CFGSWC* • ***Tim Krause,*** *UWSP* *Location: CFGSWC Conference Room, 1st floor*