Turning Data into Information – Tools, Tips, and Training

A Summer Series Sponsored by Erin Gore, Institutional Data Council Chair;
Berkeley Policy Analysts Roundtable, Business Process Analysis Working Group (BPAWG) and
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Web Data Visualization Tools
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Google Chart Tools (http://code.google.com/apis/charttools/) allow you to embed many different kinds of charts and maps in web pages. This software is free and doesn't require you to have a Google account; all you need is a website and some data. (A little HTML/JavaScript knowledge doesn't hurt either, but you can figure it out without too much trouble.) The charts can read data that's embedded directly in the page, retrieved from a database, or in some cases, stored in a Google Docs spreadsheet.

There are two major categories within Google Chart Tools:

- Image charts are simple and dynamically generated, but not interactive once produced. These are basically a picture of a chart that is created on the fly each time the web page gets viewed.

- Interactive charts are also dynamically generated, but include interactive features, such as zooming and movement. Google currently implements many of these as Flash objects, which means those particular interactive charts won't work on iPhones or iPads.

We'll be looking at both kinds of charts in this session.

Tableau Software has a similar tool, called Tableau Public, for embedding interactive charts in web pages. It's free, very powerful, and probably easier to implement than Google Chart Tools, but it does require the use of a Windows-only application to import data, and is not very well documented. You also have to upload the data that you're charting to a Tableau server, although that by itself probably isn't a big deal considering the fact that you're going to display the chart on the internet. If you're interested in trying out this software, there's lots of information at http://www.tableausoftware.com/public/. We'll also take a brief look at this software during this session.

Finally, you can easily find many other tools, both free and paid, for displaying charts online if these three don't meet your needs.

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Google Image Charts

Overview of the Tool

Google image charts, as mentioned above, allow you to embed dynamically created images of charts in web pages. You can define the chart through either URL parameters (the total length of the URL for an image chart is limited to 2K characters) or POST requests (which are a bit more complicated, but can handle up to 16K of data). In either case, the parameters that you pass to the Google charting API define everything about the image chart, from the type of chart to the data displayed.
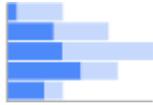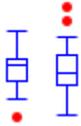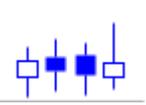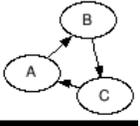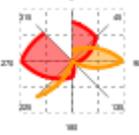
Some knowledge of HTML will come in very handy when working with Google image charts. Google does provide lots of example code, however.

How to Get the Tool

You can find documentation, examples, and a live chart playground for testing your own image charts at http://code.google.com/apis/chart/docs/making_charts.html . You do not need a Google account.

How to Use the Tool / Examples

There are currently (as of July 2010) 15 different types of Google image charts:

Bar charts:		Box charts:		Candlestick charts:	
Compound charts**:**		Dynamic icons**:**		Formulas:	$x = \dfrac{-b \pm \sqrt{b^2 - 4ac}}{2a}$
Google-O-Meters:		GraphViz charts:		Line charts**:**	
Map charts**:**		Pie charts**:**		QR codes:	
Radar charts:		Scatter charts:		Venn diagrams**:**	

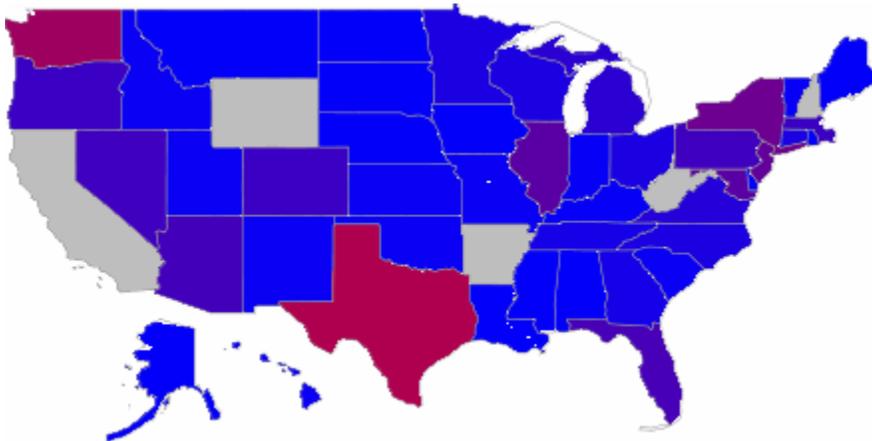# Turning Data into Information – Tools, Tips, and Training

To use one of these image charts, you put an <img> tag in your web page, with a src parameter URL that points to the Google Charts API and includes whatever parameters you want to use to define your chart. In this URL, you must specify at least three parameters for most charts: cht (chart type), chd (data), and chs (chart size). Each type of chart then has additional parameters that you can use to tweak the design.

For example, let's say you wanted to display a color-coded map of the US that shows the home states of new non-resident freshmen who intend to register at Cal in fall 2010. Following the documentation, we set it up as a very simple example in HTML like this:

```
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN"
"http://www.w3.org/TR/xhtml1/DTD/xhtml1-transitional.dtd">
<html xmlns="http://www.w3.org/1999/xhtml" >
<head>
    <title>Fall 2010 New Non-Resident Freshmen Intending to Register</title>
</head>
<body>
<img alt="US Map"
src="http://chart.apis.google.com/chart?cht=t&chs=440x220&chtm=usa&chld=AKALA
ZCOCTDCDEFLGAGUHIIAIDILINKSKYLAMAMDMEMIMNMOMSMTNCNDNENJNMNVNYOHOKORPARISCSDTN
TXUTVAVTWAWI&chd=t:2,1,27,24,10,6,1,28,9,2,5,2,5,35,3,4,3,2,24,36,2,17,10,4,1
,2,12,1,1,39,5,25,43,10,4,22,25,1,4,1,8,69,4,15,3,62,12" />
</body>
</html>
```

And then opening this HTML in a browser gives us this map (which is not interactive, because this is an image chart):

References/Other Resources

You can find extensive documentation for Google image charts at:
http://code.google.com/apis/chart/docs/making_charts.html.

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Google Interactive Charts

Overview of the Tool

Google interactive charts allow you to embed dynamically created, interactive charts in web pages. You implement interactive charts as either JavaScript and HTML or as a Google Gadget (you can read about Gadgets, which are JavaScript+HTML applications, at http://www.google.com/webmasters/gadgets/).

Interactive charts require some JavaScript knowledge, but, again, there are lots of examples that you can follow on the Google Chart Tools website.

How to Get the Tool

You can find documentation, examples, and a visualization playground for testing your own interactive charts at http://code.google.com/apis/visualization/interactive_charts.html. You do not need a Google account in order to use any of this.
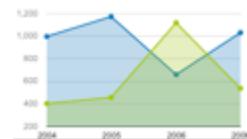
How to Use the Tool / Examples

There are many different types of interactive charts, some created by Google and some submitted by other developers. Here's a small selection of the numerous choices:
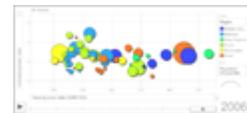
Annotated time lines:

Area charts:

Geo maps:

Motion charts:

Org charts:

Tables (with sorting, paging, etc.):

Treemaps:

Word clouds:

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Following our example above, let's say we wanted to display the same map of fall 2010 non-resident new freshmen, but now we wanted it to be interactive. Following the documentation, we set it up as a web page with a bit of JavaScript in the <head> section, like so:

```
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN"
"http://www.w3.org/TR/xhtml1/DTD/xhtml1-transitional.dtd">
<html xmlns="http://www.w3.org/1999/xhtml">
<head>
   <title>Fall 2010 New Non-Resident Freshmen Intending to Register</title>
   <script type='text/javascript' src='http://www.google.com/jsapi'></script>
   <script type='text/javascript'>
   google.load('visualization', '1', {'packages': ['geomap']});
   google.setOnLoadCallback(drawVisualization);
   function drawVisualization() {
     var data = new google.visualization.DataTable();
     data.addColumn('string', 'State');
     data.addColumn('number', 'Fall 2010 SIRs');
     data.addRows([
['US-AK',2],['US-AL',1],['US-AZ',27],['US-CO',24],['US-CT',10],
['US-DC',6],['US-DE',1],['US-FL',28],['US-GA',9],['US-HI',5],
['US-IA',2],['US-ID',5],['US-IL',35],['US-IN',3],['US-KS',4],['US-KY',3],
['US-LA',2],['US-MA',24],['US-MD',36],['US-ME',2],['US-MI',17],['US-MN',10],
['US-MO',4],['US-MS',1],['US-MT',2],['US-NC',12],['US-ND',1],['US-NE',1],
['US-NJ',39],['US-NM',5],['US-NV',25],['US-NY',43],['US-OH',10],['US-OK',4],
['US-OR',22],['US-PA',25],['US-RI',1],['US-SC',4],['US-SD',1],['US-TN',8],
['US-TX',69],['US-UT',4],['US-VA',15],['US-VT',3],['US-WA',62],['US-WI',12]
       ]);
     var options = {};
     options['region'] = 'US';
     var container = document.getElementById('map_canvas');
     var geomap = new google.visualization.GeoMap(container);
     geomap.draw(data, options);
   };
   </script>
</head>
<body>
    <div id='map_canvas'>
    </div>
</body>
</html>
```
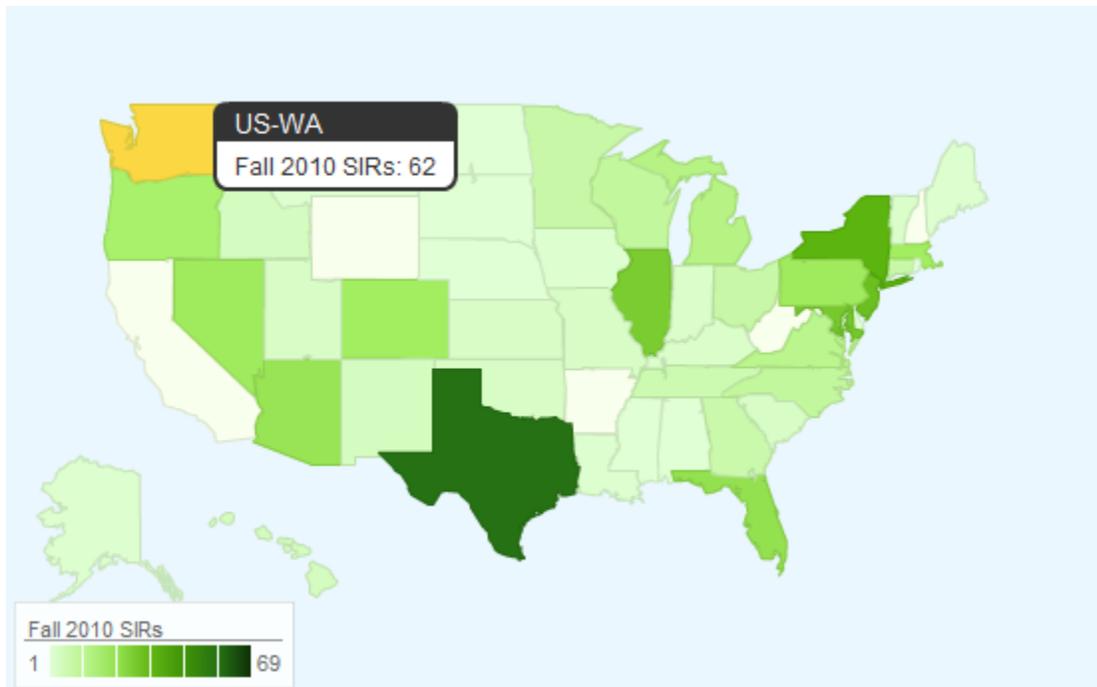
Note that each data element being loaded into the data table by the script is in a particular format (**['US-AZ',27]**), which I just created as a formula in Excel. The spreadsheet that I used looked like this:

State	SIRs	Formatted
…		
AZ	27	="['US-"&A4&"',"&B4&"],"
…		

The formula in the "Formatted" column resolves to the formatted text noted above.

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When we open this HTML+JavaScript file in a browser, we get another map, which is now interactive. When users move the mouse over this map, they'll see a little pop-up that gives the state code, and the number of new freshmen from that state intending to register in fall 2010, like so:

References/Other Resources

You can find extensive documentation for Google interactive charts at:
http://code.google.com/apis/visualization/documentation/.

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Tableau Public Charts
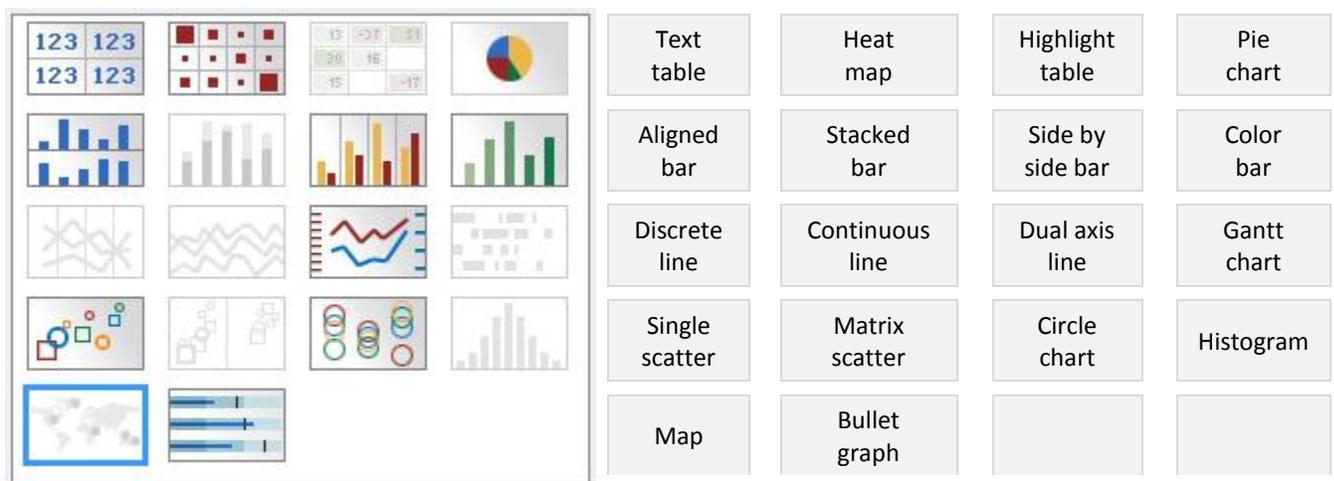
Overview of the Tool

Finally, we'll take a quick look at a similar tool, called Tableau Public, for embedding interactive charts in web pages. Tableau is free and considerably easier to implement than Google Chart Tools, since there's no programming involved. The development tool is Windows-only, however, and it's really not very intuitive, nor is the documentation very good at this point. Also keep in mind that the data for your Tableau Public charts will be stored on Tableau's servers. If none of that bothers you and you're willing to put in a little practice time, then Tableau Public may be the web charting tool for you. Note that you can also just use the Tableau Public development software as a desktop data visualization tool, sort of like a super-Excel.

How to Get the Tool

You can download the Tableau Public development tool at http://www.tableausoftware.com/public/. This site also has online help, a few examples, and some training videos.

How to Use the Tool / Examples

Tableau Public currently (version 5.2) includes 18 different kinds of charts, which you can also combine in various ways to create a dashboard. In the diagram below, thumbnails of Tableau Public charts appear on the left, with a key to those charts on the right:

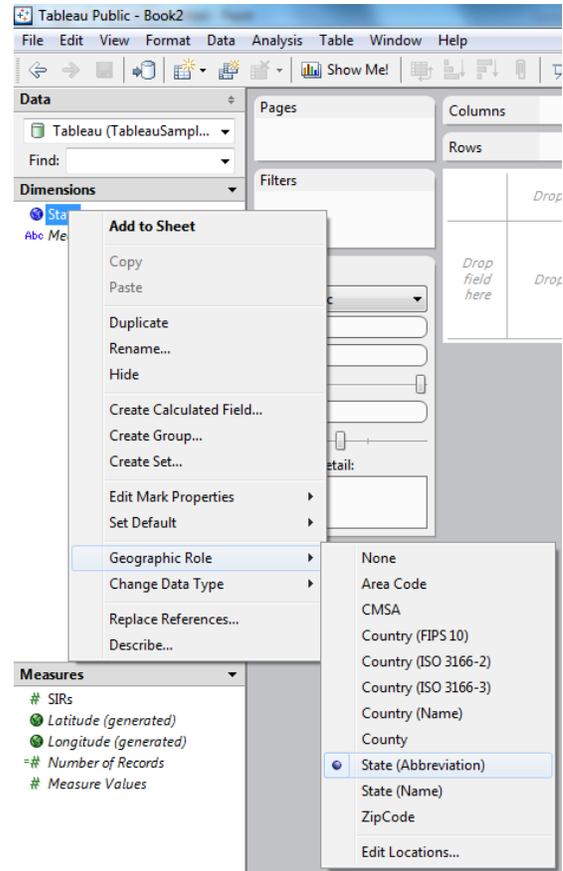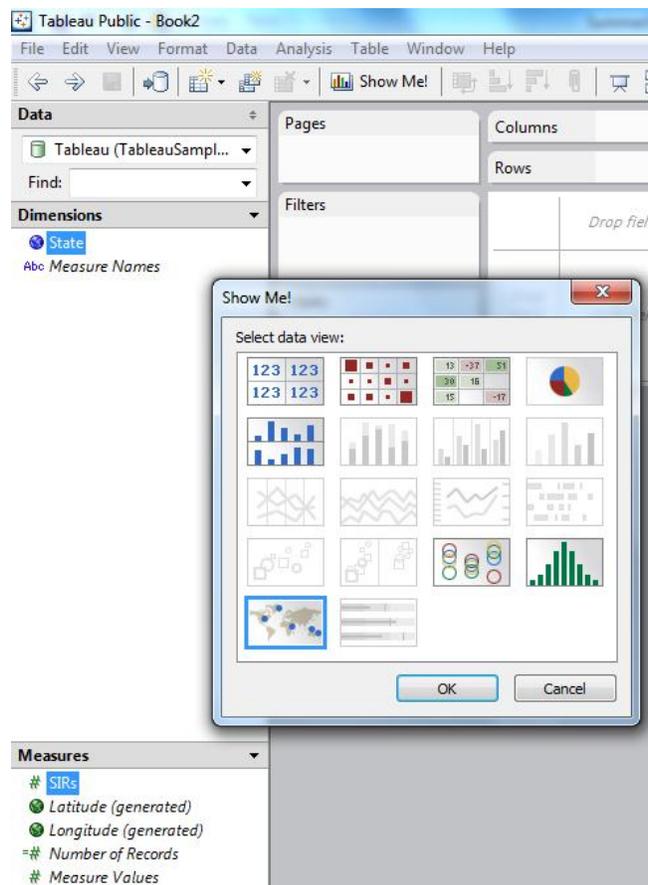|			
Text table	Heat map	Highlight table	Pie chart
Aligned bar	Stacked bar	Side by side bar	Color bar
Discrete line	Continuous line	Dual axis line	Gantt chart
Single scatter	Matrix scatter	Circle chart	Histogram
Map	Bullet graph		

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Still using our same example data set containing home states of non-resident new freshmen intending to register in fall 2010, we can also create an embeddable interactive map in Tableau Public, although it looks a little different than the Google versions.
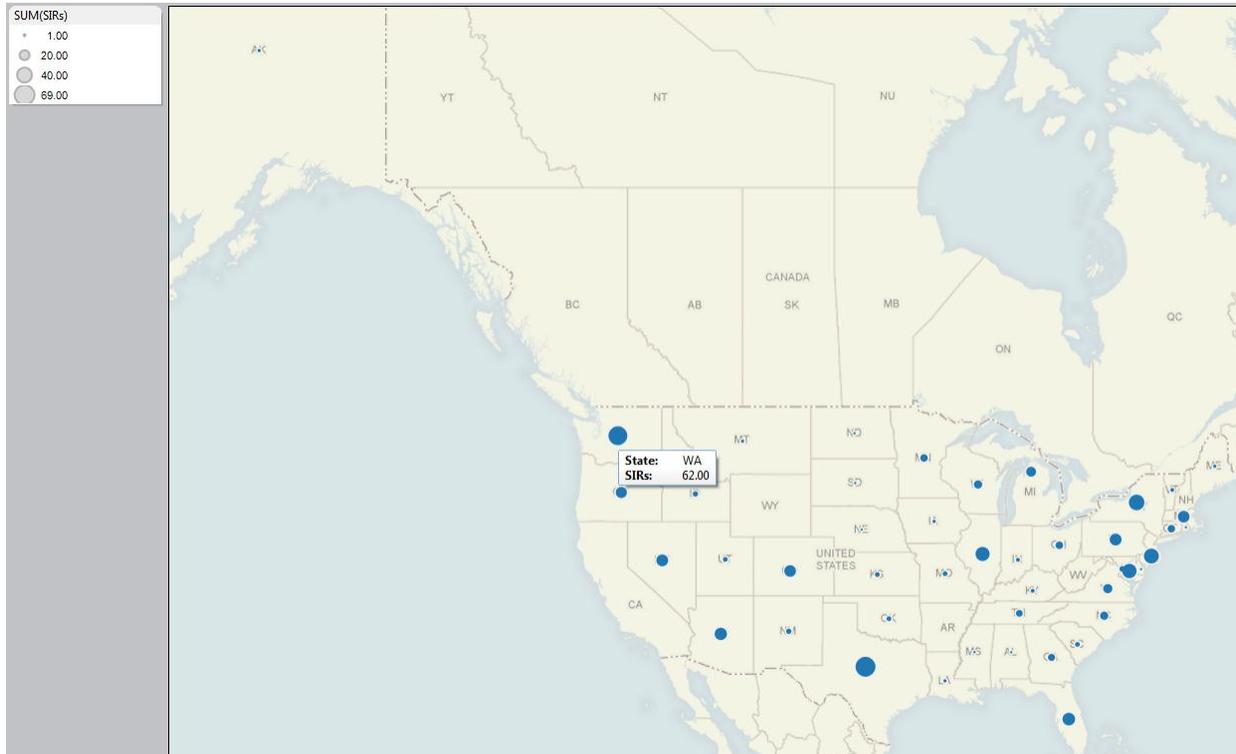
After we open the data set in Tableau Public, we just have to specify what kind of geographic values our data contains (state abbreviations, in this case), as shown to the right. Note all the different kinds of geographic data that Tableau Public can recognize, including area codes, zip codes, and county names.

Once we've done that, we highlight the data elements we want to map (in this case, State and # SIRs), then click the Show Me! button, with the map chart selected, as the screenshot below indicates:

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That will then produce the following interactive map, which as you can see, displays data as circles rather than by shading (these maps can actually use shading to display built-in census data, but your data will always be circles). Unlike Google interactive maps, where you have to program any zooming that you might want, the Tableau Public version has a pre-defined zooming feature.

References/Other Resources

There are a few Tableau Public training videos at http://www.tableausoftware.com/public/training. You can also view online help at http://tinyurl.com/tabhelp.

For More Information About the 2010 IDMG Summer Series

http://idmg.berkeley.edu/summerseries.htm

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Screencasting – Get Your Info Out There
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Overview of the Tool
There are many ways to capture and distribute information to audiences when you are not able to provide the information in person. I review three different tools you can try: **Skype**, **uStream** and **Camtasia Studio**.

How to Get the Tool
All the tools I review are available in Mac and PC formats. Skype and uStream have free versions that work perfectly fine. The high definition version of uStream Producer Pro and Camtasia Studio must be purchased.

If you wish to stream presentations, you'll need access to streaming equipment. The Kuali Student team loans our equipment if you want to get started that way. Campus Media services also offers a variety of professional quality streaming and screencasting services.

How to Use the Tool
Use **Skype** for one-to-one screen sharing when you want to add a visual component to chat or phone calls (both parties need Skype). Establish a connection, then simply select 'Share Screen'.

You know how **uStream** works or you've likely observed the process many times if you have attended these sessions. Feel free to contact me for additional guidance. The latest uStream desktop software, Producer and ProducerPro, are very powerful and feature rich.

Camtasia Studio is a typical video editing program with screen recording capabilities. You'll need to decide type of video formats to support and where to host your videos. I can help with the Camtasia software but you'll need to work with your web provider for hosting and distribution questions.

Examples
1. uStream (web) of IDMG session: http://www.ustream.tv/recorded/8111872
2. uStream (desktop) of Kuali Student session: https://test.kuali.org/confluence/x/goBLE
3. Cam Studio screencast video of Russ Acker's OPA Motion Chart
   http://metrics-dev.vcbf.berkeley.edu/bubbleclgdiv.htm
   Note: Cam Studio is similar to Camtasia Studio

References/Other Resources
Wikipedia on Screencasting: http://en.wikipedia.org/wiki/Screencast