Data Dashboards

The Nuts and Bolts of Data Dashboard Development

Introduction

Andy Houriet

Founder and President

August Development Corporation

- Over 30 years of software design and development
- Custom software and technology implementation
- Extensive experience with foundation and non-profit applications

Workshop Objectives

- What is a dashboard?
- Why do I want a dashboard, what can I do with it?
- What should I put on my dashboard?
- How do I use my dashboard?
- Current dashboards exercise
- Designing a dashboard?
- Dashboard design exercise
- Building a dashboard
- Discussion and questions


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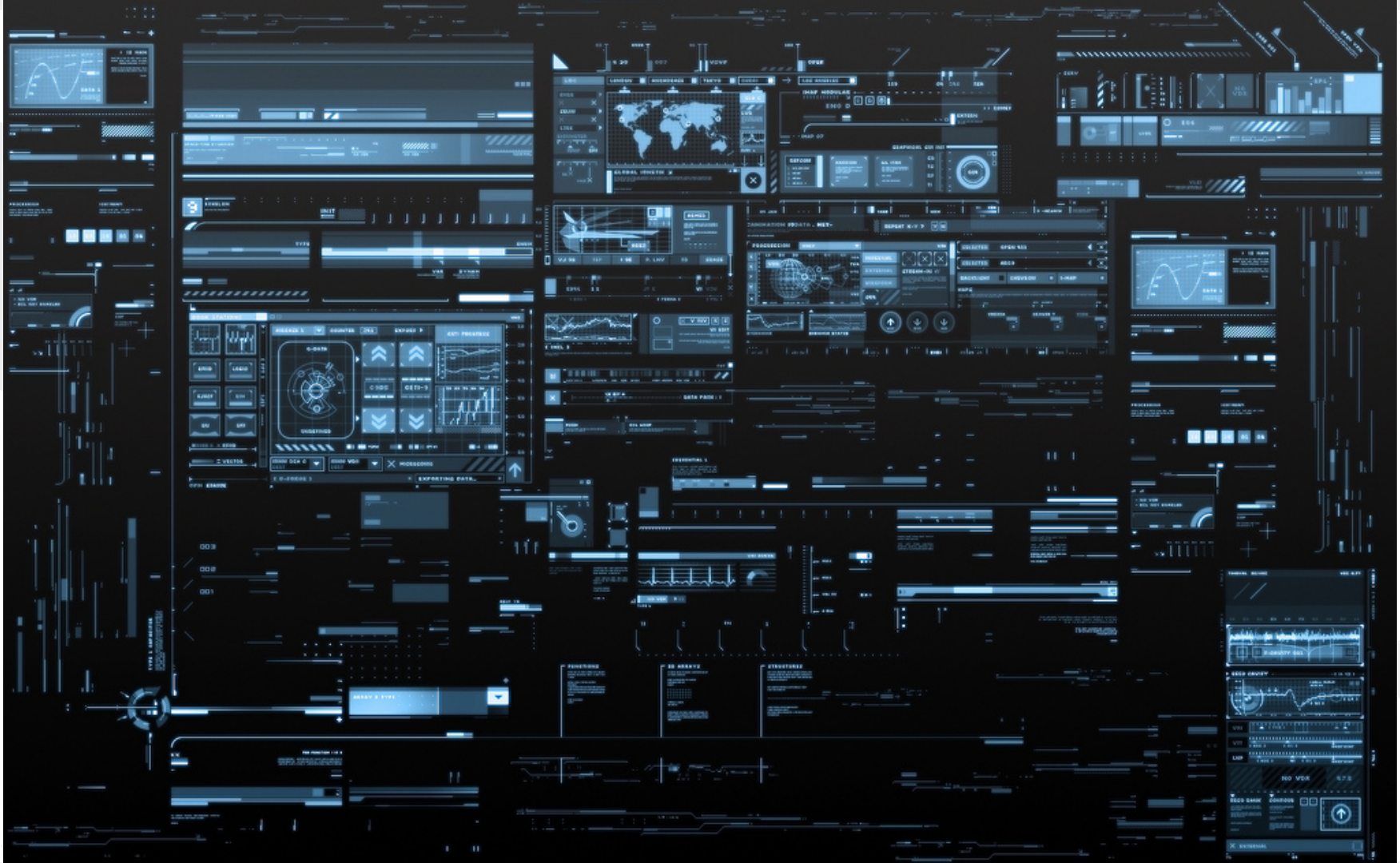
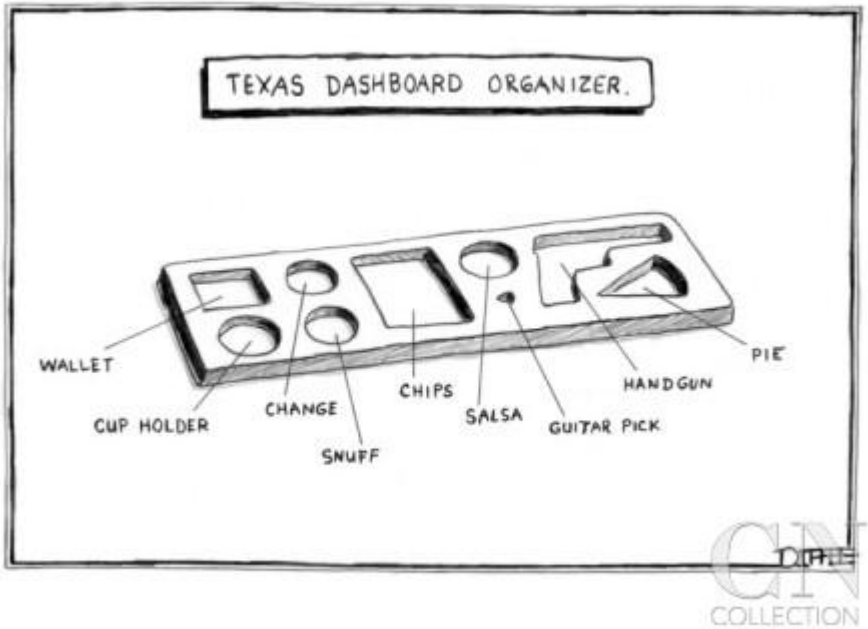


Dashboards in Detail

Part 1 of 673.

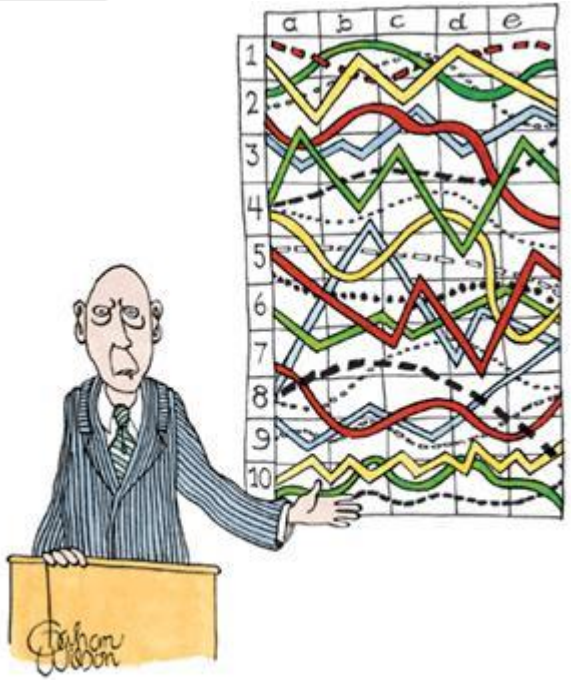


What is a Dashboard?

- Easy to read view of data, usually graphical
- Shows current and historic trends
- Simplified view of key performance indicators

Examples

- Good dashboards - information and design come together
- Bad dashboards - lack one or both attributes



"I'll pause for a moment so you can let this information sink in."

UNITED STATES **EDUCATION DASHBOARD**

About the Dashboard

UNITED STATES

The President's 2020 College Attainment Goal

	Latest percent	Change from previous period
25- to 34-year-olds who completed an associate's or higher degree: 2000 and 2010 (CPS data) Chart Detail State Comparison More Info	38.8	↑

Early Learning through High School

	Latest percent	Change from previous period
3- and 4-year-olds enrolled in preschool: 2005-07 and 2007-09 Chart Detail State Comparison More Info	48.2	↑
4th graders Proficient on the National Assessment of Educational Progress (NAEP) in reading: 2007 and 2009 Chart Detail State Comparison More Info	32	↔
4th graders Proficient on the NAEP in mathematics: 2007 and 2009 Chart Detail State Comparison More Info	38	↔
8th graders Proficient on the NAEP in reading: 2007 and 2009 Chart Detail State Comparison More Info	30	↑
8th graders Proficient on the NAEP in mathematics: 2007 and 2009 Chart Detail State Comparison More Info	33	↑
Freshmen graduating from high school within 4 years: 2006-07 and 2007-08 Chart Detail State Comparison More Info	74.9	↑
Public school graduates who took at least one Advanced Placement test in high school: 2007-08 and 2008-09 Chart Detail State Comparison More Info	26.5	↑

C*TOOLS TRAINING
Orlando 2012

Source Region: All | Destination Region: All | Select Month: January

Number of Calls

367,946 m/m-1 -12.18 %

Average Call Duration

3.37 min m/m-1 25.52 %

Calls by Platform

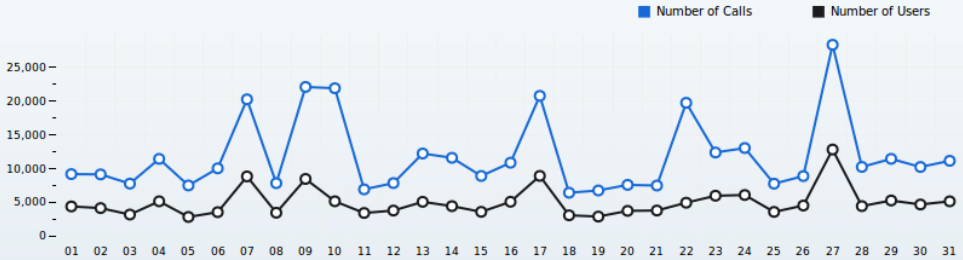
Google Android	65.14%
Apple iOS	13.27%
Nokia Symbian	11.19%
RIM Blackberry	7.46%
Windows Mobile	2.94%

Number of Calls by Plans

Nationwide	98.49%	362,406 Calls
Pay As You Go	1.44%	5,310 Calls
Prepaid $50	0.06%	230 Calls

Number of Calls vs Number of Users

Export



Calls Summary

Export

Source Call	Destination Call	Users	m/m-1	Calls	m/m-1_1	Duration	m/m-1_2
Europe	Europe	32,672	-54.72%	77,291	-47.69%	214,602	-18.92%

1. Finance

	Target	6 months ago	Now
Days of unrestricted cash on hand	45 days	65 days	18 days
Net surplus or deficit YTD compared with YTD budget	Within 25K or better	$42,500 worse than budget	$28,000 worse than budget-to-date
Government funding year-to-date (52% of budget)	Within 3%	$39,000 worse than budget	$3,200 worse than budget, 24 days
Days from end of month to financial statements	24 days	87 days	48 days

2. Program and Impact

	Target	6 months ago	Now
Number of first-time clients enrolled	360 this year	160	205
GED certificates obtained	90%	70%	82%
E-petition signatures	5,000	Not started yet	6,400
Paid seats per theatre performance	90% of performance space	85%	75%
Presentations to churches, companies, neighborhood groups	15 for year	7 YTD	7 YTD

Donor Insight Dashboard

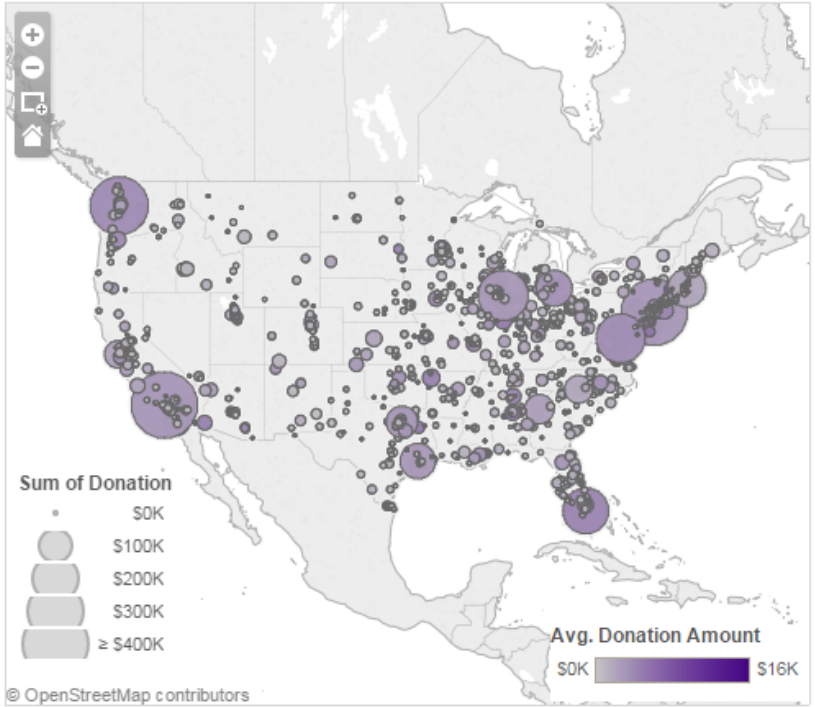
Donation Date
Use slider to select date

1/1/2010 — 12/31/2013

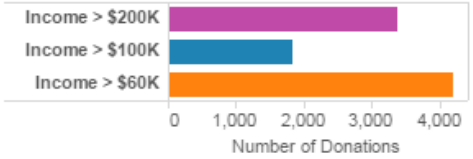
Donation Region
Select one or more region to filter

(All)

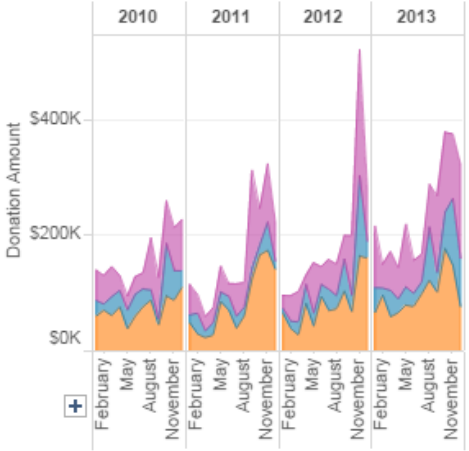
Donor Locations
Select marks to filter



Donor Demographics
Select Bar to Filter



Donation Trends by Demographic
Hover over any point to obtain insights



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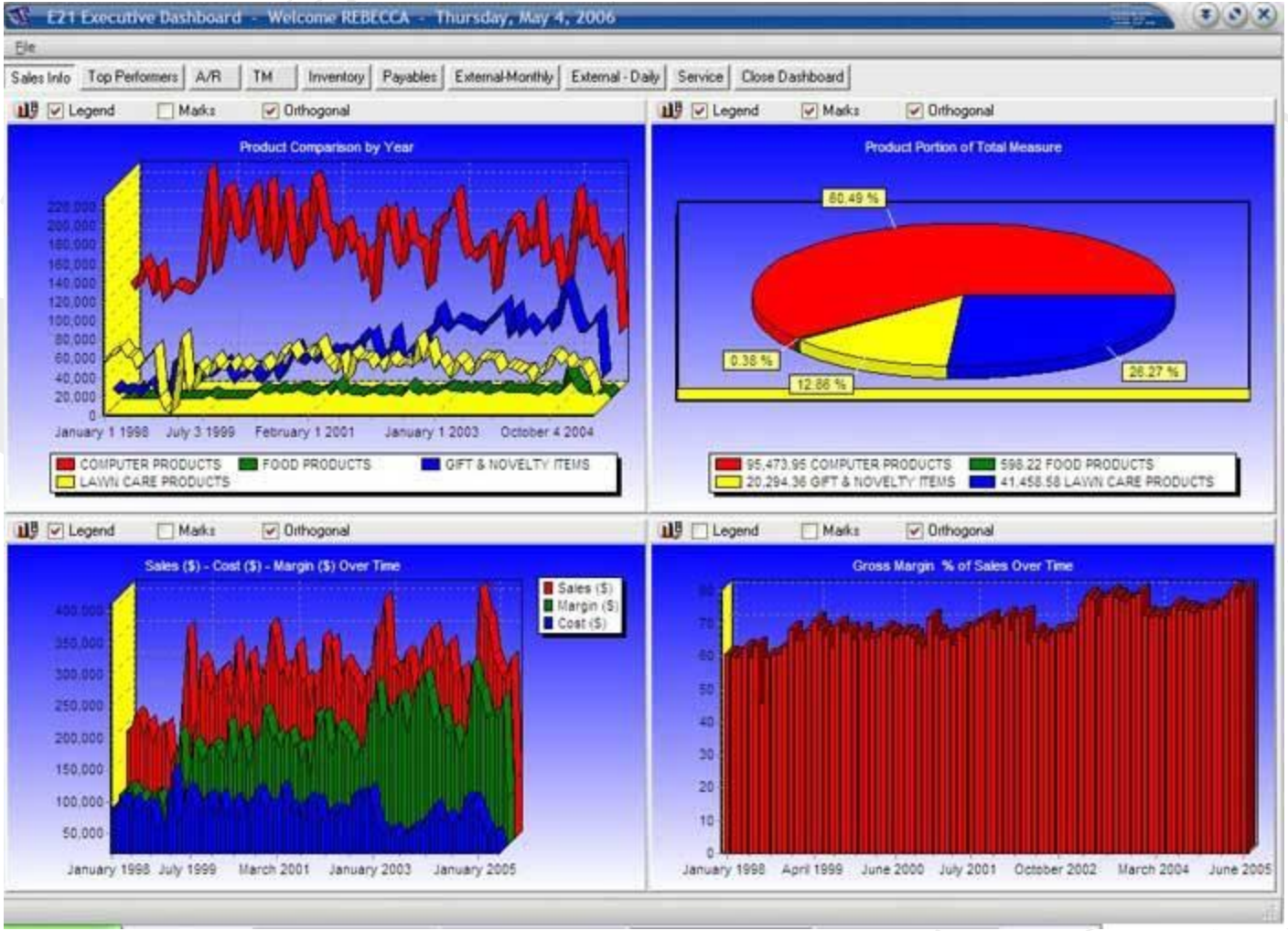

E21 Executive Dashboard - Welcome REBECCA - Thursday, May 4, 2006
File
Sales Info
Top Performers
A/R
TM
Inventory
Payables
External-Monthly
External - Daily
Service
Close Dashboard
Legend
Marks
Orthogonal
Product Comparison by Year
January 1 1998
July 3 1999
February 1 2001
January 1 2003
October 4 2004
COMPUTER PRODUCTS
FOOD PRODUCTS
GIFT & NOVELTY ITEMS
LAWN CARE PRODUCTS
Product Portion of Total Measure
60.49 %
0.38 %
12.86 %
26.27 %
95,473.95 COMPUTER PRODUCTS
598.22 FOOD PRODUCTS
20,294.36 GIFT & NOVELTY ITEMS
41,458.58 LAWN CARE PRODUCTS
Sales ($) - Cost ($) - Margin ($) Over Time
Sales ($)
Margin ($)
Cost ($)
January 1998
July 1999
March 2001
January 2003
January 2005
Gross Margin % of Sales Over Time
January 1998
April 1999
June 2000
July 2001
October 2002
March 2004
June 2005

A1

DASHBOARD - SOFTWARE SALES

Period February/08

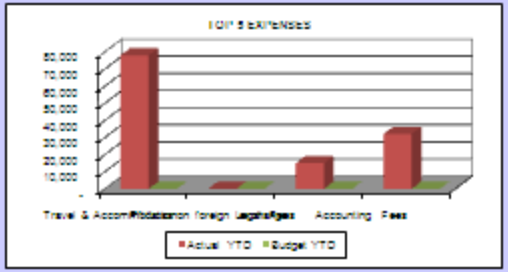
Profit & Loss	Actual	Budget	Variance	Actual YTD	Budget YTD	Variance
Sales	75,000	-	75,000	450,000	-	450,000
Cost of Sales	20,000	-	(20,000)	200,000	-	(200,000)
Gross Profit	55,000	-	55,000	250,000	-	250,000
Expenses	30,000	-	(30,000)	175,000	11,117	(163,883)
Other Income	1,500	-	1,500	5,486	-	5,486
Net Income before tax	26,500	-	26,500	80,486	(11,117)	91,603

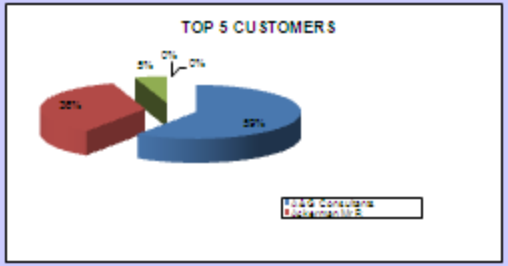
Top 5 Expenses	Actual	Budget	Variance	Actual YTD	Budget YTD	Variance
Travel & Accommodation	12,000	-	(12,000)	78,000	-	(78,000)
Pft/Loss on foreign exchange	-	-	-	-	-	-
Legal Fees	3,500	-	(3,500)	15,000	-	(15,000)
Accounting Fees	4,500	-	(4,500)	32,000	-	(32,000)
Staff Training	10,000	-	(10,000)	50,000	-	(50,000)
	30,000	-	(30,000)	175,000	-	(175,000)

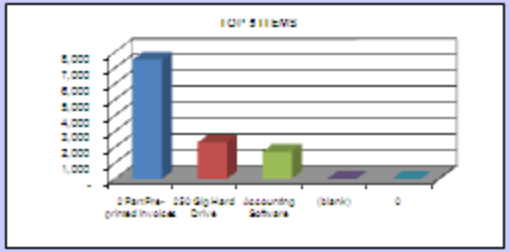
Top 5 Customers	YTD	%	Customer Category	GP	GP %
A & G Consultants	6,840	59.4%	End-User	5,048	100.0%
Ackerman Mr R	4,104	35.6%	(blank)	-	
Albatt Limited	570	5.0%		-	
(blank)	-			-	
	-			-	
	11,514	100.0%		5,048	100.0%

Top 5 Items	YTD	%	Item Category	Quantity	Avg Price
2 Part Pre-printed Invoices	7,524	65.3%	Inventory Goods	7	1,031
250 Gig Hard Drive	2,280	19.8%	(blank)	-	-
Accounting Software	1,710	14.9%		-	-
(blank)	-			-	-
	-			-	-
	11,514	100.0%			

Bottom 5 Items	YTD	%	Item Groups	Quantity	Avg Price
(blank)	-		(blank)	-	-
Accounting Software	1,710	14.9%	Inventory Goods	7	1,031
250 Gig Hard Drive	2,280	19.8%		-	-
2 Part Pre-printed Invoices	7,524	65.3%		-	-
	-			-	-
	11,514	100.0%			







Multiple Dashboards

Different dashboards for different business areas:

- Finance
- Program(s)
- Development
- HR

Why not Reports?

- Reports are useful for details, potentially time consuming for summary data
- An effective alternative to reports

M394 KPR Departed		Arrived		Duration (h:m)	Distance (miles)	Staying (h:m)	Description	Travel charge	Time charge
15th January 2009									
8:30	Home	8:47	Newco Ltd	0:17	9.2	0:03	Non-chargeable, Planned maintenance	£0.74	
8:51	Newco Ltd	9:00	Aldi car park	0:08	3.9	0:30	Non-chargeable, Domestic	£0.32	
9:30	Aldi car park	9:51	Home	0:21	11.1	4:35	Non-chargeable, At home	£0.88	
14:26	Home	14:46	Shute End Road, Alderbury, SP5 3	0:20	6.1	0:03	Non-chargeable, Break outside work time	£0.74	
14:50	Shute End Road, Alderbury, SP5 3	14:58	B and Q	0:08	2.3	0:09	Non-chargeable, Domestic	£0.28	
15:08	B and Q	16:07	Home	0:59	20.1		Non-chargeable	£2.42	
Totals on 15th January 2009				2:16	52.9	5:21		£5.38	£0.00
Number of journey legs: 6		Number of journey stops: 5							

Do you have any dashboards?

- SalesForce
- Raiser’s Edge
- Convio
- Google Analytics
- Others?

Why do I want a dashboard?

Why do I want a dashboard?

- Reliable, accurate view of your strengths and weaknesses
- Quickly identify trouble areas
- Share information between departments
- Makes it easy to see other department strategic goals and progress
- Help align your metrics with your strategic goals

Why do I want a dashboard?

Strategic goals:

- Do you have written strategic goals?
- Do you have metrics that support those goals?

Why do I want a dashboard?

- Dashboards are a very effective tool that helps drive the management decision making process
- Traditional approach is meetings, reviewing reports, asking questions

Why do I want a dashboard?

The design process can drive critical improvements in process and how you measure process:

- Detailed review of common departmental functions
- Implementing ways to measure, leading to metrics

What do I put on a dashboard?

What do I put on a dashboard?

- Anything that helps you view metrics in support of your strategic plans
- Generally speaking, 7 charts/graphs, plus or minus 2
  - Too little--don’t get full nuanced perspective on different elements of the work
  - Too much--loses readability and usability

What do I put on a dashboard?

Program performance:

- Constituents served
- Staff workloads
- Follow-up tracking
- New and existing cases
- Impact

What do I put on a dashboard?

Development performance:

- New donors
- Existing donors
- Individuals/organizations
- Donation thresholds

What do I put on a dashboard?

Membership:

- New members
- Renewals

What do I put on a dashboard?

Human resources:

- Staff training
- Staff program performance

What do I put on a dashboard?

Marketing/Communications:

- Website views
- Newsletter click-throughs
- Donation conversions
- Document downloads
- Conversions to donations

What do I put on a dashboard?

Volunteers:

- Recruiting performance
- Volunteer participation
- Retention

What do I put on a dashboard?

Financials:

- Revenue
- Expenses
- Burn rate
- Operating reserves
- Current ratio

What do I put on a dashboard?

High-level to low-level drill down:

- Start with an overall summary of key items from each area - a big-picture view
- Drill down into more detailed metrics in each area

What do I put on a dashboard?

Other data:

- It doesn’t all have to all be for decision-making, there can be informational sections

How do I use my dashboard?

How do I use my dashboard?

- Make the dashboard review a regular component of the work process
- Consider automated alerting for review
- Consider automated alerting when specific metrics are outside of range

How do I use my dashboard?

Possible options:

- Daily, weekly, monthly review
- Monthly levels check
- Executive management meetings
- Department management meetings
- Board/governance meetings/presentations
- Public website versions

How do I use my dashboard?

- Use it to make decisions that drive change
- Dashboards can drive change in practical use
- What can be measured can be monitored, what can be monitored can be changed

PAI Dashboard Walkthrough

- A little bit about Philadelphia Academies, Inc.
- National Career Academy Coalition's 10 National Standards of Practice
- To the Dashboard…

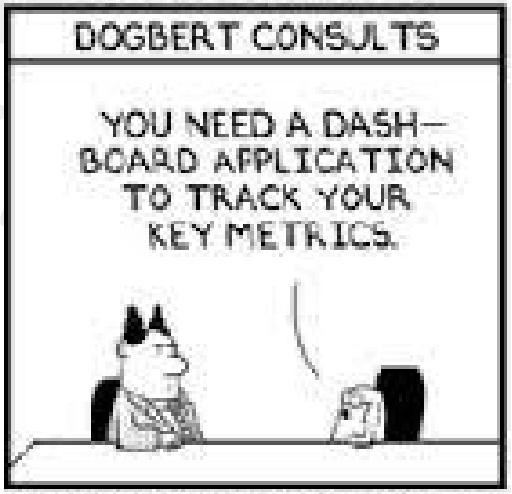
Philadelphia ACADEMIES INC.

PAI Dashboard Walkthrough

- Use:
  - Using in monthly All-Staff meetings to call out areas of need and collaboration, as well as inform other departments of work in the field
  - Will be using to show and explain progress toward goals to school-based partners (principals, Academy Coordinators, etc.)--focuses them on tangible goals empowers them to act on what is needed
  - Will share dashboard components with our Board

Worksheet - Current Dashboards

Section VII.



Worksheet - Current Dashboards

1) Do you have any existing dashboards that you use? (please list them)

2) What is on your dashboard(s)? (in general; what is the focus)

3) How did you decide what to put on your dashboard(s)?

Worksheet - Current Dashboards

4) Where does the data come from (manually entered, spreadsheets, databases, accounting system, etc.)? Who collects and/or synthesizes the data from the sources?

5) Who uses the dashboard(s)?

Worksheet - Current Dashboards

6) How is it used? (decision making, daily management review, general reference, etc.)

7) How often is it used? (daily, weekly, monthly, board, etc.)

Worksheet - Current Dashboards

8) Is your dashboard sufficient? If not, what is missing?

9) If not helpful or effective, do you have any ideas on how they might be improved?

Worksheet - Current Dashboards

Worksheet Review

Designing Your Dashboard

Unit 43.

Designing Your Dashboard

General guidelines for a dashboard:

- Metrics that reflect performance towards organizational objectives
- Keep it as simple as possible

Designing Your Dashboard

Build from reliable data sources:

- Ideally sources that are part of normal business operation
- Data entered in to management systems - done as part of business operation

Designing Your Dashboard

Manually entered/collected data:

- Spreadsheets and other manually entered data commonly has little validation
- Proceed with caution

Designing Your Dashboard

Balanced Scorecard:

- Method for designing and developing objectives and outcomes
- Prepare a plan for all aspects of the organization (balance)
- Executive management plans, with input from the organizational areas

Designing Your Dashboard

Destination Statement:

- A description of the organization in the future, typically three to five years away
- Include perspectives for:
  - Financial
  - Constituents
  - Processes
  - Learning and growth

Designing Your Dashboard

Strategy Map:

- 12 to 24 objectives as activities and outcomes
- Definitions of the objectives
- Measures for each objective with targets
- All in support of the destination

Designing Your Dashboard

Other approaches:

- What information are you frequently asking for?
- What information is in your current reports and tools?

Designing Your Dashboard

Source the data:

- What do we have now that fits the measures?
- What don't we have?
- How do we maintain it and be assured of accuracy?

Designing Your Dashboard

Source the data:

- What do we need to do to get the data we don't have yet?
- Is it really practical to get it, what is the effort?
- Is there enough return for the effort?

Designing Your Dashboard

WARNING - it’s very easy to want to include too much data, which can make things cluttered and hard to follow.

Designing Your Dashboard

Access:

- Who will have access to the dashboard?
- Do all users see the same data, or variations for different roles?
- Executive management - sees all
- Department management - views of their area

Designing Your Dashboard

WARNING - it’s very easy to make a misleading dashboard, be very careful to review with your team and make sure you are evaluating and interpreting correctly.

Designing Your Dashboard

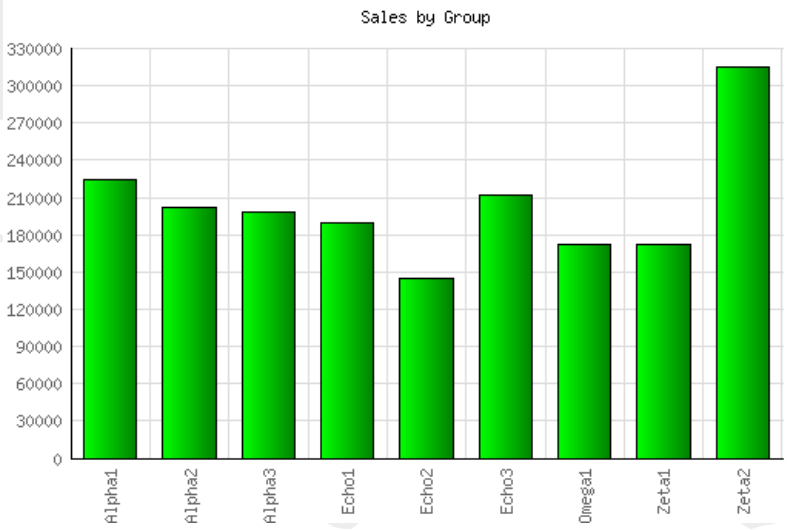
Layout and Representation:

- Reports and statistics are much harder to tease out the information, stick with graphics when possible

Designing Your Dashboard

Sales Statistics for All Sectors

		Sum	Min	Max	Range	Mean	Std
Sector	Manager	Sales	Sales	Sales	Sales	Sales	Sales
Northeast	Alomar	$786.00	$86.00	$420.00	$334.00	$196.50	$156.57
	Andrews	$1,045.00	$125.00	$420.00	$295.00	$261.25	$127.83
Northwest	Brown	$598.00	$45.00	$250.00	$205.00	$149.50	$105.44
	Pelfrey	$746.00	$45.00	$420.00	$375.00	$186.50	$170.39
	Reveiz	$1,110.00	$30.00	$600.00	$570.00	$277.50	$278.61
Southeast	Jones	$630.00	$40.00	$300.00	$260.00	$157.50	$123.39
	Smith	$350.00	$50.00	$120.00	$70.00	$87.50	$29.86
Southwest	Adams	$695.00	$40.00	$350.00	$310.00	$173.75	$141.86
	Taylor	$353.00	$50.00	$130.00	$80.00	$88.25	$42.65



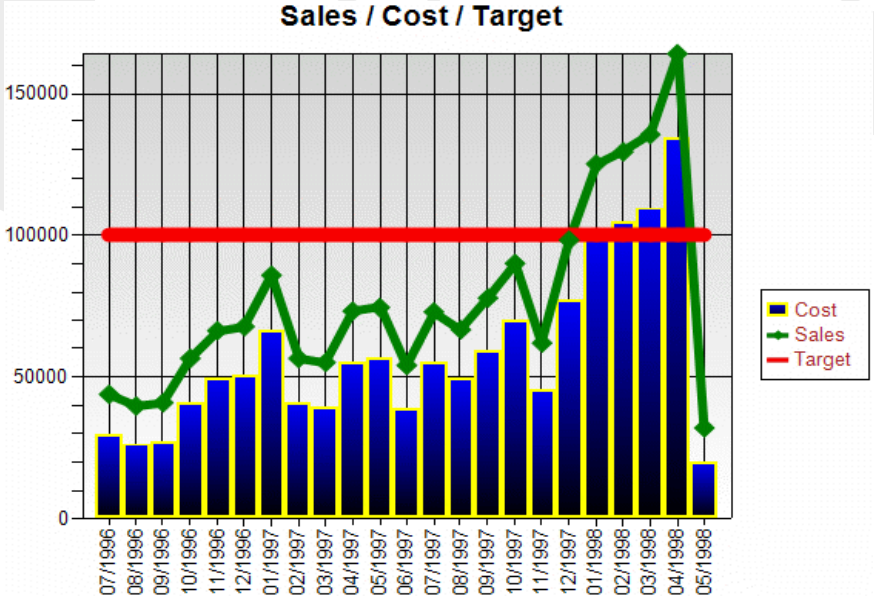
Which is easier to interpret?

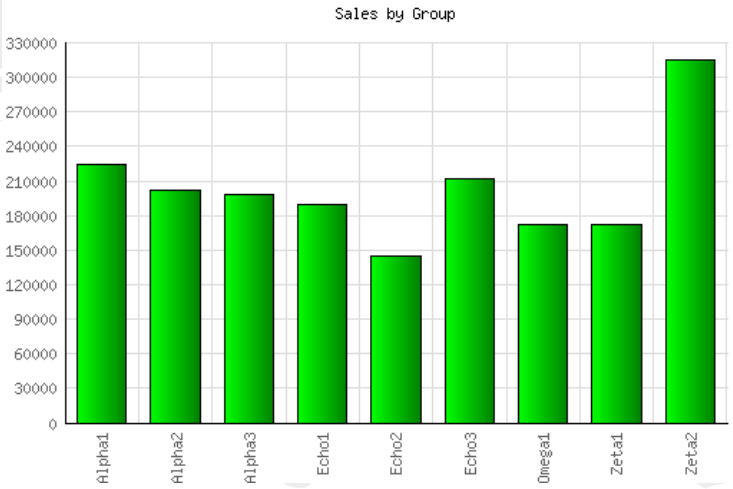
Designing Your Dashboard

Layout and Representation:

- Above all else, show the data, the fewer the pixels the better
- High data to pixel ratios

Designing Your Dashboard





Simple beats complicated every time!

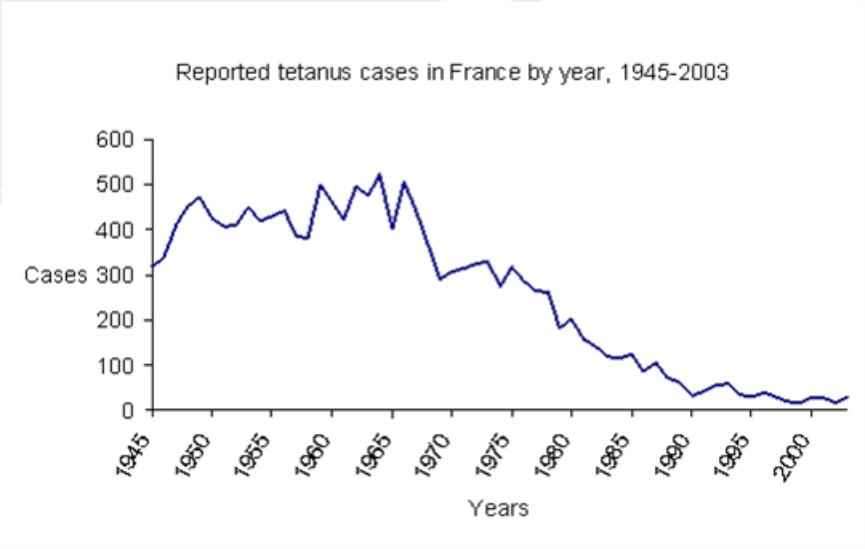
Designing Your Dashboard

Layout and Representation:

- Which charts go with which kinds of data?

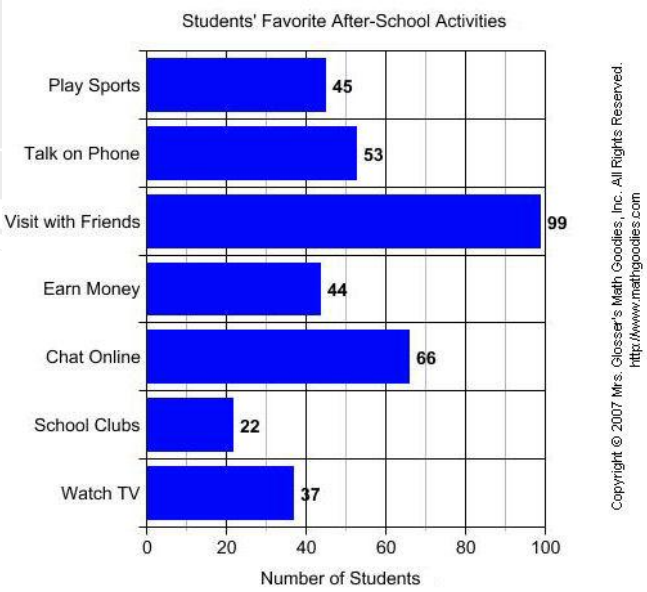
Designing Your Dashboard

Line charts - best for time series



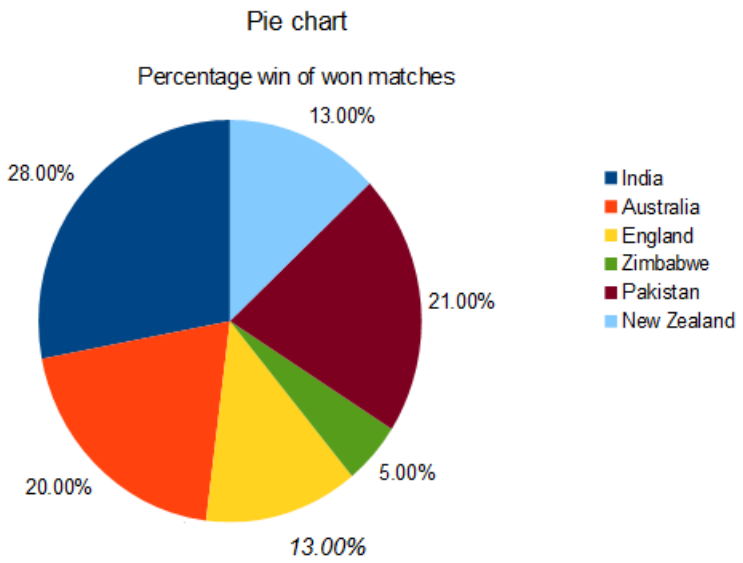
Designing Your Dashboard

Bar charts - best for comparing categories



Designing Your Dashboard

Pie charts - avoid when possible



Designing Your Dashboard

Indicator table - great for quick review

1. Finance			
	Target	6 months ago	Now
Days of unrestricted cash on hand	45 days	65 days	18 days
Net surplus or deficit YTD compared with YTD budget	Within 25K or better	$42,500 worse than budget	$28,000 worse than budget-to-date
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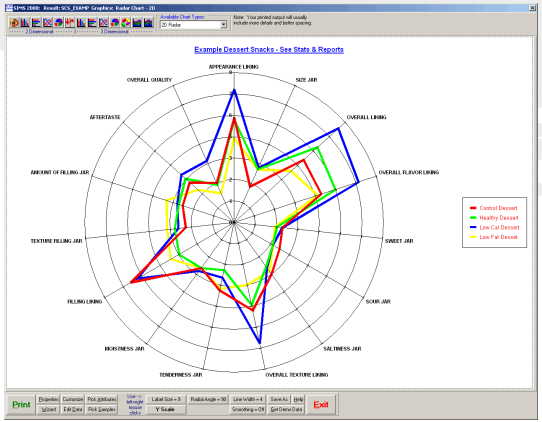
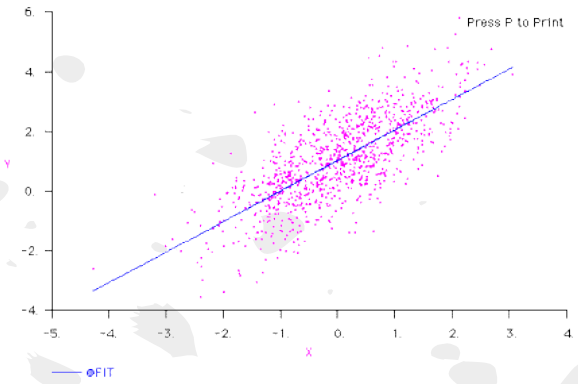
Days from end of month to financial statements	24 days	87 days	48 days

Designing Your Dashboard

Many other options, some have an application.





Designing Your Dashboard

Additional guidelines:

- Stay away from bright colors
- Avoid many shades of color, too hard to distinguish
- Minimal annotations, everything doesn’t need a label

Designing Your Dashboard

Additional guidelines:

- Test different options and get feedback
- Good data visualization takes practice

Break!

Back at 10:45…

"Sorry for calling them 'graphics', Mr Burke. I meant the 'coloured pictures'."

PAI Dashboard Design

1. What information do we include? How do we define (and measure) success?
2. How do we visualize what we want on the dashboard?
3. How will we collect and enter data?

PAI Dashboard Design

1. What information do we include? How do we define (and measure) success?
   a. Received guidelines from President (audience in mind: Board of Directors)
   b. Received guidelines from Fund Development (audience in mind: funders)
   c. Brainstormed with staff (audiences in mind: ourselves and school officials)

PAI Dashboard Design

Brainstorming with staff

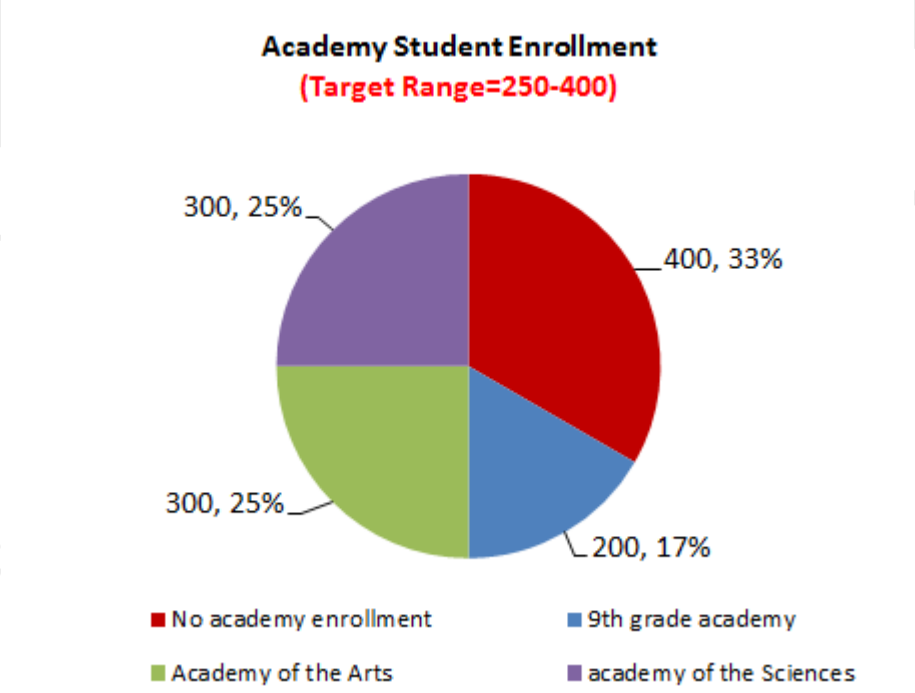
- Staff thought through the “why” of using a dashboard, and when/how they would utilize it
- Pre-work: We decided 5 main areas that we were seeking success in and asked staff to think of how they would measure success in these areas.
- The 5 areas:
  - “Purity”
  - Recruitment
  - Common Planning Time
  - Business Engagement
  - Data Wall Usage

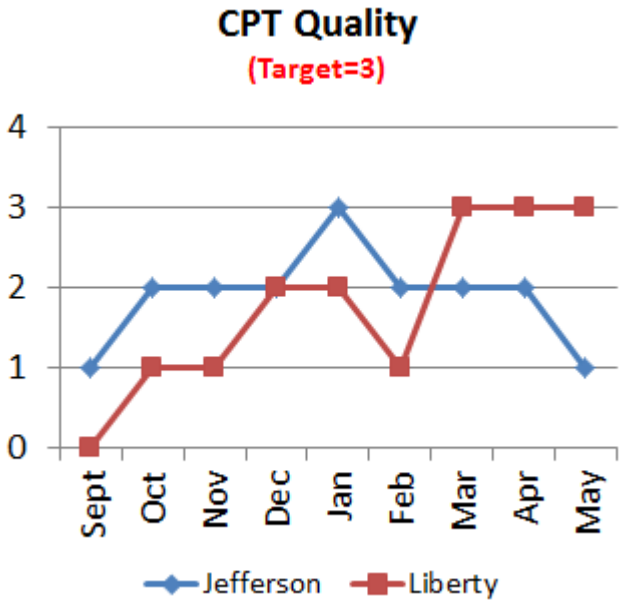
PAI Dashboard Design

2. How do we visualize what we want on the dashboard?
   a. Synthesize and eliminate
      i. Which pieces will be most telling? Avoid any duplications and also data that will be difficult to collect.
   b. Came up with charts/visualizations for each data point
   c. Defined all terms
   d. Collected them into broad categories/sections to be grouped together

PAI Dashboard Design

Original design:





PAI Dashboard Design

Final design:

Enrollment/Purity

March 2014

	Academy of Earth Science	Academy of the Applied Arts	Freshman Academy
Student Enrollment			

Common Planning Time

November 2014

	Academy of Earth Science	Academy of the Applied Arts	Freshman Academy
Meeting Took Place			
Agenda For Meeting			
Clear Goals For Meeting			
Clear Facilitator			
Follow-up From Previous Meeting			
Minutes Taken and Distributed			
Average Teacher Attendance			
High-quality Content/Conversation			

PAI Dashboard Design

- First draft, reviewed with staff, final draft

- *If you haven't noticed:* this is a hugely collaborative process! It can be painfully slow, but also gets everyone on board and invested.

Indicator Thresholds, School Dashboards

Enrollment/Purity			
Student Enrollment	250-400 students enrolled in the academy	200-249, or 401-500 students enrolled	Less than 200, more than 500 students enrolled
Student Cohort Purity	≥80% of students are taking at least half of their classes within their academy	Between 50% and 79% of students are taking at least half of their classes within their academy	Less than 50% of students are taking at least half of their classes within their academy
Academy Teacher Purity	≥80% of teachers are teaching at least half of their classes within their academy	Between 50% and 79% of teachers are teaching at least half of their classes within their academy	Less than 50% of teachers are teaching at least half of their classes within their academy

PAI Dashboard Design

3. How will we collect and enter data?
   a. Decide division of roles and responsibilities
   b. Design reporting forms
      i. Some may be optional while others are required
   c. Ask those who are collecting the best way to do it
   d. Train staff
      i. Recommendations if data entry is new for staff:
         1. Have folks practice the data entry together in a group
         2. Meet regularly to ensure or develop standardized processes and iron out inconsistencies and difficulties

Worksheet - Dashboard Design

Phase Alpha.

"Think this is bad? You should see the inside of my head."

Worksheet - Dashboard Design

1) Destination/Mission Statement

What does success for your organization look like from these lenses?

- Financial
- Constituents
- Operational
- Learning and Growth

Worksheet - Dashboard Design

Destination statement examples:

- Donor revenue is grown by 25%
- Training system is implemented for staff
- Donor management is upgraded with CRM system
- Improve volunteer retention 15%

Worksheet - Dashboard Design

2) Dashboard Elements

With your Destination/Mission statement in mind, list possible dashboard elements that would give appropriate measurements or metrics to manage those items. Don’t hold back--this is the brainstorming phase where you want to create more possibilities for the dashboard than what you eventually want in your final version.

Worksheet - Dashboard Design

2) Dashboard Elements

- Do this in multiple passes, make the list of elements and descriptions first
- Fill in the Target, Chart Type and Data Source in a later pass

Worksheet - Dashboard Design

3) Information Systems Resources

- List your current information systems (accounting/financial software, development/donor management, Excel spreadsheets, databases, line of business applications, SalesForce, etc.)

-

Worksheet - Dashboard Design

4) Audience

- List the roles/people that need access to the dashboards

Worksheet - Dashboard Design

5) Usage:

- What will the process for use be? (How often are they reviewed, at what meetings, etc.)

Worksheet - Dashboard Design

Review, questions.

Building Your Dashboard

Part last.

"That better be an arm twitch."

Building Your Dashboard

Existing applications:

- Accounting - QuickBooks, PeachTree, Sage
- Operations applications (SalesForce, CRM, Raiser’s Edge)

Building Your Dashboard

Dashboard applications:

- Excel
- Google Sheets
- Tableau (multiple editions)
- QlickView
- COGNOS
- Many, many more

Building Your Dashboard

Custom dashboards:

- Stand-alone applications
- Integrated existing applications
- Seamless workflow

Building Your Dashboard

Dashboard demo:

- Excel
- Tableau Public

Building Your Dashboard

Excel

- Enter data manually
- Import data from various tools, many options
- Add-ons for pivot tables, etc.

Building Your Dashboard

Excel

- Sample data

Building Your Dashboard

Tableau Public

- Import Excel, Access and Text data
- Import data from various tools with upgraded versions ($)
- Great variety of visualizations

Building Your Dashboard

Tableau Public

- Same sample data

Thank You

Feel free to contact me with questions about any of the process after the workshop.

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Data Dashboards

Fin.

BOB DOESN'T QUITE GET THE CONCEPT OF EXECUTIVE DIRECTOR COACHING.