Introduction to Dashboards in Excel 2007

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Academic Planning and Budget
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Course Objectives

1. Learn how to layout various types of dashboards in Excel
2. Learn how to create high quality graphs for use in a dashboard
3. Learn when and how to change graph scaling, gridlines and data labels
4. Learn how to use colors to emphasize and highlight data series and data points
Topics Covered

• Theory and Examples
• Creating and formatting charts for time-series, ranking, distribution, and nominal comparison relationships
• Resizing columns and rows to define spaces
• Filling cells, setting borders, formatting axes
• Time saving tricks and tips
Suggested Book

• Information Dashboard Design
  by Stephen Few

• Excel 2007 Charts
  by John Walkenbach
Data, Information and Knowledge

• **Data** are raw. They are symbols or isolated and non-interpreted facts.

• **Information** is data that has been given meaning through interpretation by way of relational connection and pragmatic context.

• **Knowledge** is information, which has been cognitively processed and integrated into an existing human knowledge structure.

Source: S.-O. Tergan and T. Keller (Eds.): Knowledge and Information Visualization, LNCS 3426, 2005. p.3
# Tables vs. Graphs

<table>
<thead>
<tr>
<th>Table (Data)</th>
<th>Graph (Information)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data are expressed in the form of text (that is, words and numbers rather than graphically)</td>
<td>Data are express graphically (that is, as a picture)</td>
</tr>
<tr>
<td>Data are arranged in columns and rows</td>
<td>Data are displayed in relation to one or more axes along which run scales that assign meaning to the values</td>
</tr>
<tr>
<td>Work best when the display will be used to look up individual values or the quantitative values must be precise.</td>
<td>Work best when the message you wish to communicate resides in the shape of the data (that is, in patterns, trends and exceptions)</td>
</tr>
</tbody>
</table>

### Table Shows Actual Values

<table>
<thead>
<tr>
<th>Sem</th>
<th>2002</th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
</tr>
</thead>
<tbody>
<tr>
<td>2nd</td>
<td>81.9%</td>
<td>83.4%</td>
<td>83.5%</td>
<td>86.1%</td>
<td>87.6%</td>
<td>87.6%</td>
<td>89.3%</td>
</tr>
<tr>
<td>3rd</td>
<td>78.0%</td>
<td>81.0%</td>
<td>80.0%</td>
<td>83.0%</td>
<td>85.0%</td>
<td>84.0%</td>
<td>86.0%</td>
</tr>
<tr>
<td>4th</td>
<td>71.8%</td>
<td>73.7%</td>
<td>74.4%</td>
<td>73.9%</td>
<td>79.9%</td>
<td>77.0%</td>
<td>77.1%</td>
</tr>
<tr>
<td>5th</td>
<td>69.8%</td>
<td>71.1%</td>
<td>72.3%</td>
<td>71.8%</td>
<td>75.4%</td>
<td>74.3%</td>
<td>75.0%</td>
</tr>
<tr>
<td>6th</td>
<td>65.8%</td>
<td>69.2%</td>
<td>68.2%</td>
<td>67.7%</td>
<td>72.7%</td>
<td>72.3%</td>
<td>70.7%</td>
</tr>
<tr>
<td>7th</td>
<td>64.0%</td>
<td>66.8%</td>
<td>66.3%</td>
<td>65.8%</td>
<td>68.6%</td>
<td>69.8%</td>
<td>68.8%</td>
</tr>
<tr>
<td>8th</td>
<td>61.7%</td>
<td>64.9%</td>
<td>64.5%</td>
<td>63.6%</td>
<td>66.2%</td>
<td>67.8%</td>
<td>66.1%</td>
</tr>
</tbody>
</table>

### Graphs Show Trend

- 3rd Semester
- 5th Semester
<table>
<thead>
<tr>
<th>Chart #</th>
<th>Enrollment and Outcomes</th>
<th>F 05</th>
<th>F 06</th>
<th>F 07</th>
<th>F 08</th>
<th>F 09</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Headcount Total</td>
<td>16,751</td>
<td>17,204</td>
<td>17,426</td>
<td>16,998</td>
<td>16,293</td>
</tr>
<tr>
<td></td>
<td>Undergraduate</td>
<td>11,780</td>
<td>11,884</td>
<td>11,953</td>
<td>11,796</td>
<td>11,388</td>
</tr>
<tr>
<td></td>
<td>Graduate</td>
<td>4,971</td>
<td>5,320</td>
<td>5,473</td>
<td>5,202</td>
<td>4,905</td>
</tr>
<tr>
<td>1</td>
<td>Full-time Equivalent Students (FTE)</td>
<td>14,020</td>
<td>14,524</td>
<td>14,576</td>
<td>14,314</td>
<td>13,992</td>
</tr>
<tr>
<td>2</td>
<td>New Students (Total Full-Time)</td>
<td>3,347</td>
<td>3,312</td>
<td>3,469</td>
<td>3,259</td>
<td>3,097</td>
</tr>
<tr>
<td></td>
<td>First-Time, Full-Time</td>
<td>2,218</td>
<td>2,221</td>
<td>2,282</td>
<td>2,158</td>
<td>2,013</td>
</tr>
<tr>
<td></td>
<td>Transfer, Full-Time</td>
<td>1,129</td>
<td>1,091</td>
<td>1,187</td>
<td>1,101</td>
<td>1,084</td>
</tr>
<tr>
<td>3</td>
<td>Freshman Quality</td>
<td>1161</td>
<td>1159</td>
<td>1153</td>
<td>1168</td>
<td>1165</td>
</tr>
<tr>
<td>3</td>
<td>Mean SAT</td>
<td>88.4</td>
<td>89.2</td>
<td>89.5</td>
<td>90.0</td>
<td>90.7</td>
</tr>
<tr>
<td>3</td>
<td>Mean HS GPA</td>
<td>1161</td>
<td>1159</td>
<td>1153</td>
<td>1168</td>
<td>1165</td>
</tr>
<tr>
<td>4</td>
<td>Applicants</td>
<td>19,947</td>
<td>20,673</td>
<td>21,170</td>
<td>20,843</td>
<td>20,669</td>
</tr>
<tr>
<td></td>
<td>Freshman</td>
<td>16,394</td>
<td>16,934</td>
<td>17,534</td>
<td>17,194</td>
<td>17,078</td>
</tr>
<tr>
<td></td>
<td>Transfer</td>
<td>3,553</td>
<td>3,739</td>
<td>3,636</td>
<td>3,649</td>
<td>3,591</td>
</tr>
<tr>
<td>6</td>
<td>% MD Res.</td>
<td>86.5%</td>
<td>85.4%</td>
<td>84.5%</td>
<td>83.9%</td>
<td>83.5%</td>
</tr>
<tr>
<td>6</td>
<td>% Non-MD, US</td>
<td>8.7%</td>
<td>9.4%</td>
<td>10.2%</td>
<td>11.3%</td>
<td>11.3%</td>
</tr>
<tr>
<td>6</td>
<td>% Int'l</td>
<td>4.7%</td>
<td>5.2%</td>
<td>5.3%</td>
<td>4.8%</td>
<td>5.2%</td>
</tr>
</tbody>
</table>

**Residency of New Students**

| SAT Score Distribution | 300 - 900 | 900 - 1000 | 1000 - 1100 | 1100 - 1200 | 1200 - 1300 | 1300 - 1400 | 1400 - 1500 | 1500 - 1600 | 17 | 140 | 488 | 1022 | 970 | 349 | 101 | 10 |
|------------------------|-----------|------------|-------------|-------------|-------------|-------------|-------------|-------------|----|----|----|----|----|----|----|----|---|---|---|---|---|---|---|---|
| Poli Sci               | 204       | 150        | 131         | 98          | 48          |
| Chemistry             |            |            |             |             |              |
| Biology                |            |            |             |             |              |
| English                |            |            |             |             |              |
| History                |            |            |             |             |              |

November 09
Dashboard

Inner Harbor University

November 2009

1. Headcount and FTE

- Full-Time Freshmen and Transfers

2. New Students

- Freshmen and Transfers

3. Freshman Quality

- SAT in Red, HS GPA in Blue

4. Applicants

- Freshmen and Transfers

5. SAT Distribution

- First-time, Full-Time Entering Cohort

6. Residency

- Residency of New Students

7. Intended Major

- Politics, Chemistry, Biology, English, History

University System of Maryland
The Use of Color

- Saturated Colors Should be Used for **Emphasis**
- Choose Common Colors

<table>
<thead>
<tr>
<th>Standard Colors</th>
<th>Emphasis Colors</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1.png" alt="Standard Colors" /></td>
<td><img src="image2.png" alt="Emphasis Colors" /></td>
</tr>
</tbody>
</table>
Gestalt Principles of Visual Perception

- Proximity
- Closure
- Similarity
- Continuity
- Enclosure
- Connection
Proximity

3 Groups or 10 Dots?

Rows and Columns
Closure

*See the Shape?*

*Only Need Two Axis*
Similarity

Group by Color, Size, Shape

In a Graph
## Continuity

<table>
<thead>
<tr>
<th>How many lines?</th>
<th>Indentation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Headcount</td>
<td></td>
</tr>
<tr>
<td>Full-time</td>
<td>4,302</td>
</tr>
<tr>
<td>Part-time</td>
<td>1,293</td>
</tr>
<tr>
<td>Degrees</td>
<td></td>
</tr>
<tr>
<td>Associates</td>
<td>1,007</td>
</tr>
<tr>
<td>Bachelors</td>
<td>2,982</td>
</tr>
</tbody>
</table>
Enclosure
Connection
Design is Important!

**Total Research**

**Federal Research**

**Endowment**

1. **Total Research**
2. **Federal Research**
3. **Endowment**
Keep it Simple

Extraneous Features

Annual Budget

<table>
<thead>
<tr>
<th>Year</th>
<th>$ in Millions</th>
</tr>
</thead>
<tbody>
<tr>
<td>FY 2005-06</td>
<td>$4.10</td>
</tr>
<tr>
<td>FY 2006-07</td>
<td>$4.20</td>
</tr>
<tr>
<td>FY 2007-08</td>
<td>$4.50</td>
</tr>
<tr>
<td>FY 2008-09</td>
<td>$4.60</td>
</tr>
<tr>
<td>FY 2009-10</td>
<td>$4.40</td>
</tr>
</tbody>
</table>

Less is Better

Annual Budget

<table>
<thead>
<tr>
<th>Year</th>
<th>$ in Millions</th>
</tr>
</thead>
<tbody>
<tr>
<td>05-06</td>
<td>4.1</td>
</tr>
<tr>
<td>06-07</td>
<td>4.2</td>
</tr>
<tr>
<td>07-08</td>
<td>4.5</td>
</tr>
<tr>
<td>08-09</td>
<td>4.6</td>
</tr>
<tr>
<td>09-10</td>
<td>4.4</td>
</tr>
</tbody>
</table>
Chart Scaling

**Start at Zero**

Graduation Rate

**Scale to Show Change**

Graduation Rate
Times Series - Level versus Trend

**Level**

1st Year Retention

<table>
<thead>
<tr>
<th>Year</th>
<th>Retention</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall 2000</td>
<td>88.9%</td>
</tr>
<tr>
<td>Fall 2001</td>
<td>89.8%</td>
</tr>
<tr>
<td>Fall 2002</td>
<td>91.9%</td>
</tr>
<tr>
<td>Fall 2003</td>
<td>90.9%</td>
</tr>
<tr>
<td>Fall 2004</td>
<td>92.1%</td>
</tr>
<tr>
<td>Fall 2005</td>
<td>92.8%</td>
</tr>
<tr>
<td>Fall 2006</td>
<td>91.8%</td>
</tr>
<tr>
<td>Fall 2007</td>
<td>93.1%</td>
</tr>
<tr>
<td>Fall 2008</td>
<td>93.3%</td>
</tr>
<tr>
<td>Fall 2009</td>
<td>92.9%</td>
</tr>
</tbody>
</table>

**Trend**

1st Year Retention

- Fall 2000: 86%
- Fall 2001: 87%
- Fall 2002: 88%
- Fall 2003: 89%
- Fall 2004: 90%
- Fall 2005: 91%
- Fall 2006: 92%
- Fall 2007: 93%
- Fall 2008: 94%
- Fall 2009: 94%
Stacked Bar Charts

**What’s Important?**

**Better View**

Blue series accounts for most of difference in total value.
Ranking Relationships

Sort by Category

Degrees Awarded

- Biology
- Chemistry
- English
- Geography
- History
- Political Science

Sort by Value

Degrees Awarded

- Political Science
- Biology
- Geography
- Chemistry
- English
- History

Sorting by value gives us a sense of the rank.
Part to Whole Relationship

**Pie Chart**
Enrollment by County

- Erie: 28%
- Niagara: 19%
- Monroe: 17%
- Genesee: 9%

**Bar Chart**
Enrollment by County

- Erie: 30%
- Niagara: 25%
- Monroe: 20%
- Genesee: 15%
- Orleans: 5%
Deviation Relationship

**Number**
Actual less Goal

**Percentage**
Actual less Goal
Distribution Relationship

**Area Chart**

CHEM 101 Grades

**Overlapping Bar Chart**

CHEM 101 Grades
Correlation Relationship

Graduation Rates and SAT

Graduation Rate

Average SAT Score
Nominal Relationships

**Wrong**

Program Credit Hours

**Right**

Program Credit Hours
Exercise 1 – Time Series Charts

Total Headcount Enrollment

Headcount Enrollment

- Undergraduate
- Graduate
Exercise 1 – Time Series Charts Steps

**Line Chart - Trend**

1. Open Exercise 1 Workbook
2. Select A3:F4
3. Choose Insert, Line with Markers Chart (Under Charts)
4. Delete the Legend
5. Re-title the Chart Total Headcount Enrollment
6. Select the Y-axis, Format it So it Ranges from 8,000 to 16,000

**Stacked Bar - Values**

1. Select A3:F6
2. Choose Insert, Stacked Column (Under Charts)
3. Select “Total” on the Legend and Press Delete
4. Format the Legend so It’s on the Bottom
5. Select Each Data Series, Right Click and Select Add Data Lables
6. Over the Plot Area, Right Click and Choose Select Data, Using the Arrows, Move the “Total” series to last in the list, Click Ok
7. Select a Data Series, Choose Format Data Series, Set the Gap Width to 50
8. Select the Lables for Undergraduate, Change Font Color to White, Repeat for Graduate
9. Select the Labels for Total, Right Click, Select Format Data Labels, Change the Label Position to Inside Base
10. Select the Total Data Series (Blue), Right Click, Select Format Data Series, Set Fill to “No Fill”, Set Border Color to “No Line”.
11. Select the Y-axis, Format it So it Ranges from 0 to 16,000
12. Under Chart Tools, Layout on Ribbon Bar, add a Title and Turn-off the Gridlines
Exercise 2 – Distribution Charts

SAT Scores

SAT Scores
Exercise 2 – Distribution Charts

1. Open Exercise 2 Workbook
2. Select A3:I4
3. Select Insert, Clustered Column under Charts Area
4. Select the Legend, Press Delete
5. Select the Data Series, Right Click, Select Format, Change Gap Width to 0, Select Close
6. For an Area Chart, Select the Plot Area, Right Click, Select Change Chart Type, Select Area Chart, Click Ok

**TIP**: Use Copy and Paste to Save Time. Select the Chart, Copy and Paste. Change the Chart Type Back to Clustered Column. Now You Have Both Styles.
Exercise 3 – Nominal / Categorical Charts

Degrees

- Biology: 131
- Chemistry: 150
- English: 98
- History: 48
- Poli Sci: 204
Exercise 3 – Nominal / Categorical Charts

1. Open Exercise 3 Workbook
2. Select A3:F4
3. Choose Insert, Clustered Column under Charts Area
4. Select the Legend, Press Delete
5. With the Chart Selected, Select Layout, Gridlines under Axes, Select Primary Horizontal Gridlines, Select None
6. Select the Data Series, Right Click, Select Format Data Series, Set Gap Width to 75, Select Close
7. Select the Data Series, Right Click, Select Add Data Labels

**TIP:** Select the Data Label for History (a single data label can be selected by selecting the data labels and then clicking again), Right Click, Select Format Data Label, Select Fill and the Solid Fill, Under Color, Select the Fill Color of Your Choice to Emphasize, Select Close.
Exercise 4 – Ranking Charts

Degrees

Degrees

Poli Sci | Chemistry | Biology | English | History
---|---|---|---|---
204 | 150 | 131 | 98 | 48

Poli Sci | Chemistry | Biology | English | History
---|---|---|---|---
204 | 150 | 131 | 98 | 48
Exercise 4 – Ranking Charts

1. Open Exercise 4 Workbook
2. Select B3:F4
3. Select Sort & Filter, Custom Sort under Editing Area of Home Ribbon
4. Select Options..., Sort Left to Right, Click OK
5. Set Sort by to Row 4, Set Order to Largest to Smallest
6. Select the Chart, Copy, Select A21 and Paste
7. Select the 2nd Column Chart, Right Click, Select Change Chart Type, Select Clustered Bar
8. Select the Y-axis, Right Click, Select Format Axis
9. Check the Categories in Reverse Order Box
10. Select the At Maximum Category Radio Button
Exercise 5 – Create a Simple Dashboard

A Very Simple Dashboard

- **Fall Enrollment**: Headcount Enrollment
- **SAT Distribution**: Mean Verbal and Math
- **Degrees Granted**: 2008-09 Academic Year
Exercise 5 – Create a Simple Dashboard Steps

1. Open Exercise 5 Workbook
2. Resize Columns A, C, E, G to 3 Wide
3. Resize Columns B, D, F to 30 Wide
4. Resize Row 4 to 150 Height
5. Fill A1 through G6 with White
6. Merge A1 through G1 and Fill with Color of Your Choice
7. Fill B3, D3, F3 with Color of Your Choice, Change Text Color to White
8. Fill B4:B5, D4:D5, F4:F5 with a Lighter Shade
9. Create Graphs using Data Worksheet Data
10. Be sure to Enter Titles in Row 3 Headers and a Title on Row 1. Enter data notes in B5, D5 and F5.
Exercise 6 – Create a Fancier Dashboard

A Fancier Dashboard

Fall Enrollment

SAT Distribution

Degrees Granted

Headcount Enrollment

2008-09 Academic Year
Exercise 6 – Create a Fancier Dashboard Steps

1. Open Exercise 6 Workbook
10. Set the Chart’s Border Color and Fill Color to “No Line” and “No Fill”
11. Change the Position of the Legend to the Bottom. Select the “Fall Enrollment” on the Legend and Delete it.
12. Use Select Data to Change the Data Series Order. Move “Total Enrollment” to the Bottom of the List.
13. Add Data Labels to All Data Series. Format as Desired.
14. Format the “Total Enrollment” Data Labels, Setting the Label Position to Inside Base.
15. Format the “Total Enrollment” Data Series, Setting Border Color and Fill Color to “No Line” and “No Fill”
16. Format the Y-axis to Range from 0 to 16,000.
Summary Advice, Tricks and Tips

• Think About the Point You are Trying to Make before You Graph
• Design Matters and Can Help You Communicate Information
• Data that Doesn’t Show Anything Can still Tell a Story
• Resize or Merge Cells so Graphs Fit Inside Single Cells
• Copy and Paste Graphs to Save Time
• Limited Color Palate Often Better
That’s All Folks!

Contact Information:
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