Effective and Efficient Information Delivery for Executive Management
LeRoy Bessler, Miller Brewing Company

Abstract and Introduction

The design of an online Executive Information System, or that of a hardcopy report to executive management produced by a batch job, must treat the time and attention of the intended user as precious resources. One can also make the case that the time and attention of any information user--whether laden with status and power, or not--are resources not to be wasted. Effective information delivery is always a paramount objective, regardless of the target audience/user. Hence, the importance of careful design of the communication format.

Design principles are discussed, and example implementations thereof with base SAS® and SAS/GRAPH® are shown. The examples include a one-page list of exceptions, a one-page summary, two types of (one-page) ranking reports, a share-of-whole chart, and a historical comparison table. A consistent format is used for all these report types, whether tabular or graphic. For two non-trivial examples, the supporting code is appended, but it will have been explained orally only. For graphic communication design issues, see the author’s paper Effective and Efficient Use of SAS/GRAPH Software, elsewhere in these Proceedings.

On Communication

"Put it before them--briefly . . . so they will read it, clearly . . . so they will appreciate it, picturesquely . . . so they will remember it, and, above all, accurately . . . so they will be guided by its light."

Joseph Pulitzer

"Simplicity has power."

LeRB

Text

- Always use black--it’s the most readable
  Emphasize with italics (or bold), not color

- Unless compelling counter-need, use mixed upper and lower case
  Mixed case is the business communication standard, and easier to read; all upper case is a hold-over from primitive computer printing.

- Text uses resources--keep it brief

- Focus viewer attention with sparse text

Decimal Precision

- Not doing science--usually suppress decimals
  (unless sum of rounded values will be “wrong”)

Graphs Versus Tables

- Research has shown that graphs can influence decisions, and can speed decision-making.

- Though a table does not facilitate trend analysis, it is essential for detail look-up.

- Effective combinations include:
  - Composite of graph and table
    (PROC GREPLAY can display a complex side-by-side vertical bar chart above, and a GPRINTed table below)
  - Graph with built-in detail look-up
    (e.g., simple vertical bar chart with values at ends of bars), which obviates the need for a companion table

- There have been reports that the use of images, in addition to text, improves, e.g., effectiveness of fundraising and memory of request.

“Let Part Stand for the Whole”

Somewhere I once read the above recommendation for effective communication. I cannot cite the published source. The point is that often, if not almost always, the essence or the most significant is enough. And, if more turns out to truly be desired, it can be supplied on demand, rather than as routine.

Implementations of this precept include:

- Exception Report
- Summary Report
- Ranking Reports
- Historical Comparison Table
- Pac-Man Pie Chart

For the Pac-Man Pie Chart, see the paper cited above and/or the author’s tutorial Pie Charts and Bar Charts: Getting Their Best out of SAS/GRAPH Software, elsewhere in these Proceedings.
Sequencing the Information Presentation

- First, the Exception Report (Figure 1)
  To monitor actual measurements versus goals or thresholds, any exceptions must be on Page 1 of a hardcopy report, or selectable as Option 1 on the main menu for an online report. All exceptions should be on one page, even if the measurements are for totally unrelated items.
- Second, the Summary Report (Figure 2)
  If the report includes trend charts and/or historical tables, there should be a one-page summary to show all the current report-month (or report-week or report-day) critical values.
- Then, everything else.

Sequencing Information in a Graph or Table

- To provide an all-encompassing look-up tool for a large set of categories, order the graph or table entries alphabetically by category name.
- To provide a tool for rapid identification and assessment of categories of significance, order the graph or table entries by decreasing value of the measurement of interest.

Ranking Reports

- Focus attention on high-impact categories
- Often the high-ranking categories that can be fit on one page account for 80-99% of the total of the measurement of interest, even if the full list of categories would run to several pages.
- To limit the list:
  - Show only the Top NN--e.g., Top 40 (Figure 3)
  - Show only values above a minimum cut-off (Figure 4)

See the Appendix for the macro and programs.

Shares of the Whole:

Bessler’s Horizontal Bar Chart (Figure 5)

A foolproof, better alternative to the Pie Chart

- Provides image and detail optimally combined:
  - category name
  - percent of whole
  - graphic depiction of relative size
  - value (ordered)
- Always works, even when the pie chart fails--e.g., when text for small pie slices does not print
But remember that the Pac-Man Pie Chart (op. cit.), assuming that it’s applicable, never fails

Trend Charts

For trend charts, see the author’s tutorials Intelligent Production Graphic Reporting Applications and Pie Charts and Bar Charts: Getting Their Best out of SAS/GRAPH Software, elsewhere in these Proceedings.

Alternative to the Trend Chart: The Historical Comparison Table (Figure 6)

If for some reason a Trend Chart is undesirable (e.g., it would require an interpretation-defying graph--a plot with too many criss-crossing lines, or a too-dense side-by-side vertical bar chart), consider a concise history table: e.g., report month vs. prior month vs. same-as-report-month-but-one-year-ago.

Such a volume of data is not overwhelming. Though not equivalent to visual inspection of a line, an apparent (not a definite) trend can be tested for programmatically and signalled verbally.

Graphic Formatting for Tabular Output

One can use a graphic format when displaying a tabular listing, so that tables and graphs packaged in the same report have a uniform style. Style includes not only the choice and size of font(s), but also the size of titles and footnotes, and the spacing (especially if fractional) between such lines of text.

This is accomplished by running PROC PRINT, PROC TABULATE, or whatever, in conjunction with PROC PRINTTO, and then using PROC GPRINT. See, e.g., Program 3 in the Appendix.

Notices

SAS and SAS/GRAPH are registered trademarks of SAS Institute Inc., Cary, NC, USA. Pac-Man is a registered trademark of Namco Ltd., Tokyo, Japan.

SAS System Release 5.18 was used for this paper.

The SAS code listed in the Appendix was tested, and is reliable, but it can only be presented "as is". Any code adopted by you should be tested by you, and you must assume responsibility for the consequences of its use. Also, it must be tested, and might require modification, for compatibility with Version 6.

Author

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Milwaukee, WI 53201-0482, USA
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Appendix - Programs and Macro for Figures 3 and 4

Program 3: SAS/GRAPH statements for Figure 3

```
DATA INDATA;
INFILE INDATA;
INPUT BROCHURE $8.
DOLLARS 1;
RUN;
/* put OPTIONS statements here */
STOPPREDATA=inputDATA,
CV=DESCNAME,
CVALUE="Grocery Item",
BANKVAR=DOLLARS,
EVARSIZE=7,
MINRVAR='",
NN=40,
LSIZE=751;
TITLIES H=8 HTTMIN F="NONE ';
FOOTNOTE; J=1 H=1 F="TRIPLEX
DATA INDATA;
INPUT OR;OCNAME US.
GOPTIONS MISSING=' ', NODATE NONUMBER
PAGESIZE=80 LINESIZE=80;
TITLIES H=2 F="NONE ';
FOOTNOTE; J=1 H=1 F="TRIPLEX
DATA INDATA;
INPUT GROCNAME Ull.
TITLE2 H=1 F="NONE 'Vhlt1ng Uforl'a County In March 1992';
TITLE7 H=2 F="NONE ';; "
RUN;
IITLEH H=1 F=NONE ';
RUN;
ITLIE5 H=2 F=NONE ';
RUN;
ITLIE1 H=1 F=NONE
'":

Program 4: SAS/GRAPH statements for Figure 4

```

Program 4: SAS/GRAPH statements for Figure 4

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```
Uforia County Visitors Grocery Store

Exceptions - March 1992

<table>
<thead>
<tr>
<th>Exception</th>
<th>Actual Value</th>
<th>Goal or Threshold</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grocery Returns (% of sales)</td>
<td>2.30</td>
<td>1</td>
</tr>
<tr>
<td>Employee Hours Late or Absent (% of scheduled)</td>
<td>3.03</td>
<td>1</td>
</tr>
</tbody>
</table>

*If no exceptions listed, then no goals missed, no thresholds reached.

Figure 1. Exception Report

Uforia County Visitors Grocery Store

Summary - March 1992

- Sales: $14,153
- Operating Costs (Rent, Utilities, Etc.): $1,139
- Returns: $326
- Store Open Hours: 264
- Employee Hours Scheduled: 528
- Employee Hours Worked: 512
- Employee Hours Late or Absent: 16

For history, see appropriate graphs elsewhere in this report.

Figure 2. Summary Report (No headings because LABEL varname='00'X)
Top 40 Grocery Items Most Popular with Extra-terrestrials
Visiting Uforia County in March 1992

These account for 95.8% of their grocery expenditures

<table>
<thead>
<tr>
<th>Rank</th>
<th>Grocery Item</th>
<th>Dollars</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Beef (Tenderloin)</td>
<td>1,010</td>
</tr>
<tr>
<td>2</td>
<td>Pizza (Cheese-Tomato-Mushroom-Anchovy)</td>
<td>963</td>
</tr>
<tr>
<td>3</td>
<td>Milk (Whole)</td>
<td>909</td>
</tr>
<tr>
<td>4</td>
<td>Cookies</td>
<td>872</td>
</tr>
<tr>
<td>5</td>
<td>Soup (Vegetable)</td>
<td>818</td>
</tr>
<tr>
<td>6</td>
<td>Bread (White)</td>
<td>754</td>
</tr>
<tr>
<td>7</td>
<td>Fish (Salmon)</td>
<td>718</td>
</tr>
<tr>
<td>8</td>
<td>Lettuce</td>
<td>663</td>
</tr>
<tr>
<td>9</td>
<td>Salted Pecans</td>
<td>627</td>
</tr>
<tr>
<td>10</td>
<td>Hot Dogs</td>
<td>609</td>
</tr>
<tr>
<td>11</td>
<td>Cakes</td>
<td>572</td>
</tr>
<tr>
<td>12</td>
<td>Whipping Cream</td>
<td>536</td>
</tr>
<tr>
<td>13</td>
<td>Carrots</td>
<td>490</td>
</tr>
<tr>
<td>14</td>
<td>Chocolate (Semi-sweet Chips)</td>
<td>454</td>
</tr>
<tr>
<td>15</td>
<td>Fish (Anchovies)</td>
<td>381</td>
</tr>
<tr>
<td>16</td>
<td>Cereal (Oatmeal)</td>
<td>345</td>
</tr>
<tr>
<td>17</td>
<td>Oranges</td>
<td>327</td>
</tr>
<tr>
<td>18</td>
<td>Bananas</td>
<td>309</td>
</tr>
<tr>
<td>19</td>
<td>Chocolate Milk</td>
<td>290</td>
</tr>
<tr>
<td>20</td>
<td>Salami</td>
<td>236</td>
</tr>
<tr>
<td>21</td>
<td>Flavored Gelatin</td>
<td>191</td>
</tr>
<tr>
<td>22</td>
<td>Cheese (American)</td>
<td>190</td>
</tr>
<tr>
<td>23</td>
<td>Root Beer</td>
<td>96</td>
</tr>
<tr>
<td>24</td>
<td>Soup (Chicken Noodle)</td>
<td>90</td>
</tr>
<tr>
<td>25</td>
<td>Fish (Tuna)</td>
<td>90</td>
</tr>
<tr>
<td>26</td>
<td>Soup (Tomato)</td>
<td>89</td>
</tr>
<tr>
<td>27</td>
<td>Eggs</td>
<td>85</td>
</tr>
<tr>
<td>28</td>
<td>Fish (Lake Perch)</td>
<td>82</td>
</tr>
<tr>
<td>29</td>
<td>Pies</td>
<td>81</td>
</tr>
<tr>
<td>30</td>
<td>Potatoes</td>
<td>79</td>
</tr>
<tr>
<td>31</td>
<td>Raisins</td>
<td>78</td>
</tr>
<tr>
<td>32</td>
<td>Mustard</td>
<td>76</td>
</tr>
<tr>
<td>33</td>
<td>Fish (Sardines)</td>
<td>73</td>
</tr>
<tr>
<td>34</td>
<td>Turkey</td>
<td>72</td>
</tr>
<tr>
<td>35</td>
<td>Bread (Rye)</td>
<td>66</td>
</tr>
<tr>
<td>36</td>
<td>Bologna</td>
<td>64</td>
</tr>
<tr>
<td>37</td>
<td>Fish (Cod)</td>
<td>63</td>
</tr>
<tr>
<td>38</td>
<td>Tomatoes</td>
<td>57</td>
</tr>
<tr>
<td>39</td>
<td>Pickles</td>
<td>55</td>
</tr>
<tr>
<td>40</td>
<td>Beets</td>
<td>54</td>
</tr>
</tbody>
</table>

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13,614

Figure 3. Ranking Report: Top 40
Ranked List of Grocery Items Most Popular with Extra-terrestrials Visiting Uforia County in March 1992

These account for 86.3% of their grocery expenditures

Item totals less than $100 are not listed

<table>
<thead>
<tr>
<th>Rank</th>
<th>Grocery Item</th>
<th>Dollars</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Beef (Tenderloin)</td>
<td>1,010</td>
</tr>
<tr>
<td>2</td>
<td>Pizza (Cheese-Tomato-Mushroom-Anchovy)</td>
<td>963</td>
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<td>3</td>
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<td>872</td>
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<td>Soup (Vegetable)</td>
<td>818</td>
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<td>Bread (White)</td>
<td>754</td>
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<tr>
<td>7</td>
<td>Fish (Salmon)</td>
<td>718</td>
</tr>
<tr>
<td>8</td>
<td>Lettuce</td>
<td>663</td>
</tr>
<tr>
<td>9</td>
<td>Salted Pecans</td>
<td>627</td>
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<td>10</td>
<td>Hot Dogs</td>
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<tr>
<td>11</td>
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<td>Whipping Cream</td>
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<td>Fish (Anchovies)</td>
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<tr>
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<tr>
<td>19</td>
<td>Chocolate Milk</td>
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<tr>
<td>20</td>
<td>Salami</td>
<td>236</td>
</tr>
<tr>
<td>21</td>
<td>Flavored Gelatin</td>
<td>191</td>
</tr>
<tr>
<td>22</td>
<td>Cheese (American)</td>
<td>190</td>
</tr>
</tbody>
</table>

Figure 4. Ranking Report: With Minimum Cut-off

109
Uforia County Visitors Grocery Store Sales - March 1992

From Where Did the Extra-terrestrial Customer Dollars Come?

<table>
<thead>
<tr>
<th>Category</th>
<th>Percent</th>
<th>Value (in dollars)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jupiter</td>
<td>47.2%</td>
<td>$6,702</td>
</tr>
<tr>
<td>Mars</td>
<td>24.3%</td>
<td>$3,451</td>
</tr>
<tr>
<td>Saturn</td>
<td>14.8%</td>
<td>$2,107</td>
</tr>
<tr>
<td>Venus</td>
<td>8.8%</td>
<td>$1,255</td>
</tr>
<tr>
<td>Pluto</td>
<td>2.1%</td>
<td>$303</td>
</tr>
<tr>
<td>Non-solar</td>
<td>2.1%</td>
<td>$293</td>
</tr>
<tr>
<td>Uranus</td>
<td>0.4%</td>
<td>$58</td>
</tr>
<tr>
<td>Neptune</td>
<td>0.3%</td>
<td>$36</td>
</tr>
<tr>
<td>Mercury</td>
<td>0.0%</td>
<td>$6</td>
</tr>
</tbody>
</table>

Total = $14,211

Figure 5. Customized Horizontal Bar Chart, Showing Category, Percent, & Value

Monthly Sales of Fruits and Vegetables
In Dollars

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Lettuce</td>
<td>663</td>
<td>599</td>
<td>374</td>
<td>Up</td>
</tr>
<tr>
<td>Carrots</td>
<td>490</td>
<td>455</td>
<td>128</td>
<td>Up</td>
</tr>
<tr>
<td>Oranges</td>
<td>327</td>
<td>303</td>
<td>359</td>
<td></td>
</tr>
<tr>
<td>Bananas</td>
<td>309</td>
<td>481</td>
<td>367</td>
<td></td>
</tr>
<tr>
<td>Potatoes</td>
<td>79</td>
<td>65</td>
<td>71</td>
<td></td>
</tr>
<tr>
<td>Raisins</td>
<td>78</td>
<td>75</td>
<td>61</td>
<td>Up</td>
</tr>
<tr>
<td>Tomatoes</td>
<td>57</td>
<td>55</td>
<td>14</td>
<td>Up</td>
</tr>
<tr>
<td>Pickles</td>
<td>55</td>
<td>59</td>
<td>53</td>
<td></td>
</tr>
<tr>
<td>Beets</td>
<td>54</td>
<td>47</td>
<td>64</td>
<td></td>
</tr>
<tr>
<td>Apples</td>
<td>45</td>
<td>77</td>
<td>102</td>
<td>Down</td>
</tr>
<tr>
<td>Hot Peppers</td>
<td>45</td>
<td>56</td>
<td>37</td>
<td></td>
</tr>
<tr>
<td>Cauliflower</td>
<td>37</td>
<td>33</td>
<td>20</td>
<td>Up</td>
</tr>
<tr>
<td>Grapes</td>
<td>28</td>
<td>30</td>
<td>25</td>
<td></td>
</tr>
<tr>
<td>Grapefruit</td>
<td>14</td>
<td>13</td>
<td>1</td>
<td>Up</td>
</tr>
<tr>
<td>Olives</td>
<td>7</td>
<td>6</td>
<td>4</td>
<td>Up</td>
</tr>
<tr>
<td>Zucchinis</td>
<td>0</td>
<td>1</td>
<td>3</td>
<td>Down</td>
</tr>
</tbody>
</table>

Figure 6. Historical Comparison Table