Communicating Research

The Research Report

- Research results are of little value unless they can be communicated to others
- Procedures for writing a research report is important for all researchers
- General guide
  - Specific rules, consult APA style manual

A Research Report Should Communicate . . .

- Justification of research
- Procedures used
- Findings of the research
- Implications of the findings
- Relationship to other knowledge
Writing Style

- Keep audience in mind
- Concise
- Precise
- Logically organized
- Do not editorialize

Writing Style

- Present research, not researcher
  - Impersonal tone
  - Never use first-person pronouns
  - Leave evaluation of research to readers

Types of Research Reports

- Thesis or dissertation
- Journal article
- Conference paper
General Sequence and Components

- Text
  - Introduction
    - Statement of the problem and rationale for the study
    - Objectives, Research Questions, and/or Hypotheses
    - Definition of Terms
    - Related Literature

General Sequence and Components

- Methods and Results
  - Subjects
  - Procedures
  - Instruments
  - Presentation and Analysis of Data

General Sequence and Components

- Discussion of Results
  - Interpretation of Findings
  - Implications
  - Applications
General Sequence and Components

- Conclusions and Summary
  - Conclusions
  - Summary

General Sequence and Components

- Supplementary Pages
  - References
  - Appendixes
  - Vita (if required)
  - Abstract

Writing a Dissertation or Thesis

- Demonstrates a student’s competence
  - Full literature review
  - Complete description of procedures
  - Complete tabulation of results
  - Reflective elaboration
Writing a Journal Article

- Requires only communication of author’s contribution to knowledge
  - Economy of journal space
  - Reader’s time
  - Concise
    - Related-literature – only those that provide basis for study
    - Problem – no more than a paragraph
    - Briefly describe procedures – only enough to allow replication
    - Results section – most important

The Professional Convention

- Papers, presentations, round-tables, posters, etc.
  - Much the same as Journal Articles
  - Time is an issue
  - Organization
    - Statement of Problem, Objectives, Hypotheses, etc.
    - Brief description of Procedures
    - Findings, Conclusions, Implications

What to include in your presentation

- The chair should introduce you
- Start with a “front” page that includes
  - Title of your presentation
  - Your name and affiliation
  - [Date, name of conference, paper prepared for…]
- Your next page should include
  - Acknowledgement to granters, assistants, etc.
  - Any required disclaimers
What to include in your presentation

• Introduction
  – Tell the audience what issues you are addressing
  – Place your work in the context of the existing literature
  – Identify your specific research questions

• Methods
  – Describe your data, sample, collection information
    • Necessary for understanding
  – Moderate but sufficient detail
    • Possible for audience to critique/evaluate your methods

• Results
  – Summarize the key aspects
    • Related to hypotheses
  – Use graphs and charts when possible/applicable
    • Clearly labeled
      – Test on others
What to include in your presentation
• Discussion/conclusion
  – Whether hypotheses were supported
  – Implications of your findings
  – Limitations of your research
  – Suggestions for further studies or take-home message

Guidelines for a Paper Presentation: Audience
• “Who is your audience?”
• Use terms that are familiar to your audience
• Present the material so it appeals to your audience
• Take advantage of shared assumptions/knowledge of the material

Guidelines for a Paper Presentation: Purpose
• “Why will audience be listening and/or why you will be talking?”
  – Presentation should address the purpose for the presentation
• Focus your planning on
  – Audience/speaker relationship and expectations
Guidelines for a Paper Presentation: Core Content

• “What is your message?”
• Minimum content area needed to make points
• Focus of material and delivery
  – Depends on a clear sense of core content

Guidelines for a Paper Presentation: Parameters

• “What are the constraints affecting the presentation?”
• Take into account the constraints of the situation
  – Time for talk, time for discussion, technology, level of formality….

Practical Advice: Be Prepared

• Take time to prepare content and structure of talk
• Practice timing
  – Share core issues in a clear, well-structured manner
    • Strict time limit at conferences
• Become familiar with audio-visual aides
Practical Advice: Keep it Simple

- Keep outline simple
  - Main ideas clearly set apart
  - Include only points you will elaborate (not details)
- Keep slides simple
  - 1 idea per slide
  - 5-6 words per line
  - 5-6 lines per slide
- Keep notes simple

Practical Advice: Use Visual Aids

- Use audio-visual aids *when appropriate*
  - Present idea or point faster than speech
- Keep audio-visual aides simple
  - No sound effects or fancy animations
  - Enhance talk rather than distract from talk
- Visual aids *substitute* for text
  - Audience should focus on visual

When to Use Visual Aids

- When pictures can substitute for text
- When describing complex theories/concepts
- When describing complex experimental designs/procedures
- When discussing numeric information
Communicating Information Visually

- Methods Section
  - Diagrams/Tables
    - Research design
    - Sample characteristics
    - Coding categories
- Results Section
  - Tables
    - Qualitative Data
    - Frequencies
    - Central tendency & variability
  - Graphs
    - Central tendency & variability

Criteria for Visual Information

- Clarity
  - Data representation integrated with numerical meaning
- Precision
  - Represent data accurately
- Efficiency
  - Present data in a compact space

Visualizing Data

- Summarizing numerical data
  - Tables
  - Figures
    - Stem & leaf charts
    - Box plots
    - Bar graphs
    - Line graphs
    - Histograms
Why we use visual representations. Compare this...

“The composition of radio stations is as follows: Adult contemporary (11%); Adult standards (8.6%); Contemporary hits (4.1%); Country (14.9%); News (15.7%); Oldies (7.7%); Religious (14.6%); Rock (6.3%); Spanish (5.4%); Other (11.5%)”

...to this.

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Frequency Table

- Condenses data into a table.
- Use to describe **categorical/nominal data**.
- A **count** of items falling into each category.

<table>
<thead>
<tr>
<th>Score</th>
<th>Frequency</th>
<th>Frequency (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>9</td>
<td>4</td>
<td>13%</td>
</tr>
<tr>
<td>1</td>
<td>3</td>
<td>10%</td>
</tr>
<tr>
<td>2</td>
<td>5</td>
<td>17%</td>
</tr>
<tr>
<td>3</td>
<td>5</td>
<td>17%</td>
</tr>
<tr>
<td>4</td>
<td>6</td>
<td>20%</td>
</tr>
<tr>
<td>5</td>
<td>7</td>
<td>23%</td>
</tr>
</tbody>
</table>
Stem and Leaf Chart

- Hybrid between table and graph
- Organization
  - Stems
    - First digits
  - Leaves
    - Second digits

This means there are no numbers with a 10 stem.

Advantages of Stem & Leaf Chart

- Easily assess symmetry of distribution
- Easily identify outliers
- Identify concentrations of scores
  - Median, mode
- Identify gaps in score distribution

Box Plot (Box & Whiskers Plot)

- Graphical representation of:
  - Minimum score
  - 1st quartile
  - 2nd quartile (median)
  - 3rd quartile
  - Maximum score
Advantages of a Box Plot

• Facilitates visualizing the distribution of the data
  – Identify skewed data
• Comparing scores/distributions
• Shows outliers

Disadvantages of a Box Plot

• Tend to emphasize tails of a distribution
  – Least certain points in data set
• Hide many details of distribution
  – Gaps in distribution
  – Shape of distribution (e.g., bimodal)

Bar Graph

• Represents amounts or frequencies
• Used to
  – Compare groups of data
  – Make quick generalizations about data
**Histogram**

- Bar-like graph of a frequency distribution.
- Bars are (typically) adjacent/touching
- Horizontal axis
  - Interval values
- Vertical axis
  - Frequency count.

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**Bar Graph or Histogram?**

**EXERCISE:** Which should we use?

- We want to compare how much money 5 students make in a week.
- We want to compare how many students make between $0-499, $500-$999, and $1000-$1499.
- We want to compare the heights of men and women in this class.
- We want to compare how many women are under 5’5” and above 5’5”.

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**Pie Chart**

- Summary of categorical data
  - Emphasize each category’s relation to the whole
- Organization
  - “Slices” sum to 100%
- Less informative
  - Frequency in terms of percentages only
  - Not used to describe data in empirical reports
Line Graph

- Types
  - Time plot
    - Variation over time
  - Line graph
    - Relationship between two variables

Ethics of Representing Data Visually

- Make sure you present your data carefully
- Make sure others are presenting their data accurately
  - Does representation emphasize differences between groups?
  - When two graphs are compared
    - Do they use the same scale?
    - What scale is used?

Gender Differences in ACT Scores
Gender Differences in ACT Scores

- English
- Math
- Science
- Composite