BINUS UNIVERSITY

People
Innovation
Excellence

Course : COMP6575 – Research Topics in Computer Science

Effective Period : December 2019

Language, Style, Figures and Tables

Session 08

Learning Outcomes

At the end of this session, students will be able to:

- LO 3: Analyze the results from the research study

People
Innovation
Excellence

BINUS UNIVERSITY

People
Innovation
Excellence

Outline

1. The Scientific Style
2. Truth
3. Presentation
4. Scene
5. Cast
6. Thought and Language
7. The Goals of Using Figures
8. Important Goals of Using Graphics for Communication in a Scientific Publication
9. Error in Graphs
10. Tables

Language and Style

The Scientific Style

- According to Thomas and Turner, a writing style is defined by the stand taken on 5 issues:
  - Truth
  - Presentation
  - Scene
  - Cast
  - Thought and Language

People
Innovation
Excellence

BINUS UNIVERSITY

People
Innovation
Excellence

Truth

- The scientific style assumes a universal and objective reality that exists independent of the writer or reader
- There is a truth concerning this reality, but it is not manifest
- It takes hard work to get close to this truth, and in the end we can only comment on the accuracy of our scientific models, not their correctness in some absolute sense.
- The truth is independent of both writer and reader
- Scientific knowledge is not invented or created, it is discovered.
- Then after it is discovered, it is verified by other scientists.

BINUS UNIVERSITY

People
Innovation
Excellence

Presentation

- In the scientific style, the most valued attributes are accuracy, precision, clarity, concision, and grace (int that order)
- Accuracy means that all new knowledge claims are justified and verifiable
- The point of research is to claim new knowledge
- Claiming too little gives question to the value of the paper
- Claiming too much gives question to the competence or integrity of the author
- Precise means that the meaning understood by the reader matcher the meaning intended by the writer

Scene

- The imagined scene for communicating between author and reader is a presentation at a scientific meeting
- The audience is there because they are interested in your topic, and they will save their questions until the end.
- Our job is to teach the audience what you learned in the course of your investigations.

People
Innovation
Excellence

BINUS UNIVERSITY

People
Innovation
Excellence

Cast

- Your readers are like the audience of your imagined symposium talk
- They are interested in your topic and generally familiar with this field.
- They are enthusiastic graduate students and experienced veterans
- They are intelligent and willing to put the effort into understanding what you have to say, but only if you make it worth their while.

BINUS UNIVERSITY

Thought and Language

- There are no thoughts in the writer's head that cannot be adequately expressed and understood with the right choice of words.
- Language (including mathematics notation) is fully up to the task of representing even the most complex concepts with accuracy and precision.

People
Innovation
Excellence

Figures and Tables

Figures

BINUS UNIVERSITY

People
Innovation
Excellence

The Goals of Using Figures

- As a form of communication, figures (and in particular, the graphical display of quantitative data) are uniquely suited to conveying information from complex data sets quickly and effectively.
- Graphs take advantage of the magnificent power of the human brain to recognize visual/spatial pattern and to quickly change focus from the big picture to small details.
- Graphs are extremely popular in scientific literature for the simple reason that they work so well.
- But like all the forms of communication, graphics can be used to explain and clarify but also to confuse or deceive.

Important Goals of Using Graphics for Communication in a Scientific Publication

- Document the data (a graph is often the only place the data get published)
- Make comparisons (Such as displaying trends)
- Allow for inferences of cause and effect
- Tell a story, or at least be an integral part of the tale; and
- Integrate with the text to enhance the overall communication of the paper

People
Innovation
Excellence

BINUS UNIVERSITY

People
Innovation
Excellence

Graphs

- The design of the graph it self should be driven by the structure in the data and what story the data have to tell
- However, between allowing the data to speak for themselves and forcing the story you want to tell.
- Well presented data should encourage the consideration of alternate explanations, not just for your preferred explanation.
- Overall, the process of creating a graphical display follows these basic steps:
  - Choose the data to be presented
  - Define the message to be conveyed
  - Pick a style of graph that supports the message
  - Construct the graph seeking clarity
  - Revise it until it is right

BINUS UNIVERSITY

People
Innovation
Excellence

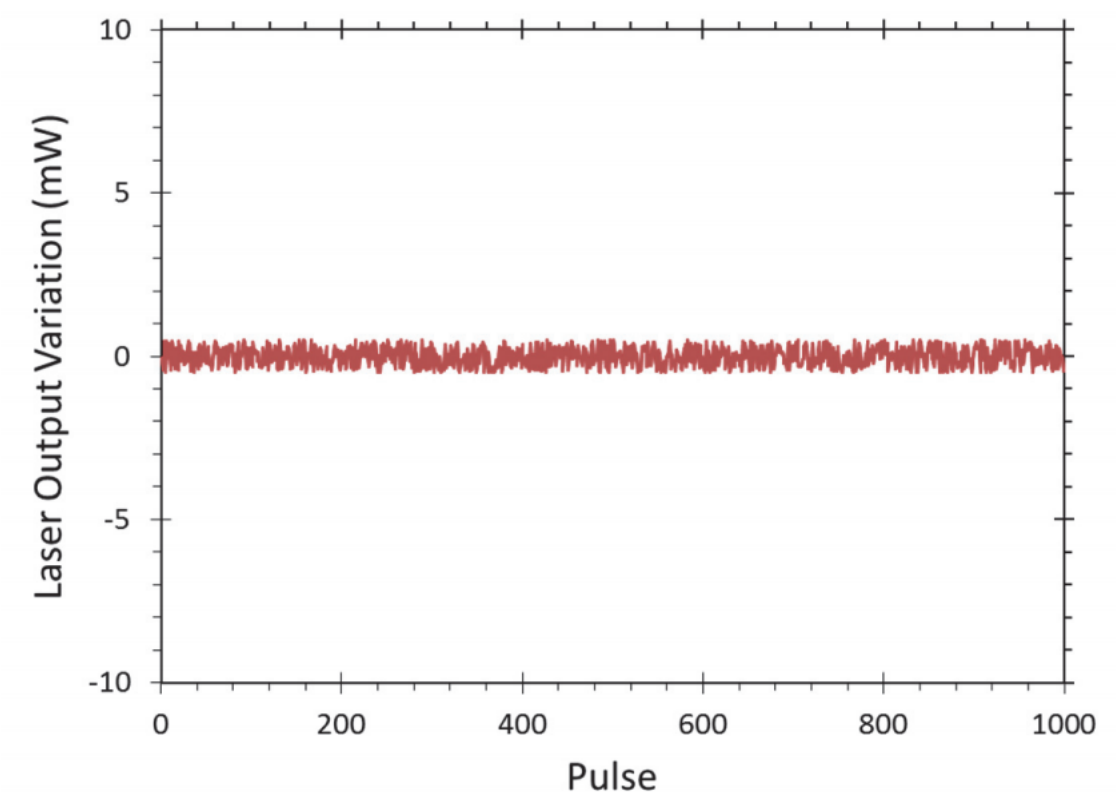
Error in Graphs

- According to William S. Cleveland that 30% of all graphs published in volume 207 of science contained errors.
- The error types he found were classified as mistakes of construction
  - [6%] Mislabels, wrong tick marks or scales and missing item
  - [6%] Poor reproduction (with some aspect of the graph missing as a result)
  - [10%] Poor discrimination (items such as symbol types and line styles could not be distinguished)
  - [15%] Poor explanation (Something on the graph is not explained, neither in the caption nor the text)

BINUS UNIVERSITY

People
Innovation
Excellence

Examples



A wasted graph

The y axis is chosen to give the impression that there is little variation in the output, but if we cannot see any variation in the data, why show the graph?

Tables

BINUS UNIVERSITY

People
Innovation
Excellence

Tables

- Tables present data directly and are preferred over graphs when the exact numerical values of the data are needed
- Still, tables often have a goal similar to that for figures: enabling comparison
- As with figures, tables should be made comprehensible on their own, without reference to the text of the paper, if possible
- Table should have a good caption, and the items presented should be clearly defined within the table
- Do not forget units and uncertainty estimates

BINUS UNIVERSITY

People
Innovation
Excellence

References

- Chris A. Mack. (2018). How to Write a Good Scientific Paper. Society of Photo-Optical Instrumentation Engineers (SPIE). ISBN: 978-1-5106-1913-5

In Class Assignment

BINUS UNIVERSITY

- List all details of your graphs and figures, discuss it with your lecturer!

People
Innovation
Excellence

Thank you