COMP 7036
Applied Research Methods in Software Development

Borna Noureddin, Ph.D.
British Columbia Institute of Technology

Measurement and Validity

Review

- Course overview
- Why do research
- What is research
- Approaches and quality
- Tips and tricks
- Starting out

Overview

- Measurement
- Validity
- Reliability
- Using statistics

Measurement

- Limiting data of any phenomenon
  - Interpretation
  - Comparison with standard
- Substantial measurements
  - Have physical substance
- Insubstantial measurements
  - Concepts and ideas
  - Opinions
  - Other intangible entities

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Measurement

Four scales of measurement

- Nominal
- Ordinal
- Interval
- Ratio

Measurement

Nominal

- Assign names to data
- Infinite number of ways
- Simplistic
- Divides data into discrete categories
- Statistical procedures = mode, percentage, chi-square test

Measurement

Ordinal

- Think in terms of symbols (>; <)
- Allows data to be rank-ordered
- Statistical procedures = median, percentile rank, Spearman's rank-order correlation

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Measurement

Interval

- Equal units of measurement
- Zero point established arbitrarily
- Rating scales, such as surveys, assumed to fall on interval scales
- Statistical procedures = means, standard deviations, Pearson product moment correlations

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Measurement

Ratio

- Equal measurement units
- Has absolute zero point
- Can express values in terms of multiples and fractional parts
- Relatively rare outside the physical sciences

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Measurement

Summary

- Nominal scale: A is different from B
- Ordinal scale: A is bigger/better/more of something than B
- Interval scale: A is so many units (degrees/inches) more than B
- Ratio scale: A is so many times as big/bright/tall/heavy as B

Validity and Reliability

Validity

- Extent to which a measurement instrument measures what it is intended to measure

Reliability

- Consistency with which a measurement instrument yields a certain result when the entity being measured has not changed.

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Summary

- Measurement
- Validity
- Reliability