Assessment Results and Research Literacy
Campus Intelligence
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NASPA/ACPA Competencies

Effectively articulate, interpret, and apply results of AER reports and studies, including professional literature.

Assess the legitimacy, trustworthiness, and/or validity of studies of various methods and methodological designs.
Learning Outcomes

ARTICULATE the main elements of QUANTITATIVE ANALYSIS

ARTICULATE the main elements of QUALITATIVE ANALYSIS

DEMONSTRATE RESEARCH LITERACY through the evaluation of a professional research article
Quantitative Analysis
Keywords Approach
(Schuh, Biddix, Dean & Kinzie, 2016)

**Describe**
Summary data: frequency, central tendency, and variability

**Differ**
Differences between 2 groups: descriptive (differences between groups) and inferential (estimate to the population from the sample)

**Relate**
Relationship between 2 or more characteristics. Correlation.

**Predict**
Regression. Use a set of independent “predictor” variables to determine how they can individually or in combination affect a dependent or “outcome” variable. (Astin, 1973 I-E-O model – input, environment, output)
Quantitative Skillset
(Schuh, et al., 2016)

• Create and manage a dataset
• Conceptualize and create effective statistical graphs, figures, and tables
• Relationship with IR office or other assessment partners
• Beginning knowledge of predict statistics
• Intermediate knowledge of differ and relate statistics
• Advanced knowledge of describe statistics
“Statistics are powerful tools in understanding students and their needs and in improving our work. Complicated, complex statistics are fortunately not necessary for student affairs assessment...However, a basic understanding of statistics is useful in articulating why a statistical method was used or not used.”

Henning & Roberts, 2016, p. 148
Statistics

Descriptive
“Mathematical techniques for organizing and summarizing data” (Gall, Gall, & Borg, 2007, p. 132)

Inferential
“A set of mathematical procedures using probabilities and information about a sample to draw conclusions about a population” (Gall, et al., p. 137)
Levels of Data

Nominal (categorical): Not more or less—just different. EX: race, ethnicity, gender

Ordinal: measured on a ranked scale—hierarchy, but distance between the ranks may not be the same. EX: Likert scale – agree-disagree

Interval: distance between each interval is the same; can apply mathematical formulas. No zero point. EX: 10 correct answers on a test are twice as many as 5 correct answers.

Ratio: same as interval, but has a zero point. EX: GPA, household income.
Descriptive Statistics: Frequencies

“What is your single most effective practice for attracting students to your events?”

<table>
<thead>
<tr>
<th>Frequency Table</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Faculty Involvement</td>
<td>110</td>
</tr>
<tr>
<td>Personal Promotion</td>
<td>35</td>
</tr>
<tr>
<td>General Student Involvement</td>
<td>77</td>
</tr>
<tr>
<td>Online Marketing</td>
<td>98</td>
</tr>
<tr>
<td>Traditional Marketing</td>
<td>128</td>
</tr>
<tr>
<td>Giveaways</td>
<td>204</td>
</tr>
<tr>
<td>Programming</td>
<td>82</td>
</tr>
</tbody>
</table>
Descriptive Statistics: Measures of Central Tendency

One number that describes an entire set of scores.

- Mean: average of a set of scores
- Median: middle number in a list of numbers
- Mode: most frequent score in the distribution
Descriptive Statistics: Variability

Describes the dispersion of the scores about the mean or other measure of central tendency.

• Range: distance between the smallest and the largest number

• Variance: statistical average of the amount of dispersion in a distribution of scores (used to compute standard deviation)

• Standard Deviation: square root of variance—a measure of the extent to which the scores are distributed around the mean
Descriptive Statistics: Correlation

Describes the relationship between variables:

- Direction: same direction = positive relationship opposing directions = negative relationship

- Magnitude:
  - Correlation coefficients range from -1.0 - +1.0—the closer to 1 or -1, the stronger the correlation
  - Correlation coefficients (regardless of direction)
    - .0 to 2.0 = weak
    - .20 to .35 = small relationship
    - .35 to .65 = moderate relationship (often have theoretical or practical value)
    - .65 and higher = large – can be used for prediction
    - .85 = strong relationship
Inferential Statistics

A set of mathematical procedures using probabilities and information about a sample to draw conclusions about a population (Gall, Gall, & Borg).
Population \((N)\)

A complete set of elements (persons or objects) that possess some common characteristic defined by the sampling criteria established by the researcher.

Sample \((n)\)

A subset of people, items, or events from a larger population that you collect and analyze to make inferences.
Confidence Interval

Also called “margin of error”

Provides a range within which the population mean is likely to occur

Confidence level calculated first—the higher the confidence level, the more likely the population mean will be within that level

Survey results: 75% +/- 4%

• 4% = confidence interval

• 75% favored the program and the percentage in the population would probably range from 71-79%
Sampling

Simple Random
Stratified Random
Cluster
Nonrandom
Systematic
Convenience
Purposive
Snowball

Sample Size & Response Rate
Statistical vs. Practical Significance

• “Statistical significance represents the probability that findings from a statistical test have not occurred by chance” (Henning & Roberts, 2016, p. 146).
  • $p$ value = probability that results occurred by chance are small
  • $p < .05$ = statistically significant

• Effect size = determine practical significance – magnitude of results
  • Cohen’s $d$ - .3 (small), .5 (moderate), .7 (large)
Parametric Tests

Make assumptions about the nature of the population (and only useful when the assumptions for the methods are met):

- t-tests
- ANOVA (Analysis of Variance)
Nonparametric Tests

Useful when sample is not random, a representative of the population, or a normal distribution.

• Mann-Whitney U test
• Chi-Square test
• Wilcoxon Signed Rank test
• Kruskal-Wallis One-Way Analysis of Variance
Quantitative Reliability

Assurance that the tools that we use to gather data and measure concepts are accurate.
Quantitative Validity

**Internal validity:** Does the instrument measure what we need it to measure? (Russ-Eft & Preskill, p. 175)

**External validity:** the extent to which results can be generalized to other situations (Russ-Eft & Preskill, p. 178)

**Multicultural validity:** “accuracy or trustworthiness of understandings and judgments, actions, and consequences across dimensions of cultural diversity” (Russ-Eft & Preskill, p. 179)
Generalizability

The extent to which the results of the study can be assumed to apply not only to the sample studied, but also to the population that the sample represents.
Qualitative Analysis
“Qualitative data analysis is the process of creating meaning, or making sense, out of the data.”

Schuh et al., 2016
Qualitative Skillset
(Schuh et al., 2016)

• Fundamental understanding of qualitative perspective
• Awareness of how identities, experiences, and biases can inform and influence data collection, analysis and interpretation
• Ability to negotiate access to sites and build rapport with participants
• Basic skills in interviewing, note-taking, and observation
• Ability to code data and identify emerging themes across multiple data sources
Qualitative Analysis: 3 Broad Tasks

(Miles & Huberman, 1994)

- Data reduction
- Data display
- Conclusion drawing
Qualitative Findings: Orientation and Assumptions

Thematic analysis:

• All pieces of qualitative data are inherently organized by larger and more abstract (and sometimes hierarchical) themes

• Breaking down a complex whole into a set of explanatory themes

Meaning discernment:

• All data exist on two different levels – what is on the surface and what might possibly exist at a deeper level
Qualitative Coding Strategies

- Inductive
- Systematic
- Reductionist
- Ongoing
Qualitative Findings: Strategies

Sorting and organizing
Reflecting and synthesizing
Narrating
General Qualitative Data Coding Steps
(Schuh, et al., 2016)

1. Optional pre-step: Develop a basic description prior to analysis
2. Select and review an initial data source
3. Identify variation and recurring regularities
4. Review a second data source, checking for congruence
5. Develop major themes and subthemes
6. Code the remaining data sources and evaluate themes (completeness, congruence, relevance, uniqueness)
7. Connect themes to objectives
Qualitative Reliability, Validity and Generalizability

**Qualitative validity** means that the researcher checks for the accuracy of the findings by employing certain procedures.

**Qualitative reliability** indicates that the researcher’s approach is consistent across different researchers and different projects.

Various terminology: trustworthiness, authenticity, and credibility
Qualitative Credibility

Trustworthiness of data through the following attributes:

• Prolonged engagement
• Persistent observations
• Triangulation
• Peer debriefing
• Member checks
Transferability

Generalization to other situations and contexts
Research Literacy: Professional Literature
“In a recent meta-analysis, Herdlein, Riefler, and Mrowka (2013) found assessment evaluation and research skills as among the most important and highly desired competencies for practitioners; however, in a large-scale variation study, Sriram (2014) showed research values, skills, and behaviors were among the lowest self-rated competencies in student affairs.”

Schuh, et al., 2016
Research Literacy Entails Knowing

- Basic principles of qualitative and quantitative research
- How research articles are put together
- How to read research articles at increasingly complex levels
- How to evaluate the quality of research
Research Articles: Basic Format

Title

Names and Institutional homes of researchers

Abstract

Introduction

Methods (or Procedures)

Results (or Findings)

Discussion (or Conclusions)

References
The Abstract

Provides an overview of the article
Addresses how and why the research was done
Summarizes key findings

May also:

• Describe research participants and setting
• State the purpose of the research
• Specify the types of analysis used
• Summarize key conclusions
Abstract Example: Coded

[PURPOSE] The purpose of this study was to examine [PROBLEM] whether online tutoring programs improve standardized math scores for first year students. [PARTICIPANTS] 210 students were recruited from a large midwestern university. [DESIGN] Students were randomly assigned to an online tutoring group, a traditional tutoring group, or a control group. [ANALYSIS] A repeated measures ANOVA was used to test for pre-and post-test findings. [RESULTS] Results show that both tutoring groups did better on the standardized tests than the control groups, but there were no differences between the tutoring conditions. [CONCLUSIONS] These results suggest that online tutoring is at least as effective as face-to-face tutoring.
Research Purpose

Not always clearly identified

Four main types:

• Exploration: where things are new or poorly understood
• Extension: studies built on other studies
• Expansion: extend the work into new or complex areas
• Correction: earlier research is wrong; set the record straight
Research Rationale

Answers the question: “so what?”

Five main types

• Crisis: something needs to change or we’re in trouble
• Importance: cooler and more analytic
• Gap-Filling: topic already considered important—increase knowledge
• Depth: dive deeper into existing knowledge (often qualitative)
• Commitment: explores area of inequity (often qualitative participatory action research)
Research Questions

Generally clearly stated:
In this study, the following research question will be addressed: Does increasing study time for weekly math quizzes for first year students increase the number of correct answers on those quizzes?

Sometimes, less clearly stated:
First year students are often disorganized and inefficient in their use of study time. If they were taught more efficient ways to use that time, would it increase their test scores?
Understanding Methods and Procedures

Who: sampling—and the type

What: instrumentation and data gathering

How: design and analysis

When: includes special considerations such as longitudinal, pre-post test

Where: setting or location
Understanding Findings

• Ideally, these are tied directly to the research questions
• Presentation will differ based on whether quantitative, qualitative or mixed methods
• Presentation of results: tables, graphs, charts, narrative
Understanding Discussion and Conclusions

• Not enough to just present the results—take a further step to tell us what they mean
• Contextualize
• Four major issues:
  • What happened?
  • What was not expected?
  • What do these results mean?
  • Where do we go from here?
Resources
References


Thank You!

Questions?