BAKER COLLEGE
STUDENT LEARNING OUTCOMES

BUS8310 Quantitative Research Methods II
3 Semester Credit Hours

Student Learning Outcomes and Enabling Objectives

1. Differentiate among the various approaches to conducting quantitative research studies.
   a. Distinguish between experimental versus nonexperimental research.
   b. Contrast the specific designs for descriptive research, survey research, correlational research, and causal-comparative research and the strengths and limitations of each.
   c. Describe the difference between random selection and random assignment.
   d. Identify the importance of randomization, control of nuisance variables, and causality in quantitative research studies.
   e. Identify the threats to internal and external validity.
   f. Compare the different sampling methods.
   g. Differentiate among assumptions, delimitations, and limitations for a study.
2. Describe basic measurement principles necessary to construct reliable and valid instruments using Classical Test theory.
   a. Identify and determine among the four different levels of measurement.
   b. Describe the common sources of measurement error.
   c. Explain the differences between reliability and validity.
   d. Estimate the reliability of an instrument using Cronbach Alpha.
   e. Analyze the differences between Content, Empirical, and Construct Validity.
   f. Discuss how to assess validity in a research study.
   g. Explain how to conduct a pilot test for a new or revised instrument in a quantitative research study.
   h. Develop the research problem, research hypotheses, and questions from a given business research scenario.
   i. Differentiate among the 3 different components of a research question.
   j. Contrast the differences among the research problem, hypothesis, and question.

3. Assess a One-Way ANOVA between-subjects design within the context of a business research scenario using a statistical software program.
    a. Compose the null and alternative hypotheses in symbols and words.
    b. Construct how to interpret the sources of variability (SV), variance estimates (MS), and the F-Ratio in the One-Way ANOVA summary table.
    c. Construct the tenacity of the assumptions and decide how to proceed if assumptions are violated.
    d. Determine the appropriate sample size using tables and/or statistical software.
    e. Interpret the appropriate effect size statistics.
    f. Develop how to conduct planned and post hoc contrasts.
    g. Interpret confidence intervals.
4. Explain a Two-Way ANOVA between-subjects design (without an Interaction term) within the context of a business research scenario using a statistical software program.
    a. Compose the null and alternative hypotheses in symbols and words.
    b. Construct how to interpret the sources of variability (SV), variance estimates (MS), and the F-Ratio in the Two-Way ANOVA summary tables.
    c. Explain the tenacity of the assumptions and decide how to proceed if assumptions are violated.
    d. Determine the appropriate sample size using tables and/or statistical software.
    e. Interpret the appropriate effect size statistics.
    f. Explain how to conduct planned and post hoc contrasts.
    g. Generate confidence intervals.
5. Assess a Two-Way ANOVA between-subjects design (with an Interaction term) within the context of a business research scenario using a statistical software program.
    a. Develop the null and alternative hypotheses in symbols and words.
    b. Demonstrate how to interpret the sources of variability (SV), variance estimates (MS), and the F-Ratio in the Two-Way ANOVA summary tables.
    c. Explain the tenacity of the assumptions and decide how to proceed if assumptions are violated.
    d. Determine the appropriate sample size using tables and/or statistical software.
    e. Interpret the appropriate effect size statistics.
    f. Describe how to conduct planned and post hoc contrasts.
    g. Interpret confidence intervals.
    h. Investigate the nature of an interaction using simple effects.
6. Defend the relationship between two quantitative variables using a Simple Linear Regression (SLR) analysis within the context of a business research scenario using a statistical software program.
    a. Determine the appropriate sample size using tables and/or statistical software.
    b. Describe the relationship between the correlation and slope in the estimated least-squares regression line.

c. Generate the estimated least-squares regression line and use it for prediction purposes.

d. Estimate the intercept, slope, and confidence interval for the estimated regression line.

e. Interpret confidence intervals for the slope.

f. Explain the ANOVA summary table and the sources of variability (SV), variance estimates (MS), and the F-Ratio in the context of regression analysis.

g. Describe how to interpret effect size statistics in the context of SLR.

h. Evaluate the tenacity of the assumptions and decide how to proceed if assumptions are violated.

7. Discriminate how to conduct a Multiple Linear Regression (MLR) analysis (without an Interaction term) to compare models within the context of a business research scenario using a statistical software program.

a. Determine the appropriate sample size using tables and/or statistical software.

b. Interpret the partial regression coefficients for the estimated multiple regression line.

c. Assess multicollinearity using diagnostic statistics and determine how to proceed when conditions are violated.

d. Explain confidence intervals for the partial regression coefficients.

e. Explain the ANOVA summary table and the sources of variability (SV), variance estimates (MS), and the F-Ratio in the context of MLR.

f. Describe how to interpret effect size statistics in the context of MLR.

g. Apply the methods of MLR with qualitative independent variables.

h. Explain the methods of variable selection and their pitfalls.

i. Describe the methods of hierarchical linear regression when comparing regression models.

8. Defend how to conduct a Multiple Linear Regression (MLR) analysis (with an Interaction term) within the context of a business research scenario using a statistical software program.

a. Determine the appropriate sample size using tables and/or statistical software.

b. Intepret the partial regression coefficients for the estimated multiple regression line.

c. Assess multicollinearity using diagnostic statistics and determine how to proceed when conditions are violated.

d. Evaluate confidence intervals for the partial regression coefficients.

e. Describe the ANOVA summary table and the sources of variability (SV), variance estimates (MS), and the F-Ratio in the context of MLR.

f. Explain how to interpret effect size statistics in the context of MLR.

g. Investigate an interaction in the context of MLR using Simple Slopes Analysis.

h. Apply the methods of MLR with qualitative independent variables.

i. Describe the methods of variable selection and their pitfalls.

j. Describe the methods of hierarchical linear regression when comparing regression models.

Big Ideas and Essential Questions

Big Ideas
- Quantitative Research Methods
- Classical Test Theory
- One and two-way ANOVA testing
- Multiple Regression testing

Essential Questions
1. How do you utilize quantitative research methodology for analysis?
2. What are the key aspects of Classical Test Theory?
3. How does one and two-way ANOVA testing support a quantitative research hypothesis?
4. How do multiple regression techniques justify a research hypothesis?

These SLOs are not approved for experiential credit.

Effective: Fall 2023