Contents

Pre	face	<i>Page</i> vii
1.	Introduction	1
2.	The Scientific Process and its Application in Educational Research The scientific process; variables and constructs; theory; scientific logic.	3
3.	Getting Started and Getting Finished	15
	Writing; bibliographies; research literature, prior reading.	
4.	Hypotheses	20
	Research, operational and statistical hypotheses; the null hypothesis; magnitudes, differences and relationships.	
5.	Designing the Experiment	26
	Meaning of design; general observations; sources and control of variance; analysis as an element in design; scores, categories and ranks; internal and external validity; examples of good and poor designs.	
6.	Sampling	56
	Census and survey; population and sample; unit of sampling; simple random sample; stratified random sample; multi-stage random sample; estimation; Type I and Type II errors; the matched sample; extreme group selection.	
7.	The Measurement Process	67
	Quantitative and qualitative measures; binary form; nominal, ordinal, interval and ratio scales; reliability; test-retest, parallel forms, split-half, Kuder-Richardson and Analysis of Variance approaches; validity; content, concurrent/predictive, construct and Analysis of Variance approaches; known groups.	
8.	Data Collection—Response Styles	83
	Response bias; open-ended, two-point, multiple-response, multi- point styles and scales; rankings; differential weighting; forced- choice scales; paired-comparisons.	•

x	Design and Analysis in Educational Research	
9.	Data Collection—Coding 80-column punched card; building in the coding.	94
10.	Data Collection—Observation Schedule design; event-sampling and time-sampling.	98
11.	Data Collection—The Interview Unstructured, semi-structured and structured interviews. Number of interviews.	103
12.	Data Collection—The Questionnaire Content; wording; question order; response style; format; presentation; use of material.	106
13.	Data Collection—Objective Tests Sources of information; item difficulty and discrimination; analysis of distractors; standardization; standard error of obtained scores.	109
14.	Data Collection—Attitude Measurement Stereotypes; social distance (Bogardus); Likert, Thurstone and Chave, Guttman techniques; other techniques; sources of in- formation on Attitude Scales.	117
15.	Data Collection—Sociometric Measures Choice and rejection; sociograms, sociometric indices; matrix analysis; sampling problems.	128
16.	Data Collection—Procedures Associated with Factor Analysis Different factor analytic possibilities; persons, tests and occasions; Q-methodology.	134
17.	Data Collection—Grid Methods Semantic differential; Repertory Grid.	141
18.	Methods of Data Analysis General introduction.	150
19.	The Tabulation of Data The master sheet and the 80-column card.	153
20.	Summarizing the Data The mean; diagrams and graphs; frequency distribution; standard deviation and variance; correlation; rank correlation;	156
21.	Statistical Hypothesis Testing	167

Hypothesis testing by analysis of variance; by calculation of correlation; standard error of r; comparison of rs; limitations of

significance.

~	
Contents	X1
Contents	- vi

22.	Drawing Statistical Inferences	177
	Statistic and parameter; confidence interval for a mean; for a correlation coefficient.	
23.	The normal Curve of Distribution and some of its Implications The normal curve; the area/number of subjects relationship; the range of scores in standard deviation units; unit normal curve; areas and numbers beyond specific points; the unit curve and probability; Geary's test of normality.	181
24.	The Transformation of Scores The need for transformations; sigma scores; standard scores; normalized scores; percentiles and percentile ranks.	196
25.	A Further Consideration of Statistical Hypothesis Testing	205
	Information and error; the sampling distribution; standard error of the mean; application to hypothesis testing; differences of means.	
26.	Analysis of Variance—Basic Theorem	214
	Partitioning of sums of squares and degrees of freedom; their additive nature; the F-ratio.	
27.	The One-Way Analysis of Variance	221
	A simple example; a repeated measures example; analysis of variance of gains; serial effects.	
28.	The Two-Way Analysis of Variance	229
	A simple example; interaction; separating the error and the interaction variances; random, fixed and mixed effects models; repeated measures.	
29.	The Follow-up to a Significant F	240
	Planned and post-hoc comparisons; independent comparisons; partitioning sums of squares for planned comparisons; Scheffé procedure for post-hoc comparisons; the significance of significance; reduction of uncertainty.	
30.	Further Consideration of Correlation	253
	Some bivariate distributions; correlation as prediction; regression towards the mean; common variance; multiple prediction and correlation; correlation from intact sub-groups; restriction of the range; partial correlation.	
31.	Measures of Correlation for Particular Circumstances	265
	Various correlation measures; chi-squared as a measure of goodness of fit; Pascal's triangle; chi-squared as a measure of relationship; the follow up to chi-squared via lambda (λ) .	

kii	Design and Analysis in Educational Research	
32.	Factor Analysis	274
	Factor loadings; factor identification; relative size of factors; communality; the procedure in outline; unrotated solution; rotated solution; two factor analysis models; the communality problem.	
33.	Multiple Regression	290
	Multiple regression as a prediction technique; multiple correlation an alternative to analysis of variance.	.;
34.	Drawing Conclusions and Writing the Report	302
	Elements in conclusion drawing; the report as a logical exercise and as a story; the line of the plot; bibliography and appendices; the mechanics of writing; diagrams and tables.	
35.	Conclusion	313
	Bibliography	314
	Appendix I	323
	Some Preliminary Mathematical Skills	
	Appendix II	332
	Table 1 Ordinates and Areas of the Normal Curve	

340

Table 2 Values of t

Table 6 Table of F

Index

Table 5 Conversion of r to z

Table 3 Values of χ^2 Table 4 Significant correlation coefficients