

M Ed Two Year Programme

R.2.1: Quantitative Methods in Educational Research

Maximum Marks: 100

This course is the second in a series of two compulsory courses in research approaches and methods.

Course Objectives

The aim of this course is to focus on the foundations of positivist research approach and method in the light of the paradigms and processes of educational research engaged with in the first course on 'Approaches to Research in Education'. At the end of the course, students will be able to:

- Develop an understanding of the philosophical and epistemological basis of educational research as derived from positivist traditions.
- Identify the several components of research approaches that characterise quantitative research methods and the basis of choosing this form of research.
- Identify areas of enquiry and derive relevant questions for undertaking quantitative educational research.
- Identify and select appropriate theoretical and conceptual basis for undertaking a research problem.
- Design a study to address a research problem, including methods of data collection and analysis.
- Identify and analyse ethical issues present in a quantitative research study.
- Develop tools for critiquing components of a research study: the purpose, the problem, research questions or hypotheses, methods of conducting research and analysis.
- Engage with basic concepts necessary for understanding descriptive and inferential (parametric) statistics, including the assumptions behind parametric and non-parametric statistics
- Develop an understanding of techniques of data analysis in order to derive meaning from quantitative research studies and for conducting quantitative research
- Learn to apply statistical techniques to a body of data in an appropriate manner and interpret quantitative data subject to statistical analysis
- Review the statistical techniques used to analyse data in published researches

Units of Study

Unit 1: Quantitative Research: The foundations of quantitative research in education; Positivist and post-positivist paradigms; the research problem, the research question, theoretical frames and basis and review of empirical studies.

Unit 2: Experimental Research Design: hypothesis, variables that influence research and that are the object of study; sampling; measurement, testing, and observation; causation, validity, and experimentation; types of experimental approaches – inductive and deductive approaches, true experiment and quasi-experimental designs and their appropriateness for research problems in education; ex-post-facto research, co-relational studies, evaluation and impact studies.

Unit 3: Data Sources and Tools of Data Collection: sources of large sets of data, such as census data, school-based data (eg. DISE) and survey data; critical understanding of tools for collecting quantitative data: questionnaires, structured interview and observation schedules, Test instruments; examining the appropriateness of tool/(s) for the research purpose; concerns in data collection, analysis and interpretation; ethics in educational research.

Unit 4: Inferential and Descriptive Statistics: Hypothesis testing and sampling distributions; assumptions behind the model of descriptive and inferential statistics and their application in educational research; frequency distribution tables and graphs, measures of central tendency: mean, median, and mode, measures of variability: range, variance, and standard deviation, z-scores and the normal curve.

Unit 5: Measures of Inferential Statistics: Correlation and other measures of association; Regression analysis; Standard errors of measurement - Type I and II errors; t tests and the critical ratio; One-way Analysis of Variance (ANOVA) and Analysis of Co-variance (ANCOVA) and their applications.

Unit 6: Nonparametric Statistics: Assumptions behind models of non-parametric measures; appropriateness in terms of data types such as ratings, rankings and scores based on categorised data; Mann-Whitney and Chi-square tests and their applications; visual representation of continuous and discontinuous data: histograms, bar diagrams, pie-charts, line graphs.