



AIU-DEI-AADC



**Report on Short-Term Capacity Building Programme
on Statistical Analysis: Theory and Practice
(Applications of SPSS and R Software in Research)**

November 28, 2023 to December 05, 2023

Executive Summary

The Association of Indian Universities-Dayalbagh Educational Institute-Academic and Administrative Development Center (AIU-DEI-AADC) organized a Short-Term Capacity Building Programme on *Statistical Analysis: Theory and Practice (Applications of SPSS and R-Software in research)*.

Data Analysis transforms raw data into valuable knowledge, enabling better decision-making, efficiency, and progress across a wide spectrum of endeavours. Data analysis through SPSS and R software is essential for informed decision-making. It empowers researchers, businesses, and organisations to extract valuable insights from complex data, uncover patterns, and make data-driven choices. These tools enable advanced statistical analysis, predictive modelling, and data visualisation, ensuring better strategies and outcomes. Therefore, the programme was organized to support students, research scholars and faculty members to gain meaningful insights from raw data to support decision-making, identify patterns, detect anomalies, and extract valuable information. Fifty-four participants from different Institutes/Universities attended the programme in blended mode. The overall course content was divided into 16 modules and each day into two sessions. The programme received an overwhelming response.

Resource Persons

Prof. Vineeta Singh

Professor, Department of Statistics, Institute of Social Sciences
Director, Institute of Fine Arts,
Dr. B. R. Ambedkar University, Agra, Uttar Pradesh



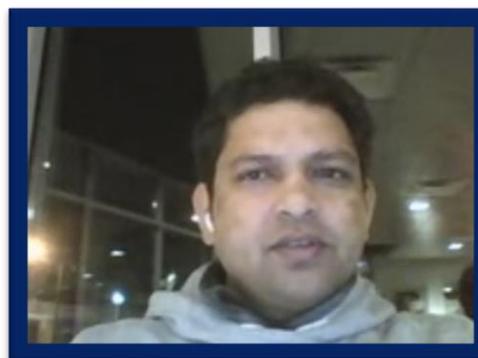
Prof. Diwakar Khare

Former Director
Former Head, Department of Statistics, Institute of Social Sciences
Dr.B.R. Ambedkar University, Agra, Uttar Pradesh



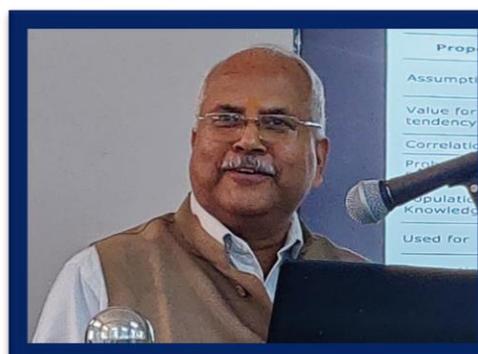
Dr. Manoj Kumar

Post Doctoral Associate (Data Science, Biostatistics, Health Economics)
McGowan Institute for Regenerative Medicine
University of Pittsburgh, Pittsburgh
Pennsylvania, USA



Prof. V.K. Gangal

Head, Department of Applied Business Economics,
Dean, Faculty of Commerce,
Dayalbagh Educational Institute (Deemed to be University)



Prof. S. P. Saxena

Professor, Department of Applied Business
Economics, Faculty of Commerce,
Dayalbagh Educational Institute (Deemed to be
University)



Dr. Saurabh Mani

Associate Professor, Department of Applied
Business Economics, Faculty of Commerce,
Dayalbagh Educational Institute (Deemed to be
University)



Dr. Aparna Satsangi

Assistant Professor, Department of Chemistry,
Faculty of Science,
Dayalbagh Educational Institute (Deemed to be
University)



Programme Schedule

| Time► Date▼ | 10:00am-12:00pm | 12:00pm- 12:15pm | 12:15pm-2:15pm |
|---------------------------------|--|--------------------------------------|--|
| Day 1 (November 28, 2023) | Inaugural Function (10:30 am-11:00 am) | <i>Tea Break</i> (11:00-11:15 am) | |
| | Session 1 Introduction to Statistics <i>Prof. Diwakar Khare</i> | | Session 2 Sampling and Hypothesis Testing <i>Prof. Diwakar Khare</i> |
| Day 2 (November 29, 2023) | Session 3 t-test, F-Test and ANOVA <i>Dr. Saurabh Mani</i> | <i>Tea Break</i> | Session 4 Non- Parametric Tests <i>Prof. VK Gangal & Prof. SP Saxena</i> |
| Day 3 (November 30, 2023) | Session 5 Data Management and Introduction of SPSS <i>Prof. Vineeta Singh</i> | | Session 6 Descriptive Analysis using SPSS <i>Prof. Vineeta Singh</i> |
| Day 4 (December 01, 2023) | Session 7 Correlation and Regression Analysis: using SPSS <i>Prof. Vineeta Singh</i> | | Session 8 Testing of Hypothesis using SPSS <i>Prof. Vineeta Singh</i> |
| Day 5 (December 2, 2023) | Session 9 Discriminant Analysis and its application using SPSS <i>Dr. Manoj Kumar</i> | | Session 10 R Fundamentals <i>Dr. Manoj Kumar</i> |
| Day 6 (December 3, 2023) | Session 11 Descriptive Statistics using R software <i>Dr. Manoj Kumar</i> | | Session 12 Correlation and Regression using R software <i>Dr. Manoj Kumar</i> |
| Day 7 (December 4, 2023) | Session 13 Parametric Tests and its application using SPSS <i>Prof. Vineeta Singh</i> | | Session 14 Nonparametric Test and its application using SPSS <i>Prof. Vineeta Singh</i> |
| Day 8 (December 5, 2023) | Session 15 Factor Analysis and its application using SPSS <i>Dr. Aparna Satsangi</i> | | Session 16 Cluster Analysis and its application using SPSS <i>Dr. Aparna Satsangi</i> |

Inaugural Ceremony

The inaugural function started with the Institute's prayer. Prof. Poornima Jain, the convener of the programme, welcomed the guests and participants. She has also introduced the programme and mentioned the objectives of the programme. She encouraged participants to make the best use of the programme.



The Chief Guest of the inaugural function was Dr V. M. Katoch, former Director-General, of ICMR and the chair, of the National Academy of Sciences, India (NASI). He highlighted the



significance of data analysis and statistical software in research. The Director of the Dayalbagh Educational Institute (Deemed to be University), Prof. C. Patvardhan, expounded on the implications of data in research and stressed

the necessity for extreme caution when analyzing data. Dr Amrendra Pani, Joint Director and Head, of the Research Division, Association of Indian Universities focused on the importance of AADC and the effectiveness of data analysis in research through technology.

Prof. Anand Mohan, Registrar of the Dayalbagh Educational Institute (Deemed to be University) also graced the occasion with his presence. Prof. Jyoti Gogia, Nodal Officer,



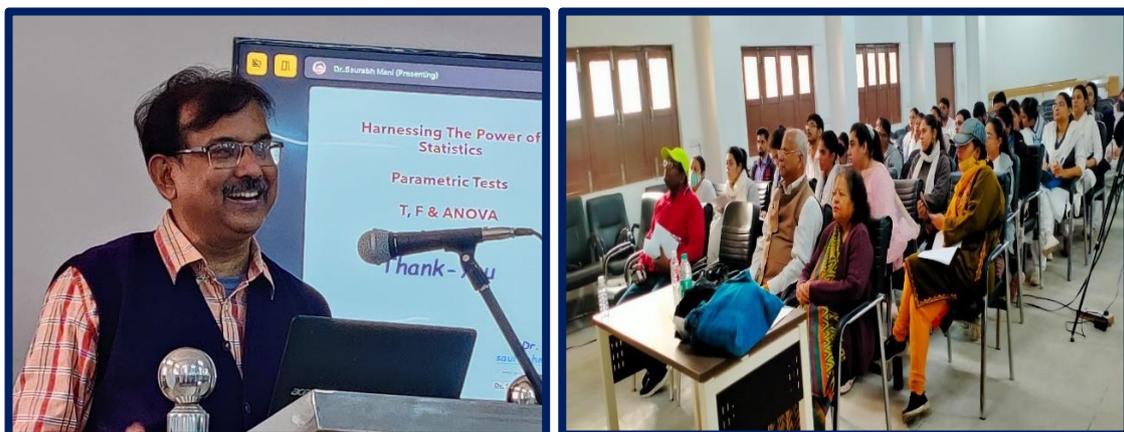
of the AIU-DEI-AADC, extended the vote of thanks. The Inaugural Function ended with the Institute's Song and the National Anthem.

Programme Sessions

Prof. Diwakar Khare explained basic statistical analysis. He discussed planning, collecting, analyzing, and drawing meaningful inferences from data. He emphasized that for valid conclusions careful planning is essential in research. He highlighted how to organize and summarize data using descriptive statistics and various ways of tabulation and graphical representation of data.

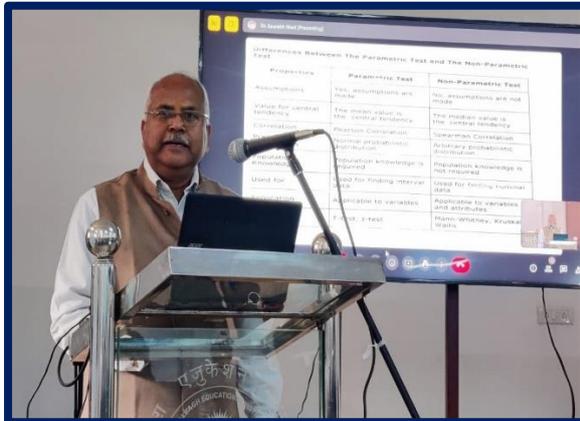


He explained how to specify the hypothesis and make decisions regarding research design and specifically sampling framework. He further explained the use of inferential statistics to test the hypothesis to draw meaningful results.



Dr. Saurabh Mani talked about the significance of hypothesis testing which depends upon how accurately the investigator wants to determine the prevalence. He highlighted the difference

between the parametric and non-parametric tests. He explained in detail various parametric tests viz. t-test, z-test and f-test for hypothesis testing.



Prof. V.K. Gangal and Prof. S. P. Saxena highlighted the significance of qualitative data in research and the use of non-parametric tests for testing the hypothesis. Run tests, one sample and two sample sign tests, Mann-Whitney U Test, Wilcoxon Signed Rank Test, and the Kruskal-Wallis Test were the major tests highlighted.



Practical sessions started from day three. All the participants were provided with a web link to download the SPSS (Statistical Package for the Social Sciences) software. This helped the participants to have a hands-on experience with the software. Prof. Vineeta Singh has introduced the software SPSS and explained data management viz. preparing, entering, and importing data in SPSS. Further, she explained the graphical representation of the data through software. She built a comprehensive understanding of data management techniques, including data cleaning, organizing, and analysing descriptive statistics. She has also focused on how to

interpret the output provided by the software. She successfully provided foundational knowledge and practical skills essential for effective data handling and drawing inferences using SPSS. Prof. Vineeta Singh gave in-depth knowledge and hands-on experience of the parametric and non-parametric tests using SPSS.



An intensive discussion on the use of correlation and regression has been done. She covered correlation and regression analysis, testing of hypothesis, and univariate and bivariate data analysis. She trained the participants so that Hands-on experience through practical exercises could enhance participants' confidence in SPSS software for statistical analysis.



Dr Manoj Kumar has taken online sessions. In the beginning, he talked about discriminant analysis, unstandardized discriminant function, and classification of cases using discriminant function. Further, he introduced R software to participants. Participants gained foundational functionalities of R software and R studio. He covered frequency distribution, descriptive

statistics, and diagrammatic representation of data. He also highlighted correlation and regression. He made the distinction between SPSS and R software and R Studio and provided hands-on experience with R software to the participants.



Dr. Aparna Satsangi talked about factor analysis its uses and conditions. She explained factor loading, computation of eigenvalues, and total variance accounted by extracted factors. Further, she elaborated on cluster analysis and statistics associated with cluster analysis. Key concepts and process of cluster analysis, hierarchical methods, and non-hierarchical methods of cluster analysis. She discussed the applications of factor analysis and cluster analysis and provided hands-on experience with them using SPSS.



Finally, in the concluding session, the programme report was presented by the convener Prof. Poornima Jain. All of the participants were given the chance to freely express their opinions about the program, and some of them stressed how important it was to them.



Additionally, a gesture of gratitude was extended to the administration of the Institute, the AIU team, resource persons, participants, and the organizing team, which included students, faculty members, technical staff, and other staff members who collaborated to plan the event. Certificates were given to each participant and the members of the organizing committee by Prof. Poornima Jain. The programme ended with the Institute's song and the National Anthem.

DEI Advisors

Prof. C. Patvardhan, Director, DEI
Mrs. Sneh Bijlani, Treasurer, DEI
Prof. Anand Mohan, Registrar, DEI

AIU Advisors

Dr. Pankaj Mittal, Secretary General, AIU
Dr. Amrendra Pani, Joint Director & Head, Research Division, AIU

Workshop Convener

Prof. Poornima Jain
Professor Emeritus,
Department of Sociology and Political Science, DEI

Organising Committee

Dr. Preet Kumari, Department of Psychology, DEI
Dr. Birpal Singh Thenua, Department of Sociology and Political Science, DEI
Dr. Ishwar Swarup Sahai, Department of Sociology and Political Science, DEI
Dr. Rachana Yadav, Department of Sociology and Political Science, DEI
Dr. Surat Priya Sethi, Department of Psychology, DEI

AIU-DEI-AADC Nodal Officer

Prof. Jyoti Gogia
Department of Economics, DEI

