



Practical Approaches to Measurements, Sampling Techniques and Data Analysis

Felix Kutsanedzie
Sylvester Achio
Edmund Ameko

Practical Approaches to Measurements, Sampling Techniques and Data Analysis

Felix Kutsanedzie

Sylvester Achio

Edmund Ameko

Published by
Science Publishing Group
548 Fashion Avenue
New York, NY 10018, U.S.A.
<http://www.sciencepublishinggroup.com>

ISBN: 978-1-940366-58-6



© Felix Kutsanedzie 2016.

© Sylvester Achio 2016.

© Edmund Ameko 2016.

The book is published with open access by Science Publishing Group and distributed under the terms of the Creative Commons Attribution 3.0 Unported License (<http://creativecommons.org/licenses/by/3.0/>) which permits any use, distribution, and reproduction in any medium, provided that the original author(s) and source are properly credited.

Dedication

This book is dedicated to parents, relatives and all well wishers of the authors.

Preface

Measurements, sampling and data analysis remain very crucial if not the fulcrum of research activities. There is not a research study for which measurement and analysis is not done. For every research study undertaken, the researcher must have a concept for which he or she needs to find a way of measuring. However concepts are vague ideas and thus must be reduced to variables for them to be measured. It is thus only variables that can be measured for data to be collected as empirical evidence to support a research study being conducted.

Many novices find it difficult about how to reduce their concepts to variables to enable their measurability. This book contains several chapters on plethora of issues very vital to research that have being arranged in a systematic and logical way to aid the understanding of its readers. As if that is not enough, it provides hypothetical data and presents practical approaches for analyzing it with the appropriate statistical tools.

It contains chapters that explain how concepts can be reduced to variables and also help identify the levels of measurement each variable being studied in a research falls into. This is to help readers understand and use data analysis software applications that allow users to identify the levels of measurements of data to be analysed such as SPSS.

Sampling and sampling techniques in research is explained with a practical touch to enable the readers know where and when appropriately to use them to achieve the objectives for a research study. There are varied data collection methods and data collection instruments used in research. These methods and instruments are to be chosen based on the study being undertaken. The book gives a detailed explanation on how to choose the appropriate instrument for a particular study.

The book gives a detailed coverage to topics such as data analysis and tests; transformation of data from that which is not normal distributed to that which is normally distributed; tabular and graphical data summarizing tools; and the researcher's use of descriptive and inferential statistics for data analysis.

It is a complete book with several book chapters vital to understanding research through measurements, sampling and its techniques, data transformation and data analysis in a practical and comprehensive way. The book is intended to equipped lecturers, researchers, tertiary students and all those interested in conducting research studies. It would be of immense help to final year tertiary students conducting their research studies; and writing their research reports.

It is written in a way that can provide self-tutorials to readers and also spare them the ordeal of learning or equipping themselves with the requisite research skills through searching of different books.

The authors of the book acknowledge the support of every individual for their diverse roles played in getting the book published. We are indeed indebt to the Science Publishing Group for quality of their services and their unremittd efforts and drive towards achieving excellence and success.

Contents

Dedication.....	III
Preface	V
Chapter 1 Data Collection Methods and Instrumentation	1
1.1 Data Collection Methods	4
1.1.1 Observation Method	4
1.1.2 Survey Method	5
1.2 Contact Method	6
1.3 Experimental Method	8
1.4 Data Collection Instruments	8
1.4.1 Questionnaire.....	8
1.4.2 Opinionnaire	13
1.4.3 Observation.....	14
1.4.4 Interview.....	14
Chapter 2 Determination of Appropriate Sample Size for a Research.....	17
2.1 Introduction	20
2.2 Determination of Sample Size	21
2.3 Determination of Sample Size with Levels of Significance.....	26
Chapter 3 Graphical and Tabular Statistical Data Summarizing Tools	29
3.1 Concepts	32
3.2 Constructs.....	32
3.3 Measurement and Variables	32
3.4 Levels of Measurement	34
3.5 Problems Associated with Data Collected	36
3.6 Measure of Reliability of Collected Data.....	37

3.7 Tools for Summarizing Data Collected	38
3.8 Tabular Method	39
3.9 Relative Frequency Distribution.....	40
3.10 Qualitative Data.....	41
3.11 Graphical Tools	46
3.11.1 Stem and Leaf Display	46
3.11.2 Dot Plot.....	46
3.11.3 Histogram	47
3.11.4 Ogive	48
3.11.5 Scatter Diagram	49
3.11.6 Box and Whisker	50
Chapter 4 Sampling and Sampling Techniques.....	55
4.1 Introduction	58
4.2 Definition of Sampling, Sampling Techniques, Samples and Population	58
4.3 Sampling Techniques	59
4.4 Probability Sampling Techniques.....	59
4.5 Non Probability Sampling Techniques.....	65
Chapter 5 Use of Random Number Table for Sample Selection.....	69
5.1 Introduction	72
5.2 Random Numbers Generation with Population Sizes	77
5.3 Assigning of Random Numbers to Subjects or Objects within a Population	78
Chapter 6 Research Errors Encountered in Data Handling	83
6.1 Introduction	86
6.2 Types of Scores	86
6.3 Types of Estimations	88
Chapter 7 Handling Research Data with Descriptive Statistics.....	93
7.1 Introduction	96

7.2 Measures of Central Tendency or Location.....	97
7.3 Measures of Variation or Dispersion.....	105
7.4 Measures of Position	115
7.5 Distribution of Shapes	120
Chapter 8 Handling Research Data with Inferential Statistics	127
8.1 Introduction	130
8.2 T-test.....	130
Chapter 9 Transformation of Data	179
9.1 Introduction	182
9.2 Testing the Data Normality	183
9.3 Transformation of Data	194

