

Document Information

Analyzed document	Communication Research Methodology.pdf (D165969143)
Submitted	2023-05-05 10:22:00
Submitted by	Mumtaz B
Submitter email	mumtaz@code.dbuniversity.ac.in
Similarity	6%
Analysis address	mumtaz.dbuni@analysis.arkund.com

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Communication Research Methodology

Unit 1 – Introduction to Communication Research Structure 1.0 Introduction 1.1 Unit Objectives 1.2 Introduction to Communication Research 1.2.1 Meaning 1.2.2 Nature 1.2.3 Objectives and Significance 1.2.4 Scope 1.2.5 Types of research 1.2.6 Characteristics of good research 1.3 Steps in the Research Process 1.3.1 Formulation of Research Problem 1.3.2 Literature Review 1.3.3 Formulating Hypothesis 1.3.4 Research Design 1.3.5 Collection of data 1.3.6 Data Analysis 1.3.7 Verification And Testing Of Hypothesis 1.3.8 Interpretation & Report Writing 1.4 Summary 1.5 Key Terms 1.6 Check your progress 1.0 Introduction This unit shall introduce you to the research methodology in communication research. The coming sections include topics that would help you to build a strong knowledge on the process and methodologies adopted and used in communication research. The process of Media Research includes collecting data for the research, analyzing the data in terms of media usage, or analyzing information concerning which form of medium is used by consumers for which type of content. 1.1 Unit

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Objectives After reading this unit students will be able to: - Understand the meaning of communication research - Understand the steps involved in the process of research -

Understand the characteristic of good research 1.2 Introduction to Communication Research The role of technology in our day to day lives is such that we wake up with it and sleep with it too. The first thing most people do after waking up is checking their phones for emails, WhatsApp messages, alerts, etc. In the fast life, technology has surrounded everyone in every walk of life. Screens, screens, and screens, we are surrounded by screens everywhere so much that from news to entertainment, reading books, etc. everything that we are doing in our daily lives is connected to technology. There is a gush of information that is shared with people through varied mediums, such as cell phones, radio, television, newspaper, movies, advertisements, etc. With so many mediums available at times it is confusing for people to choose which medium, how do we decide which medium is more reliable for a certain type of information, etc. Such similar questions also interest the producers of the content, media personnel, students of mass communication who are preparing for careers in varied fields of mass communication, such as journalism, film making, digital marketing, television, etc. For them, it is important to address the aforesaid questions to gauge the needs of the consumers, which is based on the information gathered through research. Hence the need to study this course and understand the various aspects of communication research. The coming sections include topics that would help the students to build a strong foundation for the subject and ease the students in the process of learning. 1.2.1 Meaning To understand the definition of media research, let us first define and understand the meaning of research. The dictionary definition of 'research' is "to study a subject in detail, especially to discover new information or reach a new understanding". (Cambridge University Press, 2020) Research in the general sense means a search for knowledge and truth in a scientific manner. It is a means which can be used in industry for any endeavor to find solutions to the problems in that particular field or industry, by applying the scientific techniques or methods of research. The process of research includes various steps, such as defining a problem, formulation of hypothesis, collecting data, analyzing data, etc. Hence research

is a systematic approach or method of collecting, classifying, and analyzing information in both quantitative and qualitative

forms. The term research is broadly categorized as Fundamental Research, Applied Research, Descriptive Research, Historical Research, Research through case study; however, there could be several techniques which are a combination of two or more than two types of research as categorized above. Hence the categorization of types of research can't be rigid and all researches cannot be practically categorized under the aforesaid categories. Media research or mass media research is the research done to study the aspects such as social, psychological, or physical and the impact or effect mass media has on these aspects. It includes various discussions around the development of media, their achievements, effects, etc. The process of Media Research includes collecting data for the research, analyzing the data in terms of media usage, or analyzing information concerning which form of medium is used by consumers for which type of content.

1.2.2 Nature There is a description given by Harold Lasswell that gives the nature and range of Communication Research (CR). The following diagram explains the same:

Figure 1.1 Harold Lasswell explanation of Nature of Communication Research The same model of "Who says what in which channel to whom with what effect" is the essence of media research. As the researchers researching in the field of mass media or a student studying mass media (communication), study these different aspects of the industry to establish cause and effect relationships which are analyzed to either discover new information about the industry or verify existing information.

1.2.3 Objective and Significance The goals and aims of Communication Research include the following: ? Communication research aims at identifying how the media or any other communicating agency uses and distributes the information. ? It also helps in recognizing restraining factors that could impact the flow of information. ? The study of communication research also points to the opinions that influence the flow of communication. ? Communication research also addresses questions such as effectively delivering information or content to the masses, what could be done by the communicators, or the agents of communication to increase the reach of information. ? Another purpose of communication research is to assess how communication can be effective for a two – way flow of information. ? Communication research is also used to exhibit ways or methods through which communication could be initiated in the areas or sectors or parts of society that are in greatest need of information sharing but are neglected. ? Communication research helps the government to refine its national policies and help in adjusting and making developmental plans and operations in a better way. ? A search done to scientifically acquire knowledge is also another reason for communication research to be able to formulate appropriate communication policies and thus help in nation-building. With so many objectives getting addressed through communication research, it becomes necessary to It is a summative study of the what the message had accomplished; what the receiver of the message or audience remembers from it and how that impacts their values, attitude and behaviour. It indicates to the audience or receivers of the information. A study of their behaviour, characteristics and reactions to the different channels of mass media. It includes the study of various channels of medium of mass communication through which the information is passed. This aspect includes the study of content or material being broadcasted by the mediums of mass communication. This aspect of communication research includes the study of communication organizations and agencies or communicators.

understand the significance of the subject. Communication in today's world is an important area of study for communicators and communication agencies and students studying communication. The effectiveness of being able to communicate is related to the capabilities of a person to interpret the world. Thus, communication research is a way or method through which clarity is brought in the communication process and helps them to understand the significance of communication in the daily lives of people. It also acts as a guide or a manual that helps people to identify and explore various interrelated elements that complete the process of communication, and also helps in developing strategies for effective, efficient, and appropriate use of communication.

1.2.4 Scope Communication Research being scientific is objective and believes that everything that happens must happen as it does and could not have happened any other way. The theories and methods of communication research are influenced by social and other sciences, and thus are interdisciplinary. The bottom line is that communication research involves employing social behavior and using scientific methods to understand and study communication issues and problems. The scope of communication and research on issues or problems of communication (communication research) is wide and helps in building relations that ultimately lead a person on the path of progress and development, which otherwise would remain self-contained and that would lead a person nowhere. The brainstorming, exchange of ideas leads people to research related aspects of communication. The scope of communication research can be understood from the way communication research helps and interpret the information obtained for the following heads:

Figure 1.2 Scope of Communication Research

The crux of communication research and its scope are extended by analyzing the three aspects of communication that are common to the communication industry.

1. Message Analysis: Message or content is the essence of communication as it easily and clearly describes a project for which the communication is being done. The communication based on analysis of messages or related topics gives insights to the researchers on how to design content, do data analysis, etc.
2. Channel Analysis: This aspect of communication research focuses on providing insightful information related to the medium or channel used for communication. It involves evaluation of how to use which medium for which content for impactful communication.
3. Audience Analysis: To gather and analyze the information about the end-user of information through any medium, is the essence of audience analysis. Communication research helps the producers of information to obtain such information about its audience and develop content accordingly to have effective and impactful communication.

1.2.5 Types of research Based on different disciplines and methods research can take up various forms and names, yet research can be categorized into the following forms of the research:

Figure 1.3 Types of researches

- i) Descriptive Research: It is clear from the name itself; descriptive research is the research where the researcher describes the nature or characteristics of the topics or objectives under study. In such types of research, the researcher has no control over the variables. It is mostly used for research in analyzing the data using comparative and co- relational methods like analyzing data trends, validating existing conditions, and conducting researchers at different times to draw similarities and differences.
- ii) Analytical Research: This method is most suitable for researches that involve critical evaluation and analysis of the data. This is mostly secondary research which is based on the fact and information already available. The purpose of analytical research involves

finding critical details to add new ideas to an existing subject being studied, or at times finding supporting information for current research being conducted to make it more authentic. iii) Basic research or fundamental research: The fundamental research that is usually conducted with a curiosity and desire to expand knowledge and information in a particular area or field. The findings of the research usually don't have immediate applications practically. Such research is mostly used for the formulation and generalization of a theory. The goals and aims of the study for such research are to bridge the knowledge gap by finding relevant information that can be added to the existing knowledge to improve understanding by enhancing the clarity of the subject. iv) Applied research: Unlike fundamental research, applied research focuses on providing the solutions for a particular pressing issue or solving a specific problem, and hence the results of this type of research have immediate practical usage. The problem or the issue could be related to society, an organization, a household or even solving individual problems or issues. The focus of the research is to conclude to take some decision or action to resolve the problem at the end of the study. v) Quantitative research: It is a systematic approach to investigate quantifiable data by performing statistical, mathematical, or computational techniques. The result of such research work is used for finding patterns and averages, making predictions, testing causal relationships, and generalizing the results of the study for a wider population. It is generally used for doing research related to subjects like natural and social sciences. vi) Qualitative research: It is a complete opposite of quantitative research and involves collecting non-numerical data and analyzing it to understand concepts, opinions, or experiences. The aim of this type of research is aimed at gathering deep insights for analyzing the underlying motives and desires behind a problem or for generating new ideas for research. It is mostly related to the study of human behavior. Qualitative research is commonly used for doing research related to the subjects of humanities and social sciences. vii) Conceptual research: A type of research mostly used by philosophers and thinkers for developing new theories or interpreting existing theories from a different angle. It is related to abstract ideas or concepts. It doesn't involve conducting practical experiments, instead, the research is conducted by observing and analyzing existing information on a given subject. The result of the research may not provide enough descriptive evidence, instead, it provides concepts or abstract ideas, which are to be tested and validated later. viii) Empirical research: The research that derives knowledge based on observed and measured experiments rather than relying on information and knowledge from theory or belief. It makes use of verifiable evidence to arrive at the outcomes of the research. The investigating nature of empirical research is scientific. This type of research is mostly used for systematic investigation, for validating multiple hypotheses in a different field, such as law, medicine, etc. ix) Longitudinal research: A study conducted by researchers involving several observations of the same subject over a while, sometimes even lasting for many years. In a longitudinal study, the researchers benefit from the fact that the researchers can discover developments or changes in the characteristics of the population being observed at both group and individual level. x) Time series research: This type of research studies the evolution of a variable under observation over a while. Trend analysis is an example of this type of research. This type of research helps to predict future trends based on past data. xi) Case study research: It is the research technique that provides a deep and holistic understanding of the topic under study. The results provided by such a type of research are difficult to be generalized. It is an up-close, in-depth study of a particular case. Such researches are used for studying and analyzing specific situations. xii) Historical research: A qualitative technique used by researchers to study past events, ideas, or occurrences with an aim to interpret the facts and explain the effects on the present events. Historical research involves the study of old records, documents,

scriptures, or remains to research about a phenomenon existing in the past. It helps the researchers to study and be aware of the past historical experiences about failures and successes, and learn from those. xiii) Laboratory or Clinical research: An observational research technique used by researchers to conduct research in a controlled setup. The purpose of this research is to trace out the root cause of something. The researchers mostly use scientific investigating methods to study human health and illness and address issues and questions to investigate for a particular disease, study about medicine or a particular behavior trend of human beings. xiv) Causal Research: Causal research is explanatory research used by researchers to study the cause and effect relationship. It is a type of research that the researcher uses to study the impact of change in one or more variables on the existing norms and processes. Causal research describes nature as well as the magnitude of change. For example, a media company can use causal research to study the changing behavior of people towards television after the boom of the internet.

1.2.6 Characteristics of good research

There is no concrete way, method, or strategy to comment if research is good research or bad research. However, there are parameters that could be deployed at every step of the research to gauge an understanding as to how to make sure that research is appropriate, reliable and can be validated for a particular study being conducted. The following points cover those parameters:

- To have a clear and defined objective – it is the essence of any study or research. Without a clear and defined objective, research can easily lose its focus.
- Detailed research process – the process of research needs to be discussed in detail and with absolute clarity leaving no ambiguity in the process of research.
- Research design – an appropriate research design needs to be employed in context to the objectives of the research, for research to be successful.
- Research can be considered authentic if the process of research at each stage adopts high ethical standards.
- Sufficient data – for research to maintain its effectiveness and derive at an outcome, must have sufficient and satisfactory data collected to arrive at any solution of the problem or to conclude for the objective set for the research.
- Complementing analysis, findings, and conclusions – research is considered good when the analysis, findings, and conclusion of the research are complementing the objectives and goals set for the research.
- Reliable, valid, and generalized – research must clearly define its scope and limitations so that the findings of the research being used further are clearly understood by another researcher and applied accordingly. Also, for the sake of other researchers and researchers, the findings of the research need to be reliable, valid, and presented in a generalized form.
- The research must include suggestions as it makes the process of decision making adequate.
- It needs to be a close reflection of reality. Research must present the true picture of the issue or problem being addressed through the research.

The following diagram sums up the essential qualities or characteristics of research to make it good research. Figure 1.4 Characteristics of good research

1.3 Steps in the Research Process Like any research the Process of Communication Research involves a sequence of steps, as shown in the diagram below:

Figure 1.5 Steps in the process of research Let us study the details of each step.

1.3.1 Formulation of Research Problem

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formulation of a problem is far more essential than its solution, which may be merely a matter of mathematical or experimental skill.

To raise new questions, new possibilities, to regard old problems from a new angle require creative imagination and marks real advances in science.” – Albert Einstein This is the first and most essential step in the process of any type of research. It is the heart or core of the research or thesis, which can be referred to any point during the research and writing process, in case one loses the track. The formulation of the problem consists of one or a maximum of two sentences, which is simple and makes it clear to anyone referring to the research, about the aim or purpose of the research, for whom this research is relevant and where it is relevant. However, it is not always easy to formulate and define the research problem that is simple and clear. At times, the scientists have to spend years exploring and thinking before they can identify what questions are to be addressed in the research. Many topics are too wide-ranging that it is difficult to provide a specific researchable problem. If research doesn't have a defined and focused research problem to address, research done for such a topic lacks depth and focus and thus is a waste of time and resources and making the research unfeasible. Thus, a problem statement is said effective especially in the case of applied research, if it has the following characteristics:

1. The problem statement reflects the need for research.
2. The research problem is based on factual evidence and is non-hypothetical.
3. The hypotheses suggested are meaningful and testable.
4. Most importantly the problem suggested should be relevant and Formulation of the research problem makes it clear for both oneself and others reading the report of the purpose of the research. Hence the problem statement is an important step and aspect to keep a track of the research. It also becomes an assessment guide for the evaluators to assess if the research has addressed the problem as stated in the problem statement.

1.3.2 Literature Review Literature review in the process of research means an evaluative report of the pre-existing literature found related to the topic of research. This includes the thesis, papers, journals, researches, studies, or any other information related to the topic of research. The process of literature review involves describing, summarizing, evaluating, and clarification of the selected literature for the review. It forms a theoretical basis for the research and aids to conclude on the nature of the research work. The purpose of the Literature Review includes: ● Analyzing the section of published work by summarizing, classifying, and comparing prior studies, theoretical articles, etc. related to the topic of study. ● It also acts as a guide for a particular subject or topic, a background information pool for the research problem in consideration. ● The purpose of the literature review is to give an overall view of the research already conducted on the current topic of research or related topics. ● Another aim of the literature review is to ensure and justify the rationale of subsequent or successive research. ● The historical perspective, development of the topic of the research, the anomalies of the subject, and new concepts developed for the subject is also covered through literature review. A literature review is an important aspect of the process of research or a thesis as it helps a researcher to critically approach the current research. A thorough review of the existing research done on the topic helps the researchers to modify the research questions and premises based on the works of the experienced scholars. A study of literature review and its findings are a hint for the researcher to develop new ideas related to the topic of their research.

1.3.3 Formulating Hypothesis The dictionary meaning of the term 'Hypothesis' is: "an idea or explanation for something that is based on known facts but has not yet been proved". Thus, in the process of research, this step of formulation means developing a clear statement of expectation or prediction about the topic of study that needs to be tested and proved through the process of research. It is an assumption made for a subject of study which is tested for its logical and empirical consequences. The impact of the development of the hypothesis on the process of research is that it provides a focal direction to research, it affects how tests for the hypothesis

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must be conducted, how the data is analyzed, and even indirectly affects the quality of data collected for the analysis. The characteristics of a hypothesis include it to be specific and limited to the

current topic being researched as the same

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has to be tested. It limits the periphery of the research by limiting the area of research, to keep the researcher on the right track.

With the formulation of the hypothesis, the thinking and focal attention of the researcher is on the more important aspects of the problem. It gives direction to researchers to choose and select what type of data is needed to be collected for the research, what type of methods are to be chosen for the analysis of the data. Understanding the definition and features of hypothesis and the significance of formulation of hypothesis, let us understand how to approach for developing a working hypothesis:

i) Discussing the origin and the objectives of the problem with colleagues and experts for seeking the solution for the problem. ii) Exploration of data and records related to the problem of the research for possible trends, distinctiveness, and other hints or clues. iii) Reviewing studies conducted in a similar area or related problems. iv) An exploratory investigation of the research is done by the researchers that involve field interviews of limited and interested parties and individuals to gather better insight into the practical aspects of the problem of the research in consideration. Therefore, a working hypothesis is a summation of the pre-thinking of the subject, examining existing data and material related to the study, and counseling of expert opinion on the subject matter. A working hypothesis is useful the most when it is formulated precisely and clearly.

1.3.4 Research Design In the books 'Marketing research: An applied approach' and 'Marketing research: Methodological foundations, by Kinnear & Taylor, 1996 and Churchill & Iacobucci 2005 respectively, in their versions have defined research design: "it is the blueprint that is followed to complete the study" and it "ensures that the study is relevant to the problem and will use the economical procedure". (Churchill & Iacobucci, 2005) (Kinnear & Taylor, 1996). Research design is considered as a foundational plan that directs the researchers in the process of data collection and analysis for the project. It supplies the framework that enumerates what type of information to be collected, from which sources, and what would be the collection process.

1.3.5 Collection of data Collection of data or data collection is one of the important steps in the process of research as research even with the best of the research design is incomplete without the data to analyze and study the problem in hand to reach an outcome. It is that element of the process of research on which a variable under study is measured and in a systematic manner establishes a relation between the information collected on the variable(s) of interest and various questions stated in the research. Data collection is the aspect that helps the researchers to test hypotheses, evaluate data for outcomes. This stage is the deciding factor of success and failure of research as the data analysis after the stage of data collection is dependent on what type and quality of data are collected. Further data analysis is what shapes how research is concluded. Hence to arrive at a meaningful conclusion or findings of the research, the process of data collection has to be planned meticulously. The process of data collection involves certain steps that need to be performed in order to maintain the quality of data that needs to be collected to achieve the results or outcome of the research. The following diagram explains the same.

Figure 1.6 Process of Data Collection

Identifying issues and/or opportunities for data collection decides what are the next steps to be taken. An internal and external assessment of the same helps to gauge the understanding of what is happening internally and externally with an organization conducting the research. Select issues While identifying issues and/or opportunities an organization might come across more than one issue or opportunities to explore. This step focuses on prioritising the issue and/or opportunity for the researcher to approach and collect data for it and then set goals and objectives accordingly.

Plan an This is the step where the researcher addresses the questions such as who to survey for the research, how the data is collected, sources that will be used for data collection, duration of the data collection process, etc. The methods and approach to be followed for data collection is dependent on the goals set in the previous step and other factors such as, size of organization, context, resources, purpose, complexity of issue, etc.

Collect data It is important to acknowledge and be aware of the practical aspects and best practices while dealing with the logistical challenges faced by the organization at this stage of research process and while implementing the data collection plan keep in consideration certain matters such as, who will collect data (experts or trained employees), resources, technology, logistics and people needed for developing or implementing the data collection plan, etc.

Analyse and interpret data Once the data has been collected the data needs to be analysed and interpreted for further use in the process of research. For both qualitative and quantitative methods used for data gathering, the complexity of the analysis is based on the methods used and the amount of data gathered. The need for analysing and interpreting the data internally or using external experts can't be laid down for an organization, it is for the organization to decide.

1.3.6 Data Analysis It is the process of evaluating the collected data from distinct sources, by using logical and analytical reasoning methods, in order to explore each component carefully. It is an important stage of research as it helps to illustrate the conclusion of our investigation. Data analysis helps in making decisions by reducing the larger data into smaller fragments to achieve the desired objective of the research. The process of data analysis follows three steps: Data organization, Summarization, and Categorization. The choice of the appropriate data analysis technique depends upon the type of data and research method applied in the investigation. The qualitative data is being analyzed through the methods of focus groups, content analysis, interviews, and questionnaires whereas the quantitative data can be analyzed using survey research and statistical analysis.

1.3.7 Verification And Testing Of Hypothesis The purpose of a hypothesis serves in the process of research, is to explain an existing known fact in the area of research, and serves as a guide for the researchers to explore and prove new ideas about the subject of research on the basis of empirical evidence. It is a formal question that a researcher addresses to resolve. It is an assumption, supposition, or a provisional statement that relates or has a relative relationship with an existing phenomenon which the researcher tries to prove or disprove. Formulation and testing of a hypothesis play an important role in the success or failure of any research. The formulation of hypothesis is done at the beginning of the research basis which the data collection process proceeds. There are some basic concepts that need to be considered for the formulation and testing of hypotheses.

- Null and alternative hypothesis: While the formulation of the hypothesis in the initial stage a researcher develops a null and alternative hypothesis that needs to be approved or disapproved by providing evidence through the process of research. A 'null hypothesis' in the context of statistical analysis refers to a hypothesis that states the default value or an established fact related to the parameter of the subject under study, usually denoted by the symbol " H_0 " that needs to be either proved true or false. Whereas an alternative hypothesis is a hypothesis to be tested through research which proves the null hypothesis otherwise and challenges the null hypothesis. An alternative hypothesis is usually denoted by H_a or sometimes by H_1 . This means that both the hypotheses are designed in a manner that if one is proved correct the other automatically stands to be proved wrong.
- Level of significance: It is the parameter in hypothesis testing that decides the level of surety in deciding to accept or reject the null hypothesis. It gives the range or periphery to the value of hypotheses being tested, which decides the probability of risk a researcher is ready to take to reject the null hypothesis. It is mathematically or statistically represented by the symbol ' α ' known as alpha.
- Level of confidence: It is the parameter of hypotheses testing and is the opposite of level significance. It gives the probability value of accepting the null hypothesis. The value of the level of significance and level of confidence when added is always equal to one. The generally accepted mathematical or statistical symbol of the level of confidence is "C". The values of the level of significance and level of confidence is usually a percentage value.

Steps in hypothesis testing The following diagram explains the process and steps involved in the testing of hypotheses. Figure 1.7 Steps in hypothesis testing

1.3.8 Interpretation & Report Writing For a researcher, after collecting and analyzing the data, the next task is to interpret the findings and write them. Drawing inferences from the collected facts on analyzing them is referred to - interpretation. While report writing is the medium through which a researcher communicates the 'interpretation'.

1.4 Summary Let's summarize the unit into some key-points: ?
Types of research are

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Descriptive Research, Analytical Research, Basic research or fundamental research, Applied research, Quantitative research, Qualitative research, Conceptual research, Empirical research,

Longitudinal research,

Time series research, Case study research, Historical research, Laboratory or Clinical research, and Causal Research. ? The formulation of the problem consists of one or a maximum of two sentences, which is simple and makes it clear to anyone referring to the research, about the aim or purpose of the research, for whom this research is relevant and where it is relevant. However, it is not always easy to formulate and define the research problem that is simple and clear. At times, the scientists have to spend years exploring and thinking before they can identify what questions are to be addressed in the research. ? Literature review in the process of research means an evaluative report of the pre-existing literature found related to the topic of research. This includes the thesis, papers, journals, researches, studies, or any other information related to the topic of research. The process of literature review involves describing, summarizing, evaluating, and clarification of the selected literature for the review. ? Research design is considered as a foundational plan that directs the researchers in the process of data collection and analysis for the project. ? Collection of data or data collection is one of the important steps in the process of research as research even with the best of the research design is incomplete without the data to analyze and study the problem in hand to reach an outcome.

? The purpose of a hypothesis serves in the process of research, is to explain an existing known fact in the area of research, and serves as a guide for the researchers to explore and prove new ideas about the subject of research on the basis of empirical evidence. The formulation of hypothesis is done at the beginning of the research basis which the data collection process proceeds. There are some basic concepts that need to be considered for the formulation and testing of hypotheses.

1.5 Key Terms ? Quantitative research: It is a systematic approach to investigate quantifiable data by performing statistical, mathematical, or computational techniques. ? Empirical research: It is a research using empirical evidence. It is also a way of advancing knowledge through direct and indirect research or experiences. ? Descriptive Research: It is clear from the name itself; descriptive research is the research where the researcher describes the nature or characteristics of the topics or objectives under study. ? Channel Analysis: It is analyzing through a medium or channel used for communication. ? Audience Analysis: It is analyzing the end-users or audience for communication research. ? Null hypothesis: It is the statistical analysis that refers to a hypothesis that states the default value or an established fact related to the parameter of the subject under study, usually denoted by the symbol "H₀" that needs to be either proved true or false.

1.6 Check your progress Q:1) Answer the following questions with explanations: a. Write the meaning of communication research in your own words. b. What are different types of research, explain any two in detail. c. What did you understand about the 'collection of data' Q:2) Answer the following questions in short sentences: a. What is 'Literature Review'? b. What is 'quantitative research'? c. What is 'audience analysis'? Q:3 State True or False: a. The hypotheses suggested are meaningful and testable. b. The research must include suggestions as it makes the process of decision making adequate. c. Another purpose of communication research is to assess how communication can be effective for a two – way flow of information. Q:4) Fill in the blanks: a. Communication research helps the _____ to refine its national policies and help in adjusting and making developmental plans and operations in a better way. b. _____ is the research where the researcher describes the nature or characteristics of the topics or objectives under study. c. A literature review is an important aspect of the process of research or a thesis as it helps a researcher to critically approach the current research. Q:5) Try to create a diagram, showing and explaining the process and steps involved in the testing of hypotheses.

References 1. Research Methodology Methods and Techniques, 2nd revised edition, C.R. Kothari, New Age International Publishers. 2. Research Methodology Concepts and Cases, 2nd edition, Dr. Deepak Chawla and Dr. Neena Sondhi, Vikas Publishing House Pvt. Ltd.

Unit 2 -Writing Research Reports Structure 2.0 Introduction 2.1 Unit Objectives 2.2 Interpretation & Writing Research Reports 2.1 Techniques for Interpretation 2.2 Report Writing 2.3 Aids For Writing Research Reports 2.3.1 Bibliography 2.3.2 Footnote & Referencing 2.3.3. Synopsis & Abstract 2.3.4 Summary And Executive Summary 2.4 Unit Summary 2.5 Key Terms 2.6 Check Your Progress 2.0 Introduction This unit is titled: Writing Research Reports. This shall cover different componential aspects involved in writing research reports. For a researcher, after collecting and analyzing the data, the next task is to interpret the findings and write them. Drawing inferences from the collected facts on analyzing them is referred to - interpretation. While report writing is the medium through which a researcher communicates the 'interpretation'.

2.1 Unit Objectives This unit has the main objective of introducing the different componential aspects of research writing reports, covering the following topics: - Introduction to the concept of interpretation and writing research reports - Techniques for Interpretation - Report Writing, Aids For Writing Research Reports like Bibliography, Footnote & Referencing, Synopsis & Abstract, and Summary And Executive Summary 2.2 Interpretation & Writing Research Reports For a researcher, after collecting and analyzing the data, the next task is to interpret the findings and write them. Drawing inferences from the collected facts on analyzing them is referred to - interpretation. While report writing is the medium through which a researcher communicates the 'interpretation'. The observation of the researcher on the study of collected data is the interpretation that needs to be recorded as they can work as a guide for the learners and other researchers when they have been explained through writing a research report.

2.1 Techniques for Interpretation Some significant techniques to be followed by a researcher for coming up with the right 'interpretation, can be said are: - To give reasonable explanations of the observed relations the interpretation must be like showing the relationship as an underlying process.

- To interpret the final results, any collected extra information can be used as it helps in inferencing the results.
- To reach the final and correct interpretation consulting or discussing an experienced person on findings is a good technique.
- To reach the problem-solving interpreting lines, researchers should not be in any hurry.
- To draw an appropriate interpretation, the researcher must make sure that the collected data is adequate and trustworthy.
- To make the right or original interpretation, the researcher must be extra cautious about not making any errors in studying the data. In the words of Pauline, "

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The researcher must remember that ideally in the course of a research study, there should be constant interaction between initial hypothesis, empirical observation, and theoretical conceptions. It is exactly in this area of interaction between theoretical orientation and empirical observation that opportunities for originality and creativity lie." 2.2

Report Writing Report writing is the medium through which a researcher communicates the 'interpretation' or analysis of the study'. After the interpretation, the inferences are written, as the purpose of the research is not only to find the answers but to present the findings also. Writing the report is considered to be the last step in a research study. Before reaching the final stage of drafting the report, usually, a researcher considers the following given preliminary or preparatory steps, and they are like: - Logical analysis: This should be done logically and chronologically. - Preparation of Final Outline: The preparation of the outline helps in structuring the content logically. - Preparation of rough draft: This step provides the researcher to write down his study. Under this draft, the researcher usually writes down the procedure adopted in collecting study material, techniques of analysis he adopted, and the findings, etc. - Review of Rough-draft: This step involves carefully and formally writing the report after reviewing and giving a grammar check to his report. - Bibliography: The researcher adds the list of books or all those resources he consulted or referred to. - Final draft: The final step is where the draft is given the attributes of conciseness, and simple language, etc. 2.3 Aids For Writing Research Reports Under this section, we shall learn about different aids for writing research reports like bibliography, footnote and reference, synopsis and abstracts, summary and executive summary, and conclusion and recommendation. 2.3.1 Bibliography Bibliography a list of the books that were referred to in scholarly or research works. The bibliography is a significant section of a written report as it provides the complete information of the cited or referred sources, books, journals, and papers cited, in a standardized format, used in the study. The bibliography is an organized way to present information on the cited sources. There are several predefined bibliography styles that are used worldwide like the American Psychological Association (APA), the Harvard method of citation, Chicago, American Language Association (ALA), etc. These bibliography styles are easily applicable to the use of computer application software like MS Office. They are found inbuilt and after the application of the chosen style, the bibliography appears in the well-defined format. Besides, where the researcher is using his own way of citation, he may consider the following points to apply so it could be convenient for a reader, and they are like: -

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It should contain all those works which the researcher has used. - It should be arranged alphabetically. - It may contain two parts - the names of books and pamphlets, and the names of magazine and newspaper articles.

Suggestively, a reader-friendly format for books and pamphlets could be like:

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Example Kothari, C.R., Quantitative Techniques, New Delhi, Vikas Publishing House Pvt. Ltd., 1978.

Figure: 2.1 Bibliography format for Books & Pamphlets (Source: C.R.Kothari, "Research Methodology") Indicatively a reader-friendly format for magazines and newspapers could be like: Figure: 2.2 Bibliography format for Magazines& Newspapers (Source: C.R.Kothari, "Research Methodology")

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Example Robert G. Voosa, "Coping with Short-term International Money Flows", The Banker, London, September 1971, p. 995. 2.3.2

Footnote & Referencing Footnote as the name suggests is given or printed at the bottom of a page giving a piece of information. A typical footnote is the part of a report which aids a researcher in giving information on his cited source he

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referred to or in giving an explanation of a certain concept referred to in the text. The referencing rules for a footnote and bibliography are different as: - In a footnote, we give the 'first name' first and then the surname. Though in the bibliography we give the surname first and then the 'first name'. - In the footnote, we mention the

specific page from which the information has been cited. While in the

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bibliography, we usually mention the page numbers of the article or the total pages in the book. - In the footnote, the

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reporting is based on the order in which they occur in the text,

while in the

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bibliography it is generally arranged alphabetically depending on the author's name. 2.3.3.

Synopsis & Abstract The synopsis gives a general view of the research for analysis or understanding of the research project. It is a planned activity that aids a researcher in presenting the overview of the research project and facilitates the reviewer to understand it. According to the dictionary, the term synopsis means a brief statement or account of something. Writing a synopsis, we do not include needless details. In research writing reports, the synopsis is written or structured according to a format. The following given figure (2.3) shall give you an idea about the outline of a synopsis. Figure: 2.3 Format or Outline of Synopsis (Source: Researchsynopsisguidelines2015.pdf)

Title: It should be like using a few words conveying the essence of the research project. It should be brief but informational and short but not too short. For example, "Metoo Movement In Social Science Computer Review". **Abstract:** The abstract is the section or part of the synopsis that gives a reader a distinct idea about the research using about 200 words. It is composed following a format like: - a brief paragraph - introduce the problem, - the objective or objectives, - planned methods for data collection and analysis, - expected results, and - possible impacts Following is given a figure (2.4), that shall help you to understand the composition of 'abstract'. Figure 2.4: Example of an Abstract (Source: Researchsynopsisguidelines2015.pdf) **Introduction:** It is the first part of the main text that can help a researcher in letting the reader know about the real topic of research. It could be purposeful when it is composed or structured appropriately. - **Background:** A common way of starting the Background section is to tell - how your subject is part of an overall subject area and the particular problem or case that is the focus of the study. - Without using many words, introduce the knowledge gap and variables that are relevant to your research. - The problem behind the research study and the problem statement is added to the introduction which leads to mentioning the objective of the research study. **Objectives:** This section of the synopsis lets a reader know about what the researcher will do and is composed using measurable words.

Hypothesis: A researcher tests the hypotheses which arise from the literature and is on the basis of previous studies and theories. Here the researcher does not use statistics to test the hypotheses but it is formulated by understanding the problem, reviewing the literature on it, and considering other factors. A researcher can state the problem and the hypothesis in about 200 words. Research methodology: In the synopsis, the researcher mentions the research methodology adopted in about 150-200 words, covering different aspects like: - Study design: State or specify the name of the study design. - Study area or setting: Specify the area i.e name and place where the research is conducted. - Duration of Study: Specify the time taken to study. - Sampling: Under it you mention: Specify the sample size of your study. Specify the technique and criteria employed in selecting the kind of sampling. - Variables: You shall mention the variables used in the study. - Data collection method: Specify the methods of collecting the data used for studies. The description of data collection methods should be specific and realistic. - Data analysis: Specify data analysis aiding software, statistical methods, and data sorting methods. Ethical clearance: Ethical clearance is given in all human and animal studies. Ethical approval of a research project by an ethical clearance committee that looks at the research aims and methodologies of researchers helps to increase the legitimacy of research findings. References: All references cited are listed here. There are different styles for writing references like the Vancouver style and the Harvard style. A synopsis shall be considered incomplete if it does not include the name of the researcher and designation and other names of persons like guide, department or institution head etc. Synopsis writing is considered to be very significant in a research project. All researchers should make efforts to prepare a well-structured synopsis as it gives the maximum information in minimum words and can convince the readers or reviewers on the ability of the researcher to conduct the project. 2.3.4 Summary And Executive Summary Summary: It is customary to close the research report with a very brief summary, where a researcher states,

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in brief, the research problem, the methodology, the significant findings, and the conclusions formed from the research results.

Composing this section the 'summary', the researcher may start by mentioning what he has attempted to do and the results he has achieved. He may restate the critical research questions or hypotheses. The researcher shall summarize everything covered in brief like the problem question, the methodology of research along with findings as it informs the reader about the objective of the study, the processes followed to collect and analyze the data, and the findings of the study. The summary part must be like: - It can take the attention of the reader to the main issues and findings by presenting different details. - It may help the reader to comprehend the purpose and findings of the research. - It should be clear and compact but covering every prominent step of research. - It helps and keeps a reader attached to reading the content with the usage of words like first, also, next and finally, etc.

Executive summary: This is the part of research writing where the researcher presents -

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the scope and objectives of the study, the methodology, and the results obtained, etc. in a brief and concise manner. If the research

study is coming up with some recommended changes then the researcher can provide short pointers here.

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The executive summary can be divided into four or five sections

as: -

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the study background, - the scope, and objectives of the study, - the execution, including the sample details and the methodology of the study, - the findings and results obtained, and - the conclusions based on the opinion of the researcher. -

the recommendations and suggestions. 2.3.5 Conclusion and recommendation "Conclusion" is not the summary as unlike the "summary" it does not focus on giving a brief account of the process and findings of the research and summarizing or restating the process of research and findings. It is a synthesis of the 'key-points'. It intends to help the reader to know how the research can matter to him or her. It culminates - the research report and should be set as helping a reader to comprehend the practical application and implications of the researcher's findings. It should be set as all the points are taking the reader to reach some general conclusions. It should not contain any ideas rather it should state in absolute terms what the findings are. Recommendations: Summary and Conclusions lead to another section - the recommendations. Recommendations should be research-based, practical, and achievable. Common recommendations that researchers usually make are like: - considering the areas of further research like the questions that remain unanswered in the study and need to be explored further. - discussing the methodological issues like ways and problems that could help in addressing and refining future researches. - suggesting the actions that should be taken to address the problems on the research findings. - recommending the designing and intervention of a project. The recommendations section should not take more than one or half-page as far as possible. 2.4 Unit Summary Let's summarize the unit into some key points: ? For a researcher, after collecting and analyzing the data, the next task is to interpret the findings and write them. Drawing inferences from the collected facts on analyzing them is referred to - interpretation. While report writing is the medium through which a researcher communicates the 'interpretation'. ? Report writing is the medium through which a researcher communicates the 'interpretation' or analysis of the study'. After the interpretation, the inferences are written, as the purpose of the research is not only to find the answers but to present the findings also. ? Bibliography a list of the books that were referred to in scholarly or research works. The bibliography is a significant section of a written report as it provides the complete information of the cited or referred sources, books, journals, and papers cited, in a standardized format, used in the study. ? Footnote as the name suggests is given or printed at the bottom of a page giving a piece of information. ? The synopsis gives a general view of the research for analysis or understanding of the research project. It is a planned activity that aids a researcher in presenting the overview of the research project and facilitates the reviewer to understand it. ? It is customary to close the research report with a very brief summary, where a researcher states,

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in brief, the research problem, the methodology, the significant findings, and the conclusions formed from the research results. ? "

Conclusion" is not the summary as unlike the "summary" it does not focus on giving a brief account of the process and findings of the research and summarizing or restating the process of research and findings. It is a synthesis of the 'key-points'. It intends to help the reader to know how the research can matter to him or her. 2.5 Key Terms ? Bibliography: It a list of the books that were referred to in scholarly or research works ? Synopsis: It gives a general view of the research for analysis or understanding of the research project. ? Abstract: The abstract is the section or part of the synopsis that gives a reader a distinct idea about the research. 2.6 Check Your Progress Q:1) Answer the following questions in one or two sentences: a. What is ethical clearance in the synopsis? b. How are the referencing rules for a footnote and bibliography are different? c. What is report writing? Q:2) Answer the following questions with details: a. List some general techniques followed by a researcher to come up with the right 'interpretation'? b. List some points usually a researcher considers before writing the research report? c. Write a short note on the 'bibliography'. Q:3) State True or False: a. The conclusion is the summary that intends to help the reader to know how the research can matter to him or her. b. The bibliography is an organized way to present information on the analyzed findings. c. The abstract is the section or part of the synopsis that gives a reader a distinct idea about the research. Q:4) Fill in the blanks: a. Summary and Conclusions lead to another section - the _____. b. The final step is where the ____ is given the attributes of conciseness and simple language. c.

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In the _____, the reporting is based on the order in which they occur in the text,

while in the _____ it

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is generally arranged alphabetically depending on the author's name.

References Research Methodology Methods and Techniques, 2nd revised edition, C.R. Kothari, New Age International Publishers.

Research Methodology Concepts and Cases, 2nd edition, Dr. Deepak Chawla and Dr. Neena Sondhi, Vikas Publishing House Pvt. Ltd.

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Mass Media Research, 9th edition, Roger D. Wimmer & Joseph R. Dominick

Unit 3 – Techniques of Data Collection Structure 3.0 Introduction 3.1 Unit Objectives 3.2 Types of data 3.3 Primary Data Collection 3.3.1 Observation Method 3.3.2 Interview Method 3.3.3 Questionnaire Method 3.3.4 Content Analysis 3.4 Secondary Data Collection 3.5 Summary 3.6 Key Terms 3.7 Check Your Progress 3.0 Introduction Among various aspects of research, data collection is one of the important ones. Different approaches are defined for collecting the data. The more accurate the data is, the more efficient the research will become. Although research is not just bound to collecting information or writing any description it is to collect information in a targeted and specific manner to analyze it further, be able to answer certain questions, and generate effective results. This unit describes the distinct methods of data collection for research. According to Sapsford and Jupp (2006) the process of accumulating the desired information with minimum distortion, to provide answers to the questions that arise before research, is known as data collection. 3.1 Unit Objectives By the end of this unit, the reader will be able to: • Learn about various techniques of data collection. • Distinguish between primary and secondary data collection methods. • Know about the merits and demerits of all data collection techniques. 3.2 Types of data The beginning of research is with certain questions that should be evaluated and a research plan to be executed. On the basis of the analysis of research problems and plans, data collection is carried out. Before gathering any relevant information about the desired field, the researcher should be completely cognizant about the resources and the accuracy required in the research. On the basis of choosing the desirable data collection technique, the data sources are categorized as Primary and Secondary Data. • Primary Data: The data with original character and is first-hand is said to be the primary data. The researchers collect such data with the means of surveys and interviews. It is considered to be the most reliable data source as no prior traces of such information can be founded in the past. • Secondary Data: The data which is accessible to the public and already exists in the past, is known to be the secondary data. Such kind of information is collected by someone else and reused by the successors. It can be noted that the primary data of one research can be used in another research as secondary data. The method of accumulating secondary data differs from that of the primary data as for secondary data the mode of collecting information is just a compilation of previously collected data.

Figure 3.1 Types of Data Let's discuss the modes of primary and secondary data collection in detail. 3.3 Primary Data Collection As primary data is original data, so for experimental research it is collected by performing the investigations through experiments while for descriptive research the primary data is collected by performing surveys, either sample or census, through observations or direct communications like interviews. Apart from these methods of primary data collection, for surveys and descriptive research, there are other important methods: • Observation Method • Interviews • Questionnaires • Content Analysis Figure 3.2 Primary Data Collection Techniques 3.3.1 Observation Method General observation of day to day life is different from scientific observation. The method of scientific observation involves planned and recorded data systematically by the investigator. The information is sorted according to the investigator's own observation and intellect, even without asking the respondent. For example, while studying consumer behavior, the investor did not ask for any particular brand of clothing of the respondent's choice, instead insisted on his own choice. The studies of behavioral sciences are commonly analyzed with the help of the observation method. It is most suitable in situations where the respondents are not able to respond verbally like in other methods of interview and questionnaire. Advantages of the observation method may be: • It eliminates subjective biasing if the observation made is accurate. • The information obtained is dependent on the current situations rather than the past or future attitudes. • The observation method is independent of the respondent's behavior and their compliance to respond. Limitations of observation method: • Provides limited information for research. • It is a costly method. • Sometimes, the observations may be affected by unexpected factors. The respondents are not readily available all the time for the observational task and this creates hindrance in data collection accurately. On the basis of the type of observational task, the

observation can be structured or unstructured. If the observation is characterized by certain definitions, the mode of observed information, standard conditions of observation, and filtering the relevant data, then the observation is said to be structured observation. While, if the observation is

without the pre-decided characteristics, then it is unstructured observation. The structured observation is suitable for the descriptive studies whereas, for exploratory studies, the unstructured observation method is relatively more suitable. Considering the involvement of participants in social studies, the observation can be participant and non-participant. If the investigator involves him in the group to be observed by him, to get accurate observation about the other members of the group, then it is said to be participant observation. But, if the investigator keeps him detached from the group of people to be observed, and observes without being part of the group and without even feeling what other members of the group feel, then it is non-participant observation. The observation can also be categorized as a controlled and uncontrolled observation. If the observation is according to the pre-decided planning along with experimental procedures, it is controlled observation whereas if the observation is natural then it is termed as an uncontrolled observation. This type of observation results in spontaneous understanding about life and people which is natural and without any precision instruments. In controlled observation, certain precision instruments are used for improved accuracy and standards.

3.3.2 Interview Method

This method of data collection includes oral-verbal responses between the investigator and the respondent. An interview can be a personal interview or a telephonic interview. (a) Personal Interview: In the case of personal interviews, the interviewer asks questions to the interviewee face-to-face which can result in a direct mode of data collection. Generally, the personal interviews are structured interviews as they follow a certain structure including a set of predefined questions and high standards of recording. On the other hand, the unstructured interviews lead to the freedom for asking questions and recording as it does not follow any predefined rigid set of questions and standardization in the recording. The personal interview method may result in certain advantages and disadvantages. The advantages of the personal interview method include:

- The abundance of information can be obtained in dept.
- Presence of greater flexibility to change the questions, especially in unstructured interviews.
- The personal skills of the interviewer are involved to overcome any opposition from the interviewee if any.

● The response of the interviewee can be controlled by the interviewer, in which the interviewee should respond first, in case of more than one interviewee. The Group discussion approach can also be used by the interviewer as per requirement. Some major disadvantages of the personal interview method are: ● There is a possibility of the interviewer and the respondent both being biased towards each other. This leads to extra supervision and control. ● It is a high-priced method. ● Some specific respondents such as government officials and executives may not be easily amicable and this can result in inadequate information. ● The personal interview method is comparatively more time-consuming. ● Sometimes, the interviewee can provide imaginary information just to develop an interest in the interview. ● Lack of proper connection between the interviewer and the respondent can affect the efficiency of the interview and restrict the proper and frank responses. To implement the personal interview method successfully, the interviewers should be well-trained and brief in their approach. They should possess honesty, sincerity, impartialness, technically competent, and practical experience. The efficiency of the interviewer should be checked occasionally to ensure that the interviewer is not cheating and contradicting the instructions given to them. The interviewer should make efforts to build a friendly environment of confidence and trust for the interviewee. The questions must be asked by the interviewer properly and should be recorded with accuracy. If the interviewee asks some questions in return, the interviewer should be able to clear all the doubts. The approach of the interviewer must be unbiased, friendly, and conversational without showing any surprise or condemnation to the response of the interviewee and should discard the irrelevant discussion. (b) Telephonic Interview: The telephonic interview is different from the personal interview method. In this method of data collection, the respondent is being approached on the telephone itself. This method is generally feasible for developed areas and least widely used. It is used generally for industrial surveys. Some merits of the telephonic interview method are: ● It is a more flexible, faster, and cheaper method of collecting data through interviews. ● Recalling and callbacks are easy and economical. ● The rate of response in this method is high. ● Sometimes, the respondents feel more comfortable in replying to the questions asked by the interviewer and it becomes easier for the interviewer to record the responses. ● The field staff gets reduced in this method. Some demerits of telephonic interview methods are: ● The respondent gets little time for responding to the specific questions. ● This method is restricted to the people who have telephone services. ● Due to less supervision, the chances of the interviewer to be more biased increase. ● The questions are restricted to be short and precise due to time-bound.

3.3.3 Questionnaire Method

It is quite a popular method of collecting information. It is generally used for big surveys by researchers, individuals, public and private organizations. A set of questions also known as a questionnaire is printed or typed and is sent to the individuals or organizations to answer them. This questionnaire can be mailed or sent by post to the respondents. The questionnaire is needed to be answered by the respondents and sent back. A pilot survey is being conducted before this approach to test the questionnaires. This pilot study or survey is just a rehearsal of the main survey and helps in dealing with the big surveys and inquiries. It can easily point out the weaknesses of the questionnaire and the survey method. Improper setup of the questionnaire survey can lead to failure of the survey. Before defining any questionnaire, three main aspects should be considered that include (a) the general form of the questions (b) proper sequence of the question (c) formulation and wording of the questions. For

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the general form of a questionnaire, it can be structured or unstructured. Structured questionnaires comprise pre-determined, definite, and concrete questions. The questions are being quoted in the same wordings and order to all

the respondents so that there is a similarity in answering the same questions for all respondents. The form of questions can be of 'yes' or 'no' types or can invite free responses. On the other hand, unstructured questionnaires are not pre-determined and definite. In unstructured questionnaires, the interviewer has a general information guide about the questions but it is not mandatory to follow the exact formulation of the questions and the responses are in the own words of the respondents. For an effective questionnaire and quality of responses, it is very important to take question sequence into consideration. The proper sequence of the questions should be clear and smooth so that it can reduce the misunderstanding about individual questions by the respondent. The first few questions should be designed such that they can indulge the respondent's interest and cooperation. The initial questions like the one which put on a strain on the memory and intellect of the respondent, targeting the personal character, wealth, and attitude of the respondent, should be avoided in the questionnaire. After deciding the opening questions, the following questions should focus on the research problem, and the end of the questionnaire should be with the difficult questions so that if the respondent wants, the difficult questions can be neglected. So, the question sequence should be usually from general to field specific to the difficult ones. The third and last important aspect of the questionnaire is the formulation and wording of the questions. The questions included in the questionnaire should be simple, impartial, clear in meaning, easily understood, concrete, and should correspond to the way of thinking of the respondent. The formulation of the questions can be either multiple-choice questions or open-end questions. Finally, the questionnaire should be presentable to attract the attention and interest of the recipients. Using colorful papers, different styles and themes may be helpful in this context. The questionnaire method has the following merits: ● It is a cheaper method of data collection. ● Unlike the interview method, there is no biasing of the interviewer. ● The respondents have sufficient time to answer the questionnaire. ● It is more convenient to approach the respondents through this method. ● The big inquiries and surveys can be entertained. Demerits of the questionnaire method are: ● It becomes difficult to collect the data when the rate of returning of the duly filled questionnaires becomes low. ● The use of the questionnaire method is restricted to be used for the literate and cooperating respondents. ● There is no control on the questionnaire once it is sent. ● It is possible to obtain omitted and vague replies to the questions. ● It is likely to be the slowest method of all other methods of data collection. ● There is no authenticity that whether the respondent himself is responding to the questions as there is no supervision on that.

3.3.4 Content Analysis Another widely used method of data collection is Content analysis that includes analyzing the content of documentaries, books, magazines, newspapers, and other oral or printed sources. It usually focuses on verbal material sources. It is a simple level approach used to analyze the purpose and effect of verbal content. It can be possibly used to find the connection and pattern in concepts that are communicated through content; to understand the intention of a group or institution or an individual; to identify bias in the communication; to analyze the effect and flow of information and the response of the audiences. Merits of Content analysis method: ● It is a highly flexible approach to data collection as the content can be analyzed at any time, from any location. ● It is a low-cost approach that follows a systematic procedure, making it highly reliable and transparent. ● The researcher can even keep his profile low or it is not necessary for a participant to be directly involved. The analysis can be kept restrained. Demerits of content analysis method: ? Content reliability is the main issue in this method. If the source of the content is not authentic then research efficiency is affected. ? This method is limited to verbal sources as it has to be used for primary data collection. If the content analysis is done for any published or written material then it would be secondary data collection.

3.4 Secondary Data Collection Secondary data can be obtained from the primary data by reusing the already collected information again. The researcher has to be ensured about the sources of the data before utilizing the already obtained data. Here, the researcher is deprived of the problems associated with fresh data collection. Secondary data can be considered as published data or unpublished data. Published data can be obtained from publications of government officials, international organizations, technical journals, newspapers, books, magazines, reports, the thesis of research scholars, and historical documents. The sources of unpublished data can be founded in letters, diaries, unpublished autobiographies or biographies, etc. It is difficult for the researcher to scrutinize proper data sources from abundantly available data sources. Before choosing any secondary data, the researcher should be ensured about the following characteristics: ● Data Reliability: The data chosen should be trustable and reliable. ● Data suitability: It is not necessary that the data of one survey is suitable for another survey. Thus, the researcher should filter and use suitable data for the research. ● Data Accuracy: The data which is not accurate and inadequate should be avoided by the researcher. It is riskier to use secondary data instead of primary data as it is already available. The researcher should check the data reliability, suitability, and accuracy before using any available data. Secondary data has certain merits and demerits. Merits of using Secondary data: ● Advantage of resources: Using already available data can be advantageous in terms of using the resources properly for saving both time and cost. ● Data Accessibility: The already collected data in a structured way becomes easy to access for any other research. ● Data accuracy and stability: The data collected on a large scale by the recognized organizations is quite accurate and stable. The interpretation of such data becomes more precise and accurate.

- Data Assessment: Comparison of pre-collected data and new data becomes easy and this gives more efficiency in the research. Demerits of using Secondary data:
 - The purpose of secondary data usage should be quite clear to the researcher. There is a possibility that the data first collected for one survey was in distinct time duration and environment so it may be not suitable for another survey. If the same data is used for both the surveys then this decreases the efficiency of the research.
 - If there is any hiccup in the source of the primary data while collecting the secondary data, then it can question the accuracy of the data.

3.5 Summary Let's summarize the unit into some key points: ? The data can be categorized as primary and secondary data. Primary data is the fresh data that is collected for the first time through observation, interviews, questionnaires, and content analysis whereas secondary data is collected from the already collected data (primary). ? The observation of data may be structured and unstructured, participant and non-participant, controlled and uncontrolled as per the requirement of the researcher. ? The interview can be personal or telephonic depending upon the resources available with the researcher. ? The three main aspects to be considered before designing any questionnaire are, the general form of questions, question sequencing, and formulation and wording of questions. ? In the case of secondary data collection, the researcher should be ensured about data reliability, suitability, and accuracy.

3.6 Key Terms ? Primary Data: It is the original data collected by the researcher. ? Secondary Data: It is the data re-collected from the primary data. ? Structured Data: The data which is designed in predefined conditions and process is called structured data. ? Unstructured Data: The data which is not structured initially is called unstructured data.

3.7 Check Your Progress Q1) Differentiate between primary and secondary data collection methods. Q2) Discuss the main techniques of primary data collection. Q3) What are the merits and demerits of the questionnaire method of primary data collection? Q4) Distinguish between- a) Structured and unstructured Observation b) Participant and Non- participant Observation c) Controlled and Non- controlled Observation Q5) State True or False: a) Secondary data sources do not contribute to research. b) The data collected for the first time for research is primary data. c) Primary data collection methods have the advantage of time and cost over secondary data collection methods. d) Secondary data is always specific to the research problem.

e) The researcher should ensure that secondary data should be reliable, suitable, and accurate otherwise it should be discarded.

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Mass Media Research: An Introduction, 9th edition, Roger D. Wimmer and Joseph R. Dominick,

Wadsworth Cengage Learning.

Unit-4 Qualitative and Quantitative Research Methods Structure 4.0 Introduction 4.1 Unit Objectives 4.2 Qualitative Research Methods 4.2.1 Field Observation and Experiments 4.2.2 Ethnography 4.2.3 Focus Groups 4.2.4 Case Studies 4.3 Quantitative Research Methods 4.3.1 Experimental Research 4.3.2 Survey Research 4.3.3 Content Analysis 4.4 Difference between Qualitative and Quantitative Research 4.5 Audience Research in print and electronic media 4.6 Summary 4.7 Key Terms 4.8 Check Your Progress 4.0 Introduction In the previous unit, distinct data collection techniques are being discussed for both primary and secondary data. The nature of research is dependent on the type of data being collected. The primary data source that gives original data can be qualitative or quantitative. Quantitative research contributes to the research study through measurement of amount or quantity while qualitative research is concerned about the quality measurement of any data. Generally, for analyzing and strategizing human behavior and concerns, qualitative research is used. For an instance, a teacher uses qualitative measures to study the distinct behaviors of the students. The present unit focuses on the different research methods of both qualitative and quantitative measures. Figure 4.1 Types of Research Methods

4.1 Unit

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Objectives At the end of this unit, you will be able to, ?

Differentiate between qualitative and quantitative research methods. ? Understand the concept of field experiments, ethnography, focus groups, and case studies in the qualitative research study. ? Gain knowledge about the concept of experimental research, survey research, and content analysis methods of quantitative research. ? Understand the perspective of the audience in the research of print and electronic media.

4.2 Qualitative Research Methods

Qualitative research is concerned about collecting and studying non-numerical data that includes audio, video, texts which help in gaining in-depth knowledge about the concepts and opinions of the required research field. Consequently, it can help in cultivating the research problem and create a new window for research. Qualitative research can be generally applied in the field of education, health, science, sociology, etc. and generally to read and analyze a human mindset. It took a long time for qualitative methods to be accepted as a research approach. Jean Anthelme Brillat-Savarin, in his book, "The Physiology of Taste", stated that "Tell me what you eat and I will tell you what you are"; this generated considerable interest in the study of human behavior and attitude. This also indicates analyzing organizational behavior with the personality and emotions of humans. Subjective methods that were meant to analyze this certain behavior and reaction of people were introduced by William Henry in 1956 named as Thematic Apperception Tests (TAT). This test was a great help in interpreting the behavior of employees in an organization. Three different techniques of research were suggested by Blaikie (1993) and Neuman (1997) in the field of social science: Positivism, interpretive, and critical. All of them exhibited a paradigm for research that included a set of theories, methods, and beliefs or assumptions about the perspective of the researcher. Paradigms are generally based on the statements that are universally considered as true and they are important in selecting proper research methodologies. Philosophers Comte and Mill proposed the positivist paradigm which was used for studying natural sciences and is still most widely used in the research of mass media. The positivist paradigm is based on the fact that the human mind can be understood through observations and reasons. It also includes the concept of hypothesis, quantification, and objective studies. The interpretive paradigm aims at understanding the natural behavior of people in dealing with daily life events. This paradigm contributed to mass media studies in the 1970s. The third paradigm known as the critical paradigm contributes particularly to the field of humanities. In a nutshell, qualitative research can go beyond the observable attributes and variables that cannot be measured in quantity. There are distinct methods available for carrying out qualitative research. Although these methods have some common grounds such as close interaction between the researcher and respondent is required, the collected data is intense and more structured. However, due to high subjectivity, the researcher has to follow a more objective approach while investigating. It is very skillful to conduct qualitative research as it involves the application of aptitude and proper training. The analysis of qualitative data generally includes the following five steps: ? Data organization ? Reviewing and exploring data ? Developing codes for data ? Assigning codes to specific data ? Identifying recurring data

Figure 4.2 Steps for Qualitative Data Analysis In the following topics, we will discuss the four major methods of qualitative research that include Field Observation & Experiments, Ethnography, Focus Groups, and Case Studies.

Figure 4.3 Types of Qualitative Research Methods

4.2.1 Field Observation and Experiments

The technique of field observation focuses on collecting information and creating a hypothesis or theory for the required research field. The field observation approach works on two primary dimensions: 1) The extent to which the researcher participates in the research while observing. 2) The extent to which the research is concealed, whether it is carried out openly or secretly. These two dimensions embrace a four-quadrant approach that is formed while observing the data. The four possible conditions generated are a) Overt observer b) Overt participant c) Covert observer d) Covert participant. Each quadrant represents one condition as shown in figure 4.4.

Figure 4.4 Dimensions of the field observation method (Source- Mass Media Research, Roger D. Wimmer and Joseph R. Dominick, Chapter-5, Page No.- 124) ? It can be observed that quadrant 1 demonstrates Overt observation which means that the research here is openly done. Here, the researcher is open and can be clearly identified and the people under observation are also aware that the study is being conducted on them. In this quadrant, the researcher is confined only to observe and avoid participating in the research. ? Quadrant 2 displays Overt participant that means in this condition, the researcher is involved in the research and participates in observing while the respondents know the researcher as well. ? Quadrant-3 represents the condition of Covert observer, illustrating the role of the researcher which is confined to only observing and avoiding participation. The interesting fact is that the people being observed are not aware that any research is being done on them. ? The fourth condition is associated with Covert participants, where the researcher is a part of the study but cannot be identified as a researcher. Generally, there can be six major stages of field observation study: 1. Choosing a proper research site. 2. Acquiring access and establishing contacts. 3. Sampling. 4. Data collection. 5. Data Analyzation. 6. Taking exit.

Advantages of Field observation method: Although all the research questions are not answerable through the field observation method, this method has its own unique advantages. ? In this method, the researcher relies on self- collected data from the respondents as he actually is involved in the research and collects the information. ? Generally, the data collected from this method is Primary Data. ? This method designs a basic background for creating a hypothesis with the help of dependent and independent variables. ? The field observation technique is favorable for the Gatekeeping theory in Mass Media. ? It is usually a cost-effective method and the study is done in a natural setting.

Disadvantages of field observation method: ? It is unfavorable when the study corresponds to the external validation of the data collected. ? It highly relies on the own perception and judgments of the researcher. Field experiments are carried out in natural settings without creating any artificial environment. The laboratory experiments are used for quantitative research methods and are discussed in upcoming topics. Field experiments are unbounded and are performed in uncontrolled conditions but in a structured manner. The major advantage of field experiments is that they can provide external validity to the variables of the experiment. This method is useful in analyzing complex social processes, phenomena, and situations. Generally, field experiments are classified into two categories: 1. Those experiments in which the researcher manipulates the independent variables. 2. Those experiments in which manipulation of independent variables occur naturally due to other situations. There are two techniques of manipulating the independent variables, straightforward and staged manipulation. In a straightforward manipulation, written materials, verbal instructions, or other provocations are considered while in a staged manipulation, certain events and circumstances are built by the researcher that enables manipulation of the independent variable. For example, reading a newspaper is an independent variable and it can be manipulated accordingly.

4.2.2 Ethnography

Ethnography refers to a special qualitative research method focusing on the study of anthropology and sociology. The meaning of ethnography is obtained from the combination of two Greek words i.e. 'ethno' that means a community, tribe, nation, or race and 'graphy' means to write. Thus, ethnography is referred to as the approach where the researchers are involved in analyzing a community, tribe, or nation. Various anthropologists have used this approach of research to study about a particular community. This art of observing and exploring the society involved the researcher to be a part of the community itself so that the research could become more effective. According to Murchison (2010), the researcher interacts with the participants as a conversation or interview to understand their rituals and experiences. "Ethnography usually

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involves the researcher participating, overtly or covertly, in people's daily lives for an extended period of time, watching what happens, listening to what is said,

and/or asking questions through informal and formal interviews, collecting documents and artifacts-

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in fact, gathering whatever data are available to throw light on the issues that are the emerging focus of inquiry". - Hammersley and Atkinson (2007)

Apart from the study in the social field, ethnography has recently been used in the field of political science, social work, education, and communication. The focus of the researcher for these fields was diverted towards analyzing the institutions, professions, subgroups, organizations, audiences, etc. instead of focusing on the entire way of living of that particular community. It was suggested by Berg (2004) to categorize the study of the smaller units of the community as Micro-ethnography and the entire cultural study of the community as Macro-ethnography. Generally, the former approach is most widely used by media researchers. The following characteristics can be defined for ethnography: ? In this approach, the researcher has to study the topic in-depth and can only rely on the data collected from the field. ? The emphasis is on the frame of reference of the participants and not on the researcher. The researcher is also a part of the group to be studied. ? The data collection requires ample time in the field.

? Various research techniques are used in the analysis that includes observation, interviews, studying the existing documents, video recording, photography, keeping the notes in a diary, etc. LeCompte and Schensul (1999) provided a procedure to conduct ethnographic research that is quite similar to other qualitative research methods. This procedure includes: → Defining the research problem: The initial step is to define the research problem or the study to be done. The appropriate questions for ethnographic research should be related to the common perception of the people for a particular phenomenon. → Choosing a field site: The second stage of the research includes choosing a proper field site having a natural setting from where data can be collected. It may be possible that some researchers may choose an interesting field site first and then define a proper research problem for it. → Sampling: Generally for such field research, sampling is an important stage of research. Different key informers or old and experienced members of the group can refine and contribute to making a strategy for the sampling procedure. They help the researcher to determine when and where to observe and what could be the key information to be collected. → Fieldwork: After the sampling strategy, the fieldwork is initiated. Data is collected with the help of the observation method. Researchers take notes, photos, videos, etc. to collect the required information. → Data Analysis: The analysis of the data is done in the same manner as in the other qualitative methods. General themes and patterns are being searched by the researcher in the data. Finally, the researcher prepares a written report depicting the complete pattern of the illustration done. The qualitative researchers Daymon & Holloway (2002) suggested that ethnography is helpful in combining the perspectives of the outsiders (researcher) with that of the insiders (participants/ respondents). The blend of etic (general scientific concepts and theories) and emic (cultural perspective and patterns) points of view. A new development in the field is presented in Online or Virtual Ethnography. In comparison to traditional ethnography, virtual ethnography includes a variety of techniques and methods that results in keeping the data tracking online. This makes the process more quick and accurate.

4.2.3 Focus Groups The focus group technique of research involves interviewing the groups of at least 6-12 people, simultaneously for understanding their behavior and attitude. The discussion is generally unstructured in nature corresponding to the topic of investigation. The researcher here acts as a moderator for the discussion and also having the control in asking questions or modifying them. This method is considered to be a faster approach among all other qualitative methods and is popularly used in market research. According to Krueger and Casey (2000), four major characteristics of focus groups can be defined: ? Involvement of participants in the focus groups method. ? Generally, the people on whom the study is carried out should possess similar kinds of qualities, interests, or characteristics. ? The data collected from this method can be used to build up an understanding of distinct opinions, even for those which are not expected by the researcher. ? This method involves focussed discussions on the predefined questions. These questions are structured according to the investigation but the moderator can change this structure according to the requirement in the present discussion.

Figure 4.5 Methodology of Focus groups (Source- <http://www.getresearchpower.com/news/2017/4/18/focus-on-focus-groups>) Figure 4.2 represents the general methodology of Focus groups. It can be observed from the figure, that there are seven basic stages of the process of research: 1. Determine the topic and goals of the focus group: It is the basic step that involves defining the research problem, taking in count the previous investigations, or out of curiosity. They are helpful in pilot projects to test and analyze the opinions and thoughts of the people on a particular topic or concept. 2. Identify potential participants: The second stage is to choose proper participants as per the topic of the discussion. The participants in the discussion should possess some kind of similarity in interests or qualities so that the discussion becomes easier and focus on the topic only. Similarly, it is very essential to choose a proper moderator possessing the right kind of qualities of controlling and guiding the discussion in the required flow. 3. Prepare a guide: A proper guide is designed for the moderator briefing about the main purpose of the discussion. Each aspect of the discussion is planned in detail including the type of questionnaire, the quantity or quality of the questions to be asked, or the timing given for the discussion to each participant. 4. Choosing a location: A specified location is chosen for the discussion to take place. Nowadays, online focus group discussions are also in trend. It saves the cost and time in data collection and analysis. 5. Recruiting and Cost planning: Recruitment of the proper candidates and fixing their incentives according to the cost planning of our research project. The aim should be to achieve the desired discussion at low cost and timing. 6. Conducting the discussion: The trained moderator conducts a session of discussion following the proper guide. The timing of the session depends on the topic of discussion and the types of questions. 7. Data Analysis and Report preparation: The moderator has to analyze the discussion thoroughly and write a proper detailed report explaining the whole session. It depends on the type of analysis required, the moderator can even generate a synopsis. Sometimes, the intense discussion may require coding of each comment of the session which is recorded by the moderator and can be decoded when required.

Merits of Focus groups method ? This method is favorable in pilot projects to identify ideas of preliminary data that can be further analyzed using other methods. ? It is a quick approach as the discussion does not take much time only the arrangements take time. ? It is a less expensive method than other qualitative methods as the type of research conducted is usually academic. ? The ease in designing questions and their follow-up makes this method more favorable for the researchers. ? The focus group method gives complete information in comparison to the personal interview method. In an individual interview, only one person's perception can be analyzed at a time while in the focus group method, the perceptions of more than one person can be analyzed at a time. Demerits of Focus groups method ? Certain complications of the focus group method cannot be avoided. It thoroughly depends on the skills of the moderator. If the moderator manipulates the discussion with his/ her own opinions and thoughts, then this method would not be that effective. ? Sometimes, a focus group alone is not a perfect method. It has to be associated with other research tools to provide specific questions to be answered. ? It is practically possible that a saturation point in the focus group method may occur when the participants may have repeated opinions or do not have anything new to contribute to the discussion or the moderator has already got a point and not getting anything new to analyze.

4.2.4 Case Studies

Another common technique for qualitative research is Case studies. A case study can utilize all the possible research techniques for both individuals and groups, to understand and demonstrate the whole process or phenomenon. There is a wide range of application of the case study method in various fields such as history, science, management, anthropology, psychology, medicine, etc. According to Yin (2003), a case study is a practical inquiry that can make use of distinct sources to investigate a phenomenon based on its real-life context. There is much difference between a research strategy and a case study. A case study research may include single and multiple cases both. For example, political science uses a comparative case study approach which is a multiple case study technique. Some essential characteristics of the case study approach as given by Merriam (1988): ? Particularistic: In this aspect, the focus is on one particular situation, program, event, or phenomenon, to deal with the real-life and practical issues ? Descriptive: A case study is capable of providing a detailed explanation of the topic being illustrated. ? Heuristic: A case study aims to illustrate new interpretations, new meanings, and new perspectives about the phenomenon. ? Inductive: The principles and observations are obtained from the data examination. Usually, most of the case studies are dependent on inductive reasoning. The focus is on creating new relationships instead of verifying existing theories. Although, there is no traditional or precise method for conducting a case study, as an outline the method can be divided into five stages: design, pilot study, data collection, data analysis, and report writing.

1. Design: The initial stage of the case study method is concerned about designing proper questions that form the basis of the research. Most of the questions begin with 'why' and 'how'. Secondly, it should be clear that 'what' contributes to our case study. Generally, a case study is concerned with an individual, group, event or events, organization, or organizations. The researcher can get a rough idea about the topic from its literature and can compare the new data with the existing data. 2. Pilot Study: Before any pilot study, a study protocol is being constructed by the researcher that demonstrates the method and procedures to be followed in the study. This study protocol helps in gaining access to the records of an individual or an organization. For example, the protocol should be able to justify whether any office space is available in the field for the researchers and what else is needed, before starting the research. After the development of the protocol, the pilot study is being initiated that helps in refining the research design and procedures. A pilot study can also help in emerging the facts and variables that can be foreseen during the first stage of designing. The results of the pilot study are helpful in revising and polishing the research and its protocol. 3. Data Collection: The case study method includes different sources for data collection. Letters, minutes of meetings, memos, historical records, agendas, brochures, posters, pamphlets, etc. are helpful in the process of collecting desirable data. Some case studies also use interviews, survey research, and questionnaires for the purpose. Media researchers use multiple data sources like newspapers, printouts, magazines, etc. for the study. Multiple data sources improve the reliability and authenticity of the research. 4. Data Analysis: Yin (2003) suggested that generalization for the data analysis methods is very difficult in case study research. There is no specific formula or equation to determine the desired analysis technique. However, three main strategies are also suggested by Yin, that is pattern matching, explanation building, and time series. In the pattern-matching strategy, a comparison of an empirical pattern is being done with one or more existing patterns. In the explanation building strategy, the researcher provides an explanation about the cause or causes of the aspect of the case through certain statements. In the time series strategy, a comparison of a series of data points is done with the theoretical aspects, which were predicted before the research. 5. Report Writing: A report for the case study research can be in various forms. It can be either in a traditional format- problem, techniques, findings, and discussion or can be in a non- traditional format. Some case studies follow chronological order whereas some can be in a comparative format. However, any format can be followed, the report should be authentic, easy to understand, and should cover all the aspects of the study done. Advantages of Case Studies ? This method is favorable when detailed information is required about the topic. ? It provides clues and ideas for further research on the same topic. ? This approach gives a general idea about why the phenomenon or event has occurred. ? The researcher can deal with an abundance of information and information on a single topic of research. ? Multiple technique utilization makes this approach more valuable. Disadvantages of Case Studies ? Lack of scientific precision and accuracy is an issue. In some case studies, the research becomes sloppy and clumsy as the researcher influences the data collection with his own views. ? Case studies are not generalized forms. It can't be said that the results of all the case studies are peculiar and unique.

? Case studies are a time-consuming process and sometimes provides an abundance of data that is hard to analyze

4.3 Quantitative Research Methods

A systematic investigation of any quantifiable data that can be collected and analyzed statistically, mathematically, or with the help of computational techniques, is known as quantitative research. Such research methods are favorable for finding patterns, averages, testing casual relationships, making predictions, and generalizing the results for the wider range of the population. Quantitative research uses sampling techniques to collect data from existing and potential respondents and gives the results in the form of numerical values. This research approach is generally applied in the natural and social sciences field. Mathematical frameworks and theories are deployed by the researchers and statisticians to obtain the desired results of the illustration. The templates used in these research methods are objective and investigational resulting in the logical, statistical, and unbiased study. As mentioned earlier, quantitative research is data-oriented. Both primary and secondary data can be collected in these methods in a statistical manner. Some general characteristics of quantitative research methods are:

- ? **Structured tools:** Quantitative research uses structured tools such as surveys, polls, or questionnaires to collect data. Structured methods help in in-depth data collection.
- ? **Sample size:** Quantitative research is conducted on specific sample size. Choosing an appropriate sampling technique to obtain the required sample size is an important task.
- ? **Close-ended questions:** The close-ended questions serve the objective of the research. The questions which can be answered by limited options, usually multiple- choices, are known as close-ended questions. Although these type of questions give limited insight, they are suitable for gathering quantitative research data.
- ? **Prior studies:** Before conducting any quantitative research, the topic is thoroughly studied and then the feedback is collected from the respondents.
- ? **Quantitative Data:** The data so collected is represented in the form of tables, graphs, charts, etc. that makes the data more understandable and valid for market research.
- ? **Generalization of results:** Results once obtained can be generalized for the entire population and this generates the scope for improvement. Quantitative research methods include the process of quantification of data that means dividing the data into small parts and studying each part separately to get the idea of the whole topic. Specific variables correspond to the entire research study and are measured through statistical or computational analysis. In the following topics, we will discuss the three major methods of quantitative research that include Experimental research, Survey Research, and Content Analysis.

Figure 4.6 Types of Quantitative Research Methods

4.3.1 Experimental Research

The method of experimental research includes the manipulation of one or more casual variables and their effects on the dependent variables. Any experiment can be conducted in two types of environments: laboratory and field environment. Laboratory experiments provide artificial arrangements that are constructed specifically for the experiment whereas field experiments provide a natural setting for any experiment. Laboratory experiments have advantages over field experiments in terms of higher internal validity, the minimum effect of historical events, less time-consuming, using smaller test units, easy to conduct, less expensive. However, the results of laboratory experiments cannot be generalized. The following general concepts are used in experiments:

- ? **Independent Variables:** Also known as explanatory variables. The variables that do not have any dependency on other variables are independent variables. The researchers manipulate the levels of these variables to measure the effect on the dependent variables.
- ? **Test Units:** The entities on which the experiment is applied are called test units. The effect of treatment is measured on test units only. In general form, the test units can be individuals, organizations, events, and geographic areas.
- ? **Dependent Variables:** The variables that measure the effect of independent variables on the test units are considered as dependent variables. They can include profits, sales, market shares, brand awareness, etc. for a product in the market.
- ? **Experiment:** An experiment is conducted when one or more independent variables are manipulated and their effect is measured on the dependent variables while controlling the extraneous variables.
- ? **Extraneous Variables:** The variables other than independent variables that influence and affect the response of the test units to the treatments. They can include government policies, temperature, food intake, location, storage size, advertising by competitors, etc. Such variables can cause an adverse effect on the results of experiments. The experimental research method includes manipulation and observation. The independent variables are manipulated by the researchers and their response is observed on the dependent variables. The experiment can be conducted according to the following general steps:
- ? Selection of proper setting (natural or laboratory).
- ? Selection of appropriate experimental design.

? Operationalize the variables (both independent and dependent variables for manipulation and observation respectively). ? Strategize to manipulate independent variables. ? Selection and assignment of subjects to experimental conditions. ? A pilot study with less number of samples. ? Conducting the experiment. ? Data Analyzation An experimental design is an important aspect of the research procedure. The design of the experiment should be easy to understand and execute. It is simply surrounded by pre-test and post-test factors. However, an experiment is also influenced by variables, sample selection, measurement instruments, and control. Some of the most widely used experimental designs are Pretest-posttest control groups, Posttest-only control groups, Solomon-four group design, Quasi-experimental design, etc. 4.3.2 Survey Research One of the most widely used and oldest methods in Quantitative research is Survey research. A questionnaire containing structured questions related to the topic of the survey is given to the respondents and on the basis of their answers, a report is being prepared. Questionnaire designing plays a vital role in this research method. Depending upon the availability of resources, presently online surveys are also very common. The survey helps in decision-making, understanding the mindset of people, generally in the field of business, politics, consumer and activist groups, and media. Due to the increased use of the survey method, the focus has increased to sample selection, questionnaire designing, error analysis, etc. The method requires proper and careful planning and execution. The surveys can be classified into two types: ? Descriptive Survey: A descriptive survey describes the current or present condition of the surroundings. For example, the broadcast stations continuously conduct surveys on their audiences to determine the interest and choice of the programs. ? Analytical Survey: An analytical survey describes the reason for the situation to exist. In this method, two or more variables are examined that investigate the research questions. The result helps in examining the relationships between the variables and to determine explanatory conclusions. Although survey designing seems to be a simple task, eventually it requires a lot of practice. The questions in a survey can be open-ended or close-ended. The open-ended questions provide freedom to the respondents to create their own answers while in the close-ended questions, the respondents are allowed to choose the answer from the options given. The following aspects should be kept in mind while designing a questionnaire for the survey: ? The basic step is to analyze and understand the goals of the survey. This helps in including only relevant questions. ? The questions of the survey should be clear and explicit. ? The questions should be able to thoroughly communicate the requirements from the respondents. ? The researcher should not assume that the respondents already understand the questions they are asked. Advantages of survey research ? Surveys are helpful in identifying problems in real-life situations. The basic modes of communication such as newspapers, TV, radio, etc. can contribute to investigating consumer behavior patterns rather than creating an artificial setting for the research. ? Surveys are quite cost-effective, even some online surveys are free of cost. ? A large amount of data is easily obtained from the survey method from distinct people. Variables like lifestyle, attitude, perception, motives, intentions, etc. can be examined through surveys and the data can be analyzed using a variety of statistical methods. ? This research method is not restricted to any geographical boundaries. Disadvantages of Survey research ? The manipulation of independent variables is not the same as it is in the laboratory experiments. The researcher is not able to establish a relationship between dependent and independent variables. ? Inappropriate designing of questions can affect the authenticity of the survey. ? Sometimes it is possible that wrong respondents get included in the survey which could affect the survey efficiency. ? The decline in response rate from respondents can cause survey failure. 4.3.3 Content Analysis The content analysis research method is already discussed in previous units. Here, the focus is on the quantitative approach for content analysis, specifically in the field of mass media. This method has gained popularity among mass media researchers as it is effective in analyzing the content of media in terms of commercials or advertisements in both broadcasting and print media. Walizer and Wienir (1978) have defined content analysis as a systematic approach to examining the content of recorded data. According to Krippendorff (2004), content analysis is a method used to make replicable and authentic references of the data according to its context. Kerlinger (2000) typically explains content analysis to be a method of studying communication in a systematic, objective, and a quantitative way for measuring variables. Here, systematic means that the choice of content to be analyzed is explicitly according to certain rules; objective means the analysis of the content should be free from being biased by the researcher's personal views; quantitative means the precision in the content analysis that is obtained from quantifying the content. For example, 'eighty percent of marketing is influenced by social activities' is more precise than 'Social activities have a great influence on marketing'. Generally, content analysis can be conducted in the following stages: 1. Formulation of the research question. 2. Defining the universe in question. 3. Selection of appropriate samples. 4. Selecting a unit of analysis. 5. Creating categories of content to be analyzed. 6. Establishing a quantification system. 7. Training of the coders and conducting Pilot study. 8. Data Analysis and Results Figure 4.7 Steps to conduct Content Analysis

The reliability and validity of the content analyzed is an important aspect of the research method. Research is considered to be reliable when repetitive measurements of the same content or material give similar conclusions and decisions. To achieve reliability in the process, the coders should be well trained about the guidelines and strategy of the research, and categories of the content to be analyzed should be well defined to filter out the irrelevant information. Besides reliability, the validity of the analysis is also important. Validity can be defined as

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the extent to which an instrument actually measures what it is supposed to measure.

If the analysis contains faulty sampling design, overlapping categories, and low reliability, then it is not considered to be a valid analysis.

4.4 Difference between Qualitative and Quantitative Research

One can easily differentiate between the two research methods, considering different aspects.

S.No.	Aspect of differentiation	Qualitative Research	Quantitative Research
1.	Research Objective	Used to explore and understand the reason for a particular phenomenon.	Used to study quantified data that is suitable for predicting the occurrence of a particular phenomenon.
2.	Research Design	The design is exploratory and loosely structured.	Structured design with a measurable set of variables.
3.	Sampling Plan	Usually small samples.	Large samples.
4.	Data Collection	In-depth data collection through a more interactive and unstructured approach.	Data collection through a formatted and structured approach.
5.	Data Analysis	Textual and usually non- statistical	Numerical and Statistical

4.5 Audience Research

in print and electronic media

The term 'audience' refers to a group of people who are involved in consuming any kind of information that can be text, audio, or video. These people can be newspaper or magazine readers, radio listeners, or television viewers depending upon the medium of the information being sent to them. Mass communication mainly focuses on the effect of the circulated information being made on the audience. The media seems to be incomplete without an audience. The channel for broadcasting the message is chosen according to the audiences influenced by it. For instance, there is more accessibility to newspapers in comparison to radios or television in a rural area, so the widely used transmission channel for that particular area will be preferred to be newspapers. Audience Research refers to determining the reach, exposure, and environmental context of mass media to the audience. The data collection and analysis to provide feedback to the media organizations is demonstrated from the research conducted on the audiences. This audience research helps in planning the program, formulation of policy, and qualitative advancements. The media organizations should be aware of the requirement of the audiences and the suitable format of the information to be broadcasted for an effective projection. The research on audiences is helpful in the following aspects:

- ? Deciding the usefulness of a particular program.
- ? Strategizing media policies.
- ? Choosing and filtering the required content.

? Determining the efficiency of the medium and strategy of communication. Different theories and models have been designed and evolved over the years in media studies that have affected the perception of the audience. Researching the audience aims at establishing their relationship with the mass media. The prominent approaches for audience research may include media effects, cultivation analysis, uses and gratification, cultural studies, reception analysis, and everyday life. Audience Research in Print Media Focusing on the audience research in the print media, much of early print media research was qualitative in nature. With the advancement in quantitative research techniques, print media research became more empirical. It was first recognized by Wilbur Schramm (1957) how quantitative research methods were taking over the newspaper and magazine articles. The data was easily available and advancement in sophisticated tools became the reason for this switch from qualitative to quantitative approaches. Basically, four types of studies are conducted by the print media researchers: Readership, circulation, management, and website usability. Readership deals with the interest of the audience in reading newspapers and magazines depending on the reader profiles, item-selection studies, uses and gratifications studies, and journalist–reader comparisons. Circulation implies to determine the aspects of delivery, pricing system, and the number of people involved in the medium of print media. For instance, a newspaper circulation study will help in determining the number of people who subscribe to the newspaper or buy it from vending machines or read them online. Management in print media deals with distinct management structures to be applied in the print media strategies that can help them in increasing the circulation and readership of the newspapers and magazines. Website Usability research has gained popularity in recent years, in which the users of the product are asked to perform certain tasks that can help in measuring product’s feedback, its ease-of-use, and user’s experience about the product. Audience Research in Electronic Media “Research is the only way to find out about a target audience and what they want from a station. Research helps us determine when we must adjust our business to meet new demands. This is important because changes in broadcasting can happen in a matter of minutes. Competition has increased dramatically with the advent of the Internet. We are now competing with stations from around the world in addition to local competition. How do we best serve your audience? We have to ask them.” -Phil LoCascio (2009) The audience research in electronic media implies the feedback of audiences in transmitting information through any broadcast medium. The method of ratings in electronic media has a vital contribution to the research. Ratings are used in broadcasting and decision-making processes. Other than ratings, the non-rating methods like focus groups, image studies, music research, and program testing are also frequently used in the research for data collection. Audience research in electronic media is important to learn about the audiences’ interest in watching programs and how they use media in their everyday lives. The competition between TV viewers and radio listeners gives way to the need for research in this field. The audience is fragmented according to the programs they watch on TV. For instance, TV programs are different for kids and adults. 4.6 Summary Let’s summarize the unit into some key points: ? Qualitative research is concerned about collecting and studying non-numerical data that includes audio, video, texts which help in gaining in-depth knowledge about the concepts and opinions of the required research field.

? The qualitative research methods include field observation, field experiments, ethnography, focus groups, case studies. ? A systematic investigation of any quantifiable data that can be collected and analyzed statistically, mathematically, or with the help of computational techniques, is known as quantitative research. Mathematical frameworks and theories are deployed by the researchers and statisticians to obtain the desired results of the illustration. ? The three major methods of quantitative research include Experimental research, Survey Research, and Content Analysis. ? Audience Research refers to determining the reach, exposure, and environmental context of mass media to the audience. The prominent approaches for audience research may include media effects, cultivation analysis, uses and gratification, cultural studies, reception analysis, and everyday life. ? Basically, four types of studies are conducted by the print media researchers: Readership, circulation, management, and website usability. The audience research in electronic media implies the feedback of audiences in transmitting information through any broadcast medium. 4.7 Key Terms ?

Ethnography: Ethnography refers to a special qualitative research method focusing on the study of anthropology and sociology. It is an approach where the researchers are involved in analyzing a community, tribe, or nation. ? Heuristic Case Study: A case study that aims to illustrate new interpretations, new meanings, and new perspectives about the phenomenon. ? Pilot Study: A study or survey that is just a rehearsal of the main survey and helps in dealing with the big surveys and inquiries. It can easily point out the weaknesses of the questionnaire and the survey method. ? Extraneous Variables: The variables other than independent variables that influence and affect the response of the test units to the treatments. They can include government policies, temperature, food intake, location, storage size, advertising by competitors, etc. Such variables can cause an adverse effect on the results of experiments. 4.8 Check Your Progress Q1) Distinguish between qualitative and quantitative research. for different research aspects. Q2) What is the Focus group method of qualitative research? Give the merits and demerits of the focus group discussion method. Q3) Explain the process of conducting a content analysis study. Q4) Write a short note on audience research in print media. Q5) State true or false: a) Qualitative research methods are more expensive and time-consuming than quantitative research methods. b) The ethnography method is used to study audience research in electronic media. c) Survey research is not dependent on the questionnaire. d) A case study can utilize all the possible research techniques for both individuals and groups, to understand and demonstrate the whole process or phenomenon. e) In the content analysis method, the reliability and validity of the content analyzed is an important aspect. References

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Wadsworth Cengage Learning. Research Methodology Methods and Techniques, 2 nd revised edition, C.R. Kothari, New Age International Publishers. Research Methodology Concepts and Cases, 2 nd edition, Dr. Deepak Chawla and Dr. Neena Sondhi, Vikas Publishing House Pvt. Ltd. <http://egyankosh.ac.in/bitstream/123456789/34807/1/Unit-17.pdf> <http://egyankosh.ac.in/bitstream/123456789/57201/1/Unit2.pdf>

Unit 5 - Statistical Applications I Structure 5.0 Introduction 5.1 Unit Objective 5.2 Statistical Applications 5.3 Classification and Tabulation of Data 5.3.1 Classification of Data 5.3.2 Tabulation of Data 5.3.2.1 Data distribution in Tabular form 5.4 Univariate & Bivariate 5.5 Diagrammatic And Graphical Presentation 5.6 Sampling 5.6.1 Guiding Principles And Types of Sampling 5.6.2 Types of Sampling 5.7 Unit Summary 5.8 Key-Terms 5.9 Check Your Progress 5.0 Introduction This unit shall explain the basics of statistical analysis in research. Statistics application is an organized way of collecting and studying data. A researcher presents the data using statistical methods. Statistics is a kind of activity that a researcher cannot avoid in presenting the data and research conclusions. 5.1 Unit Objective This unit has the objective of teaching statistical applications of data in communication research, where the following topics shall be covered like: - Classification and Tabulation of Data - Univariate & Bivariate - Data distribution in Tabular form and Graphical Form - Sampling - Guiding Principles And Types of Sampling 5.2 Statistical Applications Collecting, organizing, analyzing, interpreting, and presenting data is acknowledged as a statistical approach to data for studying it. Statistics is a mathematical method used in analyzing data. It provides valid and reliable results. Today with the use of computers - analyzing, organizing, and presenting data has become advanced, useful, and convenient. Communication research professionals face tower growth of data daily. Besides, to stay competitive, and to understand and utilize the researched information it is desired to use a statistical approach. A researcher presents the data using statistical methods. Statistics is a kind of activity that a researcher cannot avoid in presenting the data and research conclusions. Most research studies provide a large volume of raw data, and to read, comprehend, and analyze, we need to arrange the data into a suitably reduced size. We can do it effectively with the use of established scientific procedures of statistics.

5.3 Classification and Tabulation of Data Under the classification and tabulation of data, we arrange the raw data in classes and through the process of tabulation can summarize it. 5.3.1 Classification of Data We arrange raw data in groups or classes based on common characteristics. The characteristics are either descriptive or numerical in nature. Descriptive is like literacy, sex, honesty, etc. and numerical are like weight, height, income, etc. Classification reduces the size of the large gathered raw data. Depending upon the characteristics classification is of two types: Figure 5.1 Classification of Data A. Classification based on attributes - Descriptive (qualitative): When data is classified based on descriptive characteristics, such a classification is called classification based on attributes. Descriptive characteristics are the qualitative phenomenon and cannot be measured quantitatively. Data arranged this way is known as statistics of attributes. It can be a simple classification or manifold classification. In the simple classification, considering only one attribute we divide everything into two groups. One group shall have all those items which have the given attribute and the other group will have all those items which do not have the given attribute. In the manifold classification, considering two or more attributes we divide the data into several classes. B. Classification according to class-intervals - numerical (quantitative):

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Such data are known as statistics of variables and are classified based on class intervals. For example, classifying persons whose incomes are within Rs 201 to Rs 400 into one group

and classifying or grouping persons whose incomes are within Rs. 401 to Rs. 600 into a different group and so on shall be known as classification according to class-intervals. Notice: With each group of class-interval you shall find

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an upper as well as a lower limit. The difference between the two class limits is known as class magnitude. We may have classes with equal class magnitudes or with unequal class magnitudes. The number of items that fall in a given class is known as the frequency of the given class. 5.3.2

Tabulation of Data Tabulation is the process that helps in summarising the mass and raw data and in displaying it with the attribute of compactness too. To arrange the data in the compact display for analyzing it we use tables of columns and rows. It is one such important process of statistical application to your data that we use it for several reasons like: ? It helps in comparing the data. ? It helps in summarising large data. ? It helps in statistical computations. Tabulation can

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be classified as - simple and complex tabulation. Simple tabulation gives information about one or more groups of independent questions.

Such tabulations give answers to questions on knowing one characteristic of data. Complex tabulation presents a kind of division of data in one or more categories. Such tabulations usually give answers to questions on knowing about two or three characteristics of data. For the tabulation of data: ? We use a minimum of space. ? We use short statements for explanations. ? We can use mechanical or electronic devices like computers, depending upon the size of the data. ? We use a clear and concise title for the table. ? We use clear and brief column headings and row headings. ? We can use explanatory footnotes if required. ? We use the citation of sources and indicate the same just below the table. ? We use abbreviations. ? We use the

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logical, clear, accurate, and simple presentation of data. ? We can arrange data in a table on chronological, geographical, alphabetical, or any facilitating way. The table must suit the needs and requirements of

an investigation, analysis, or study to conclude. 5.3.2.1 Data distribution in Tabular form The following are given two tables 5.1 and 5.2. Table 5.1 depicts the distribution of data and Table 5.2 draws the frequency distribution of data collected. During a survey, some people were asked a question "How many hours did they spend on watching television during the last two days?". Their answers or collected data is arranged into a collection of numbers like: Table: 5.1 Data Distribution Respondent Hours Respondent Hours A 10 H 7 B 9 I 2 C 8 J 3 D 12 K 5 E 5 L 16 F 2 M 14 G 8 N 10 Table: 5.2 Frequency Distribution Hours Frequency 2 3 5 7 8 9 10 12 14 16 3 1 2 1 2 1 1 1 1 Table: 5.3 Frequency Distribution using Grouped Intervals Hours Frequency 0-5 6-10 11-15 16-20 6 6 2 1 After the distribution of data through 'frequency distribution' and 'frequency distribution in groups', a pattern of reading the data could emerge. Though in the frequency distribution (5.2) the individual score of data has lost. In the frequency distribution table, you can incorporate other columns for showing proportions or percentages and cumulative frequency also. The percentage shall be obtained by dividing the frequency of the individual response by N (the total no. of responses in the distribution). Cumulative frequency (cf) Some frequency distributions include the cumulative frequency (cf), constructed by adding the number of scores in one interval to the number of scores in the intervals above it (table 5.4). Table: 5.4 Frequency Distribution with Columns for Percentage, Cumulative Frequency, and Cumulative Frequency as a Percentage of N Hours Frequency Percentage Cumulative frequency (cf) Cumulative percentage of 'N' 2 3 5 3 1 2 20 *7 13 3 4 6 20 27 40 7 8 9 10 12 14 16 1 2 1 2 1 1 1 7 13 7 13 7 7 7 7 9 10 12 13 14 15 47 60 67 80 87 93 100 15 = N 100% *Rounded off 5.4 Univariate & Bivariate Univariate and bivariate are the two kinds of variables. In statistical research, defining the term 'variable' we can say, it is an attribute of an object of study or research. It is a measurable characteristic that varies. Variables can be qualitative like blue, green, or numeric i.e quantitative like when we are talking about the number of people in an auditorium, it is a quantitative variable. In statistics research, univariate and bivariate are such two types of variables that are used in communication research for studying data. Figure 5.2 Types of Variables Conducting a study by looking at only one variable is - working with univariate data. For instance, suppose a survey is conducted to estimate the average height of class 5 students. Here the study is about one aspect: the height means one variable, it shall be identified as we are working with univariate data. When we conduct a study that examines the relationship between two variables, we are working with bivariate data. Suppose a study is being conducted to see if there is any relationship between the height and weight of class 5 school students. 5.5 Diagrammatic And Graphical Presentation After collecting the data for a research study, it needs to be summarized for the objective of analyses or findings. Studying raw data through multiple sheets or unorganized or disarranged ways cannot help a researcher or analyst to study it. Well summarized, organized and presented data through the use of tables, graphics, or diagrams not only facilitate a researcher into summarizing data but facilitate in reaching the findings or results also. Using tables and graphs or diagrams enhances data visualization also with the creative powerful visuals. It consolidates or condenses data and makes it easier for interpretation. If 100 people were asked how long they watched television yesterday, all the 100 answers recorded on more than one sheet shall not be easier to read and to reach a conclusion by going through all the sheets. Arranging or organizing the data in a meaningful way - using the descriptive statistics shall help to read and reach a conclusion through the analysis. We can summarize and present the data with visual representations like graphs and diagrams.

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The visual representation of the findings in the form of lines, boxes, and bars makes it easier to comprehend and interpret		

the data. For incorporating the graphics and diagrams, the researchers follow

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some standard rules and procedures for this. There are computer programs like MS Excel and SPSS		

that help in converting the data into graphical form.

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Line and curve graphs: When the objective is to demonstrate trends and patterns in the data, a line chart is the best option a researcher can use. The line		

on the line chart can describe changes and patterns in growth or fall so clearly. Some points to keep in mind while forming a line chart are like: ? Keep the time units or the causal variable of study on the x-axis (horizontal axis). ? Use lines in different colors to compare different series on the same chart. ? Do not use too many lines on the same chart to avoid confusion. ? Formulate the zero base-line in the chart to avoid misleading interpretation. Figure 5.3 Line Chart Examples (Source:<https://www.wallstreetmojo.com/line-chart-examples/>)

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Area or stratum charts: Area charts are like the line charts and are usually used to describe changes in a pattern over some time. Here multiple lines are essential components of the original composite data.

Changes in each element or component are individually described on the same chart.

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The areas between the various lines indicate the scale or volume of the relevant factors

or categories (fig.5.4).

Figure 5.4 Area or Stratum Chart (Source: [slidesharecdn.com](https://www.slidesharecdn.com)) Pie charts: It is

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another way of describing the area or stratum or sectional representation. Though, the main difference between a line and pie chart is that the pie chart does not show changes over time.

The pies or slices in

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the chart indicate the ratio of that section to the total area.

Figure 5.5 Pie Chart (Source: <https://apexcharts.com/javascript-chart-demos/pie-charts/>) Bar charts and histograms:

Histograms or bar charts are the most common form of a graphical presentation of data.

A bar-chart helps in representing a comparative position of objects clearly. A researcher can use either horizontal or vertical bars if none of the variables is time-related. where the researcher wants to show both positive and negative patterns on the same graph, he should use the horizontal bars. The arrangement of bars can help in displaying the increasing or decreasing flow of data. The histogram is a

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variation of the bar chart, where the bars are vertical and the height of each bar indicates the relative or cumulative frequency of that particular variable.

In the histogram chart, the plotted bars depict the distribution of a set of data. A researcher uses a histogram when he intends to organize and display the data in a reader-friendly format as it communicates information graphically. It helps in summarizing the data. In the histogram, the values of the variable are held on the horizontal axis scale known as X-axis and the frequencies are held on the vertical axis scale. Figure 5.6 Bar Chart & Histogram (Source: keydifferences.com/difference-between-histogram-and-bar-graph.html) One can easily identify the two - bar graph and histogram as there will be a gap between the bars in a bar graph while the bars of a histogram shall be touching each other. In the histogram, the elements are grouped while in a bar graph all the elements are taken as individual entities. In a histogram, the height of the bars need not be the same, while in a bar graph all the bars shall be of the same size. 5.6 Sampling Sampling is - data collection from a part of units of population or universe. Here the word population or universe represents the entire group of units that are in the focus of the study. The population could consist of all the persons in the country, or in the world, or in a particular geographical location, or of a special ethnic or economic group who are the focus of the study. For example, during a survey around 100 above sixty years of age men and women were asked a question. Here the survey involves the method of sampling as the 100 men and women are the part of that population or group of people who are the focus of the study. Sampling is considered to be an economical and less time-consuming method of study. Sampling involves - defining the object of research, identifying the population or universe, deciding the sampling unit, the size of the sample, considering the budget available, and choosing the techniques to be adopted.

5.6.1 Guiding Principles And Types of Sampling Sampling is basically of two types – probability and nonprobability. Probability sampling uses mathematical guidelines. Nonprobability sampling does not use mathematical guidelines. One researcher can consider some guiding issues or principles for deciding whether to use probability or nonprobability sampling. The objective of the study: Where the purpose of the research or studies is not to generalize the results to the population but rather to investigate variable relationships, nonprobability sampling shall be appropriate. Cost versus value: Where the cost of 'probability sampling' is quite about the type and quality of information collected then 'nonprobability sampling' is usually adequate. Time - constraints: Where the searchers are collecting preliminary information, they may have time- constraints then 'probability sampling' is often considered adequate. Amount of acceptable error: Where the amount of error is not the prime concern, a nonprobability sample is usually fair. 5.6.2 Types of Sampling As mentioned above sampling can be classified as - Probability Sampling and nonprobability sampling. Probability sampling is further classified as: ? Simple Random Sampling: In simple random sampling, the members are selected randomly. Sometimes researchers use a lottery system to select the members randomly. Such a kind of sampling shall be useful for such a highly homogeneous population. ?

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Stratified random Sampling: In stratified random sampling the population shall be divided into sub-groups and

then from the sub-groups members shall be selected randomly. ? Systematic Sampling: In systematic sampling, a member coming after a fixed gap shall be selected and the member is known as 'Kth element'. For example, selecting from 1000 members; The sample shall be 100, 200, 300.....1000. ? Cluster Sampling: In cluster sampling, clusters are different segments of a population, and members shall be selected from the clusters randomly. The cluster sampling method may seem to be similar to stratified sampling, but there is a difference between both. In stratified sampling the population is divided into homogeneous sub-groups like age, profession, etc. but in cluster sampling, it is not so. In cluster sampling, the groups will be like a society or a family or a district or a firm. ? Multi-stage Sampling: In multi-stage sampling, the clusters are divided into smaller clusters and members shall be selected from these smaller clusters randomly. These smaller clusters can be further divided into more small clusters depending upon the necessity of the research or studies.

Figure 5.7 Types of Multi-stage Sampling In non-probability sampling,

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each member of the population shall not be getting an equal chance of being selected in the sample.

This kind of sampling is adopted when a researcher is selective about the members. For example, to study the impact of child labor on the education of young slum area children, a researcher shall select only those children from a slum area who are instead of going to school are going on work. Non-probability sampling is further classified as: ? Purposive Sampling: In purposive sampling, members shall be selected according to the purpose of the study. For example, studying the impact of lock-down during the Covid-19 pandemic on the students of college students studies, a researcher shall be selecting the college students only and not the middle school or higher school students. ?

Convenience Sampling: In the convenience sampling, members are selected based on their convenience of accessibility. Hence, only those members that are easily accessible shall be selected by a researcher. For example, studying the impact of new education policy on the academic growth of students, a researcher may visit different schools with a prepared questionnaire to interview teachers in different schools. ?

Snowball Sampling: Snowball sampling is also known as 'chain sampling'. A researcher uses the 'chain-sampling' when it is not easy to identify or reach the members of the sample. In this kind of research method, a researcher finds the other member of sampling through one member and so on. ?

Quota Sampling: in quota sampling, members are selected based on some specific characteristics like age, sex, profession, interest, and so on.

5.7 Summary Let's summarize the unit into some key points: • Collecting, organizing, analyzing, interpreting, and presenting data is acknowledged as a statistical approach to data for studying it. Under the classification and tabulation of data, we arrange the raw data in classes and through the process of tabulation can summarize it. •

Tabulation is the process that helps in summarising the mass and raw data and in displaying it with the attribute of compactness too. To arrange the data in the compact display for analyzing it we use tables of columns and rows. •

Univariate and bivariate are the two kinds of variables. In statistical research, defining the term 'variable' we can say, it is an attribute of an object of study or research. It is a measurable characteristic that varies. Variables can be qualitative like blue, green, or numeric i.e quantitative like when we are talking about the number of people in an auditorium, it is a quantitative variable.

• Studying raw data through multiple sheets or unorganized or disarranged ways cannot help a researcher or analyst to study it. Well summarized, organized and presented data through the use of tables, graphics, or diagrams not only facilitate a researcher into summarizing data but facilitate in reaching the findings or results also. A common form of a graph is the histogram, or bar chart, where vertical bars represent frequencies. • Sampling is - data collection from a part of units of population or universe. Here the word population or universe represents the entire group of units that are in the focus of the study. The population could consist of all the persons in the country, or in the world, or in a particular geographical location, or of a special ethnic or economic group who are the focus of the study. • Sampling can be

classified as - Probability Sampling and nonprobability sampling. • 5.8 Key Terms ? Descriptive statistics are used to describe the data in a study, in a summarising way. ? Univariate variable: When data has only one variable to study about, it is called a univariate variable. ? Bivariate variable: When data has more than one variable to study about it is called a bivariate variable.

5.9 Check Your Progress Answer the following questions: Q:1) What do you understand about the statistical application in research methodology? Q:2) Under the classification of data how do we classify data, explain? Q:3) What do you understand by the method of sampling in research? Q:4) Complete the following lines: a. Statistics is a _____ used in analyzing data. b. We arrange raw data in _____. c. Complex tabulation presents a kind of _____.

d. Graphs have two perpendicular lines: _____. e. Where the amount of error is not the prime concern, _____ is usually fair. Q:5) State True or False: a. In stratified random sampling, the population shall be divided into sub-groups, and then from the sub-groups members shall be selected randomly. b. In statistics research, univariate and bivariate are such two types of variables that are used in communication research for studying data. c. The tabulation of data helps in comparing the data. d. In the simple classification, considering two or more attributes we divide the data into several classes. e. In quota sampling, members are selected based on some specific characteristics like age, sex, profession, interest, and so on. References Research Methodology Methods and Techniques, 2nd revised edition, C.R. Kothari, New Age International Publishers.

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Mass Media Research, 9th edition, Roger D. Wimmer & Joseph R. Dominick

Unit 6 - Statistical Applications II Structure 6.0 Introduction 6.1 Unit Objective 6.2 Test of Hypothesis 6.2.1 Basic Concepts Concerning Testing Of Hypotheses 6.3 Probability 6.3.1 Probability distribution 6.3.2 The Normal distribution 6.4 Statistical Tests 6.4.1 T-Test 6.4.2 Chi-Square Test 6.5 Measures of Central Tendency & Measures of Variability 6.5.1 Central Tendency: 6.6 Basic Correlation Statistics 6.6.1 Pearson Product-moment Correlation 6.6.2 Spearman's Rank 6.7 Measurement Scales 6.7.1 Simple Rating Scales 6.7.2 Arbitrary Scales 6.7.3 Thurstone scales 6.7.4 Likert Scales or Summated Rating Approach 6.8 Unit Summary 6.9 Key Terms 6.10 Check Your Progress 6.0 Introduction This unit shall introduce you to other statistical applications in communication research. In the words of Bailey (1978) "A hypothesis is a proposition in testable form and predicts a particular relationship between two or more variables". The test of the hypothesis provides a variety of benefits to a researcher. Statistics tests like -the T-test is a - statistical test that offers an opportunity to compare between two group means. Chi-square Test is one of the most commonly used non-parametric tests, which is used to determine the difference between expected frequencies and observed frequencies in one or more than one category. The collected data can be summarized further with the use of summary statistics. Summary statistics is the method that helps in making data more manageable by measuring two basic tendencies of distributions: central tendency and dispersion, or variability. There may be a relationship between any two variables, and the mathematical expressions of the degree to which two variables change about each other are known as measures of association or correlation. When the available data is not in numeric form but the information is sufficient to rank the data as Ist, IInd and IIIrd and so on for doing correlation analysis, we often use the 'rank correlation method'. In communication research, a researcher happens to use the statistical system of scaling techniques when he is assigning numbers or symbols to such characteristics as attitudes, preferences or perceptions, etc. not the objects. 6.1 Unit Objective This unit has the objective of teaching statistical applications of data in communication research, where the following topics shall be covered like:

- Test of Hypothesis - Basic Concepts Concerning Testing Of Hypotheses - Probability: Probability distribution, The Normal distribution - Statistical Tests: T-Test & Chi-Square Test - Measures of Central Tendency & Measures of Variability - Basic Correlation Statistics & Spearman's Rank - Measurement Scales - Simple Rating Scales, Arbitrary Scales, Thurstone scales, Scales or Summated Rating Approach 6.2 Test of Hypothesis A problem or a question to test is always the reason behind any research. For a researcher, a raised or given question is the instinct behind its project of research. Mass media researchers use different approaches to answer questions. Starting with the research towards testing a question or problem, a researcher shall make some tentative generalizations. These generalizations may take two forms - 'research questions' and 'statistical hypothesis'. Where research questions do not help to predict an outcome, the statistical hypothesis does. In the statistical hypothesis, when a researcher develops studies that are based on some existing theory, they can make some predictions about the results of their work. Hence, a researcher can form a hypothesis, which gives a tentative solution to the question. The hypothesis suggests connections that can be observingly verified. According to Bailey (1978) "A hypothesis is a proposition in testable form and predicts a particular relationship between two or more variables". In the words of Grinnell (1988), "a hypothesis is written in such a way that it can be proven or disproven by valid and reliable data" Figure 6.1 Benefits and criteria of Good Hypotheses Benefits of Hypotheses: It provides a variety of benefits to a researcher: - The beginning of research with hypotheses, provide a starting point. In the absence of hypotheses, research may lack focus and clarity. - Hypotheses reduce or eliminate trial-and-error research. - As hypotheses, direct research towards precise testable statements, other variables that might be relevant or not can be eliminated. - Hypotheses allow - quantification of variables. Whenever a concept is given a proper operational definition it can be quantified and hypotheses felicitate and demand it. Terms that cannot be quantified cannot be included in a hypothesis. A valuable hypothesis must have at least four essential characteristics - It should be compatible with current knowledge in the area, it should be logically consistent, it should be stated concisely, and it should be testable 1 6.2.1 Basic Concepts Concerning Testing Of Hypotheses Basic concepts in relation to testing of hypotheses have been categorized and they are like: Null hypothesis and alternative hypothesis On a hypothesis finding - any two given variables having no comparison, as they are equally good, then it shall be considered a null-hypothesis. Whereas the hypothesis finding shows or brings out any scope of comparison between or among the variables, it shall be considered an

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alternative hypothesis. The null hypothesis is generally symbolized as H_0 and the alternative hypothesis as

H_1 .

Significance level or probability level In hypothesis testing, a researcher either rejects or accepts the null hypothesis. This is like, if H_0 is accepted then it shall be assumed that H_1 is rejected; and if H_1 is accepted then it shall be assumed that H_0 is rejected. In hypothesis testing, a researcher sets a probability level or significance level against which the null hypothesis is tested. Where on the findings or studies the probability is lower than this level the researcher shall reject the null hypothesis. But if the result shows high probability, the researcher shall support the null hypothesis. The probability level is represented by a lowercase letter p followed by a "less than" or "less than or equal to" sign and then a value. For example: " $p \leq .01$ " indicates that the null hypothesis is being tested at the .01 (one percent) level of significance and that the results will be considered statistically significant if the probability is equal to or lower than this level. In mass media research studies, It is a common practice to set the probability level at .01 or .05. This means that either one or five times out of 100 significant results of the study occur because of random error or chance. Area of rejection: In a sampling distribution or graphed display of sampling results, the proportion of the area in which the null hypothesis is rejected is called the region of rejection. The area shall be decided by the 'level of significance' which has been chosen by the researcher. In figure 6.2 the yellow highlighted area represents the area of rejection. One-tailed and two-tailed testing: In a graphical display of sampling results, the regions of rejection can be located in the tails or outer edges. The terms one-tailed testing and two-tailed testing refer to the type of prediction made in a 1R.D. Wimmer & J.R. Dominick "Mass Media Research"

research study. In a two-tailed test, we get two areas of rejection while in a one-tailed test there shall be one area of rejection. Two-tailed tests are mainly used when little information is available in the research area. One-tail tests are used when researchers have more knowledge of the area and are able to more accurately predict the outcome of the study. 2 Figure: 6.2 One-tail Hypothesis Graphical Representation Figure: 6.3 Two-tail Hypothesis Graphical Representation Error Types: There are

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two types of errors - Type-I error and Type-II error

which are particularly related to hypothesis testing. We may reject H_0 when H_1 is true and H_0 is accepted when it shows this fact that

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H_1 is not true. The former is known as Type I error and the latter is known as Type II errors. Type-I errors mean rejection of hypotheses that should have been accepted and type II errors mean accepting the hypothesis that should have been rejected. Sometimes Type I error denoted by alpha errors, also called the level of significance of test; and type II errors are denoted by beta known as

beta errors. "

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The probability of Type I errors is usually determined in advance and is understood as the level of significance of testing the hypothesis. If Type I error is fixed at 5 %, it means that there are about five chances in 100 that will reject H_0 when H_1 is true. We can control Type I error just by fixing it at a lower level ". 3 For instance, if we fix it at 1 percent, we will say that the maximum probability of committing

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type I error would only be 0.01. "

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with fixed sample size, n , when we try to reduce Type I errors the probability of committing type II errors increases. Both types of errors could not be reduced simultaneously. There is a trade-off between these two types of errors, which means that the probability of making one type of error can only be reduced if we are willing to increase the probability of making other types of errors. To deal with this trade-off in business situations, decision- 2

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Decision Accept H₀ Reject H₀ H₀ (true) Correct Decision Type I error (an error) H₀ False Type II error (an error)
 Correct Decision

Figure: 6.4 Error Types (Source: Book: Research Methodology by C.R.Kothari) 6.3 Probability Probability is a significant foundational concept of statistical tests and processes. Explaining probability in simple words - probability is how likely something is to happen. When one is unsure about the outcome of an event, he or she talks about the probabilities of certain outcomes based on how likely they are to happen. We learn the concept of probability in statistics through an example, for instance, a coin is being tossed for around 1000 times, where the head face comes about 300 times, then we can say that the probability of coming to the head face is 3/10. We understand the concept of probability with another classic example of a dice. If a dice is rolled then there is an equal chance of all the six faces to come up, hence the probability of dice coming up with number 5 is 1 out of 6. Symbolically: $Pr(D=5) = 1/6$ Here, D stands for the value on the dice. Probability always ranges between 0 and 1. A probability with 0 would mean that the event shall never occur or happen, while a probability of 1 would mean that it shall always occur. A numeric value that comes out is known as a 'random variable'. The quantity 'D' is a 'discrete random variable'. If the dice is about to be rolled for 600 times, there is a probability that each number (from 1 to 6) shall come 100 times. But if some numbers are seeming to come up a lot more than others, then we shall say the dice was loaded which means not fair. 4C.R.Kothari, "Research Methodology" 6.3.1 Probability distribution In statistics, an 'experiment' is any action where the result is not predetermined. The 'experiment' has a number of 'outcomes', and associated with each outcome is a probability. 'Probability distribution' lays out the probability of multiple outcomes. The 'probability distribution' of a 'random variable' depicts the probability of each outcome for the variable. 6.3.2 The Normal distribution The Normal distribution is the most common probability distribution for a continuous 'random variable'. A normal distribution has two parameters: mean and standard deviation. The distribution with $\mu = 0$ and $\sigma = 1$ is the standard normal distribution and the associated random variable is generally denoted by z. Figure 6.5 5 : The Normal distribution 6.4 Statistical Tests Statistics which are based on the normal distribution of the data are called parametric statistics. The T-test is an example of a parametric statistical test. The statistical tests, which are not based on the normal distribution of the data, are called nonparametric statistics or distribution-free tests. The Chi- square test is one example of a non-parametric test. 6.4.1 T-Test The T-test is a - statistical test that offers an opportunity to compare between two group means. For instance, if we want to compare boys and girls on health issues or whenever there are two groups we want to compare on the same, the t-test is a suitable statistical test. The Internet provides a variety of t-test calculators, or see Bruning and Kintz (1997) for a step-by-step t-test algorithm. 6 5Wayne Goddard and Stuart Melville, "Research Methodology An Introduction" 6R.D. Wimmer & J.R. Dominick "Mass Media Research" Common types of t-tests which are frequently used are dependent sample t-test and independent sample t-test. Figure 6.6 Common types of T-tests I. Dependent samples t-test: The dependent samples t-test is used to compare two sample means on a single variable (dependent variable). It is used to compare the mean of a single sample or paired samples. For instance, if a researcher is looking forward to researching the behavior of people under two circumstances before and after a storm, which has been announced to come in two days. The researcher shall maintain a group of people who shall be questioned or researched upon before and after the storm. Now the researcher shall have two sets of data from the same group. Then the researcher can compare the two means. Under the dependent sample t-test, each score is matched and because of this matching, the researcher can predict that the scores are interdependent. For such kind of study, dependent sample t-test is the appropriate statistics II. Independent samples t-test: Independent samples t-test is when we make a comparison between two samples' means which are not dependent on each other. For example, a comparison between a group of males and a group of females. Notify: While performing a t-test: - The scale of measurement should be continuous or ordinal in nature; - The data should be selected through probability sampling technique; - The data should be normally distributed; and - The sample should be adequate. 6.4.2 Chi-Square Test It is one of the most commonly used non-parametric tests, which is used to determine the difference between expected frequencies and observed frequencies in one or more than one category. It helps in measuring or examining the independence across two categorical variables.

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Chi-square, symbolically written as χ^2 (Pronounced as Ki-square), is a statistical measure used in the context of sampling analysis for comparing a variance to a theoretical variance. 7 As a non-parametric test,

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chi-square can be used as a test of goodness of fit and as a test of independence. 8 a. "goodness of fit-test":

Mass media researchers usually compare the 'observed frequencies' of a phenomenon with the 'expected or hypothesized frequencies'. For example, a researcher wants to learn if the sales of the smartphone of three companies in the current year are the same as the sales during the previous year. Here a hypothesis can be: "Smartphone sales of three major companies are not the same this year from those of the previous year." Let's look at the previous year's sales of smartphones: Companies Sale % Apple 22 Samsung 36 One Plus 19 Now from these sales, the researcher can determine the 'expected frequencies' by multiplying the percentage of each company's sales by 1,000. Companies Expected Frequency Apple 220 Samsung 360 One Plus 190 7C.R.Kothari, "Research Methodology" 8C.R.Kothari, "Research Methodology"

Subsequently, as the researcher conducted a survey, collected data, and determined observed frequency as: Companies Expected Frequency Observed Frequency Apple 220 180 Samsung 360 330 One Plus 190 220 Now to determine whether the change in frequency is notable, the researcher can interpret it by reducing the data to a chi-square statistic and performing a test known as the chi-square "goodness of fit" test. A chi-square χ^2 is simply a value that shows the relationship between expected frequencies and observed frequencies. It is computed by this formula 9 : where O_i is the observed frequencies and E_i is the expected frequencies. This means that the difference between each expected and observed frequency must be squared and then divided by the expected frequency. The sum of the quotients is the chi-square for those frequencies. b. As a test of independence: The χ^2

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test enables us to explain whether or not two attributes are associated. For instance,

a researcher is interested in knowing whether a new vaccine is effective in safeguarding against common flu or not. The χ^2 test will help him in deciding this issue. The researcher shall start

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with the null hypothesis that the two attributes i.e 'new vaccine' and 'common flu' are independent, which means that

the new vaccine is not effective in safeguarding flu. He shall

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first calculate the expected frequencies and then work out the value of χ^2 . Now on the calculated value of χ^2 : - If it is less than the table value at a certain level of significance for given degrees of freedom, he can conclude that the null hypothesis

stands. -

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But if the calculated value of χ^2 is greater than its table value,

then the inference will be that

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null hypothesis does not hold good which means the two attributes are associated. And the

new vaccine is effective in safeguarding against common flu. 9R.D. Wimmer & J.R. Dominick "Mass Media Research" Notify:

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Here, χ^2 is not a measure of the degree of relationship or the form of relationship between two attributes but is simply a technique of judging the significance of such association or relationship between two attributes. 6.5

Measures of Central Tendency & Measures of Variability The collected data can be summarized further with the use of summary statistics. Summary statistics is the method that helps in making data more manageable by measuring two basic tendencies of distributions: central tendency and dispersion, or variability. 6.5.1 Central Tendency: Central tendency statistics gives - a typical score, a single number that shall characterize the entire distribution. For every distribution, three characteristic numbers can be identified - Mode, Median, and Mean. Mode: Mode let us know the number that is occurring the most frequently in the data. One can know the 'mode' by merely inspecting the distribution of data and there is no need for calculation. But it is not much useful in respect of descriptive statistics as it focuses on only one number and other data numbers are not considered and ignored. We can not even analyze the most frequently occurring number in the descriptive data in a situation where more than one number, the other numbers are occurring for the same number of times The simple way to determine mode: The following is given a set of 11 numbers: 21,23,23,54,67,21,25,21,54,72,75 To find the 'mode' or 'the most frequently occurring number' we can arrange them in an order like: 21,21,21,23,23,25,54,54,67,72,75 No. 21 is occurring for the maximum times more than any other number, hence it is the mode. Median: It shall give you the midpoint of a distribution. If the numbers are in odd numbers of counts then the median is calculated in a certain way. To find the median, the numbers shall be put in an order from the smallest to the largest. The simple way to determine the median: consider the following given 11 numbers: 21,21,21,23,23,25,54,54,67,72,75 25 is the number which is placed at the midpoint of the distribution, where the 5 numbers are on its left and 5 numbers are on its right. Hence, 25 is the median in the given 11 numbers. Suppose, the numbers are 12(an even number) in counts: 21,21,21,23,23,25,54,54,67,72,75,75 Add both the numbers - 25 and 54 and divide the sum by 2 to determine the median of the given 12 numbers. Hence, $25+54 = 79/2 = 52$ is the median. Mean: The third type of central tendency statistic is the mean. Mean gives us the average of a set of numbers. Unlike the mode and the median, the mean considers all the values or numbers in the distribution. The simple way to determine 'mean': The following is given a set of 11 numbers. 22,23,23,54,67,21,25,21,54,72,75 Add all the numbers: $22 + 23 + 23 + 54 + 67 + 21 + 25 + 21 + 54 + 72 + 75 = 457$ Now divide the sum by the total number of counts. $457/11 = 41.54$ Hence, 41.54 is the 'mean' or the average number of the set of numbers. The arithmetic mean can be calculated by using the following formula: \sum = summation (the symbol is Greek capital letter sigma) N = the total number of scores in a distribution The purpose behind the statistical application is to describe the data in such a way that we could measure it efficiently. For example, 5 people were asked: "how many hours in the past two days they listened to the radio". The data comes like: A 10 B 10 C 10 D 0 E 0 The mean grade is 6. Does the number 6 portray the distribution desirably or accurately? In fact, here 'mode' shall provide a more characteristic description. Hence, where the data is at the nominal level, the 'mode' is meaningful; with ordinal data, either the mode or the median can be used. All three measures are appropriate for interval and ratio data. Dispersion: Dispersion is the second type of 'descriptive statistic'. It helps in measuring dispersion (distribution) or variance. Dispersion measures are particularly relevant in comparisons of different distributions. For example, the average turnover of two firms in research is the same, but one firm has some years of excellent turnover, and many of the poor turn-over; while the other firm has all the years of average turnover. A measure of dispersion shall be used by an investor to choose the company to invest. The three measures of dispersion, or variation, are range, variance, and standard deviation. The measure - range (R) is the difference between the highest and lowest scores in a distribution of scores. The formula used to calculate the range is $R = X_{hi} - X_{lo}$

where X_{hi} is the highest score and X_{lo} is the lowest score. The range is sometimes described simply as, for example, "the range among scores is 50". "The range expands with the sample size as larger samples tend to include more extreme values (outliers). For these reasons, the range is seldom used in mass media research as the sole measure of dispersion" 10 . The second measure - variance, is a mathematical index of the degree to which scores or numbers deviate (differ) from, or are at variance with, the mean 11 . Notify: - A small variance would mean that most of the numbers in the distribution are close to the mean. - A large variance would mean widely scattered scores. Hence, the variance is directly proportional to the degree of dispersion or difference among the group of scores" 12 . To compute the variance: - subtract mean from each score - these determined deviation scores are then squared, - the squares are summed and divided by $N - 1$. The formula for variance is : The standard deviation is considered to be more meaningful than the variance as it is expressed in the same units as the measurement used to compute it. 13 For example, a research project has a question on rates of smartphones that gives a variance of Rs. 30,000 interpreted as 30,000 "squared rupees". As the interpretation involves a question on household income that produces a variance of \$90,000— interpreted as 90,000 "squared dollars." Because the notion of "squared rupees" does not make a good sense, the researcher can choose to report the standard deviation. Standard deviation is symbolized as 'S' or 'SD' and is computed with the following formulas 14 . 10R.D. Wimmer & J.R. Dominick "Mass Media Research" 11R.D. Wimmer & J.R. Dominick "Mass Media Research" 12R.D. Wimmer & J.R. Dominick "Mass Media Research" 13R.D. Wimmer & J.R. Dominick "Mass Media Research" 14R.D. Wimmer & J.R. Dominick "Mass Media Research"

6.6 Basic Correlation Statistics There may be a relationship between any two variables, and the mathematical expressions of the degree to which two variables change about each other are known as measures of association or correlation. When two different measurements are being made of the same thing or person, the researcher shall assign one measure as the 'X variable' and the other measure as 'Y variable'. The relationship between the two variables may come up as negative or positive and uncorrelated.. ? A negative relationship is said to exist when one variable increases and correspondingly the other decreases. Sometimes, the relationship between two variables can be like - 'positive' up to a point, and then it turns negative. ? An uncorrelated relationship is said to exist when there is no tendency for a high score on one variable to be associated with a high or low score on another variable. 6.6.1 Pearson product-moment correlation As said, the mathematical expression of the degree to which two variables change about each other is known as 'measures of association or correlation'. And to measure the degree of relationship between two variables, the most commonly used statistics is the "Pearson product-moment correlation", which is symbolized as 'r'. It changes or ranges between -1.00 and +1.00. A correlation coefficient of +1.00 means - a positive correlation. While, -1.00 means - a negative correlation. The value of the Pearson 'r' coming as 0.00 indicates - no relationship exists between two variables. Hence, Pearson r provides two information: ? the sign part '-' or '+' states about the direction of the relationship. ? the number part provides - an estimate of the strength of the relationship For example, a correlation of -.53 is a stronger relationship than the +.20. Hence, the strength of the relationship depends only on the number. The formula for calculating r:

Here: X and Y are the original scores, N is the number of pairs of scores, and \sum again is the summation symbol. A correlation coefficient is one such number that is not expressed in units and sizes like feet or inches or a proportion or percentage. The Pearson r is independent of the size and units of measurement of the original data. 6.6.2 Spearman's Rank When the available data is not in numeric form but the information is sufficient to rank the data as 1st, 2nd and 3rd and so on for doing correlation analysis, we often use the 'rank correlation method'. "The rank correlation coefficient is a measure of correlation that exists between the two sets of ranks". It is based on the ranks of the observations and not on the numerical values of the data. As it was developed by the famous statistician Charles Spearman, it is also known as Spearman's rank correlation coefficient. For calculating the '

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rank correlation coefficient': Table 6.1 Steps to workout Spearman's Rank Correlation 15 First step: replace the actual observations by their ranks, giving rank 1 to the highest value, rank 2 to the next highest value, and

so on. If two or more values are happening to be equal: The average of the ranks which should have been assigned to such values had they been all different is taken and the same rank (equal to the said average) is given to concerning values. Second step: To record the difference between ranks (or 'd') for each pair of observations, square these differences to get a total of such differences. This can symbolically be stated as $\sum d^2$. Final Step: Spearman's rank correlation coefficient, r, is worked out as: : 15C.R.Kothari, "Research Methodology" The value of Spearman's rank correlation coefficient varies between ± 1 . Where +1 indicates - a perfect positive correlation and -1 indicates a perfect negative correlation between two variables. 6.7 Measurement Scales

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Scaling is considered - an extension of measurement. Measurement is a process of assigning numbers or symbols to the characteristics of an object.

In communication research, a researcher happens to use the statistical system of scaling techniques when he is assigning numbers or symbols to such characteristics as attitudes, preferences or perceptions, etc. not the objects. For example, items like - age, number of radios in a building can easily be measured without scaling techniques. But where the measurement of other variables involves like attitude toward radio listening the researcher shall use a suitable scaling measurement technique. Significantly, we can say that "A scale represents a composite measure of a variable. Scales are generally used with complex variables that do not easily lend themselves to single-item or single- indicator measurements" 16 . Several scaling techniques have been developed over the years. They are like: 6.7.1 Simple Rating Scales In mass media research, simple rating scales are commonly used by a researcher. A researcher selecting a type of scale asks a respondent to rate a list of items on a scale of 1 to 3 or 1 to 5 or 1 - 9 or 1 - 10 or 1 to 100. Usually, a researcher selects the type of scale based on the requirement as to where the requirement is of a scale that has more points (1-10) than fewer points (1-3) to help a researcher for greater differentiation on the item or items being rated he shall use the scale of more points. Universally the scale of 1 - 10 is the most commonly used. 6.7.2 Arbitrary Scales Arbitrary scales are developed on an ad hoc basis i.e on the necessity. Arbitrary scales are usually designed by a researcher himself. They can be designed to be highly particular and adequate and besides they can be developed easily with relatively fewer expenses, hence they are widely used in practice. This technique works like: On the collected statements or items which are according to a researcher are clear and appropriate for a given topic, he may select some of them to include in the measuring instrument. Then respondents or people shall be

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asked to check in a list the statements with which they agree. 6.7.3

Thurstone scales A Thurstone scale involves several "agree" or "disagree" statements. Based on the technique used to develop Thurstone scales, they are also called "equal appearing interval scales". Based on the Thurstone scaling technique: - First, a researcher collects a large number of statements that are relating to the concept. Thurstone advocates collecting at least 100 statements. - He shall now submit the statements to a panel of judges, who rate these statements on an 11 category scale. Where each category expresses a different degree of favorableness towards the topic. 16R.D. Wimmer & J.R. Dominick "Mass Media Research"

- Items are ranked according to the mean or median ratings given by the judges. Ratings help in constructing a questionnaire of 20 to 30 items. The statements are like that a person can agree or disagree with them. - The scale is then given to a sample of persons whose scores are determined by computing the mean or median value of the items agreed with. A person who disagrees with all the items shall have a score of zero. Considering the advantage and disadvantage of the scale, it is believed that: Advantages: - it is an interval measurement scale, - it is widely used for developing differential scales that are used to measure attitudes towards different issues like war, religion, etc. - it is reliable when used for measuring a single attitude. Disadvantages: - The Thurstone method is time-consuming and tiring work. - The values or rank assigned to statements by the judges may reflect their attitudes. Thurstone scales are frequently used in psychology and education research while are rarely used in mass media research. 6.7.4 Likert Scales or Summated Rating Approach Likert scale is the most commonly used scale - in mass media research. In the Likert Scales: - Numerous statements are developed concerning a topic. - Persons or respondents can - firmly agree, agree, stay unbiased, disagree, or firmly disagree with the statements. - The option of each response option is given a value. - Each person's responses shall be added to generate a single score on the topic.

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The procedure for developing a Likert Scale is as: - Collect a large number of statements relevant to the attitude. Some of the statements

shall be positive and some shall be negative. - Administer the scale to a sample of persons. - Code the answers with numbers from 1 to 5. The firmly agreeable shall be given the highest number while the firmly disagreeable shall be given the lowest number. - Analyze the responses. This way, we determine which statements frequently or regularly correlate with the low favourability and which with high favourability. 6.8 Unit Summary Let's summarize the unit into key points:

- A problem or a question to test is always the reason behind any research. For a researcher, a raised or given question is the instinct behind its project of research. Mass media researchers use different approaches to answer questions. Starting with the research towards testing a question or problem, a researcher shall make some tentative generalizations.
- Basic concepts in relation to the testing of hypotheses have been categorized and they are like Null hypothesis and alternative hypothesis, Significance level or probability level, etc.
- Probability is a significant foundational concept of statistical tests and processes. Explaining probability in simple words - probability is how likely something is to happen. 'Probability distribution' lays out the probability of multiple outcomes. The Normal distribution is the most common probability distribution for a continuous 'random variable'. A normal distribution has two parameters: mean and standard deviation.
- Statistics which are based on the normal distribution of the data are called parametric statistics. The T-test is an example of a parametric statistical test. The statistical tests, which are not based on the normal distribution of the data, are called nonparametric statistics or distribution-free tests. The Chi-square test is one example of a non-parametric test.
- Central tendency statistics gives - a typical score, a single number that shall characterize the entire distribution. For every distribution, three characteristic numbers can be identified - Mode, Median, and Mean.
- There may be a relationship between any two variables, and the mathematical expressions of the degree to which two variables change about each other are known as measures of association or correlation. When two different measurements are being made of the same thing or person, the researcher shall assign one measure as the 'X variable' and the other measure as 'Y variable'.
- When the available data is not in numeric form but the information is sufficient to rank the data as Ist, IInd and IIIrd and so on for doing correlation analysis, we often use the 'rank correlation method'.

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Scaling is considered - an extension of measurement. Measurement is a process of assigning numbers or symbols to the characteristics of an object.

In communication research, a researcher happens to use the statistical system of scaling techniques when he is assigning numbers or symbols to such characteristics as attitudes, preferences or perceptions, etc. not the objects. 6.9 Key Terms • The T-test: This is a - statistical test that offers an opportunity to compare between two group means. • Chi-square test: It is one of the most commonly used non-parametric tests, which is used to determine the difference between expected frequencies and observed frequencies in one or more than one category. It helps in measuring or examining the independence across two categorical variables. • Spearman's rank method: When the available data is not in numeric form but the information is sufficient to rank the data as Ist, IInd and IIIrd and so on for doing correlation analysis, we often use the 'rank correlation method'. • Arbitrary scale: Arbitrary scale is developed on an ad hoc basis and is designed by the researcher. • A Likert Scale: It is a type of rating scale used to measure attitudes or opinions. 6.10 Check Your Progress Q:1) Answer the following questions in one or two lines: a. Write the benefits of the Hypothesis? b. What is the normal distribution in probability? c. What is T-Test? Q:2) Answer the following questions with explanations: a. Explain the benefits of Hypothesis? b. Explain the method of the Chi-square test? c. Explain the scaling technique - Likert Scales? Q:3) Fill in the blanks: a. _____ is how likely something is to happen. b. A _____ involves several "agree" or "disagree" statements. c. _____ scales are usually designed by a researcher himself. Q:4) State True or False: a. A negative relationship is said to exist when one variable increases and correspondingly the other decreases. b. A numeric value that comes out is known as a 'discreterandom variable'. c. There are

100%

MATCHING BLOCK 61/67

W

two types of errors - Type-I error and Type-II error

which are particularly related to null hypothesis testing. Q:5) Complete the Table:

77%

MATCHING BLOCK 67/67

SA

Business Research methods M.Com II semester.docx (D146772727)

Decision Accept H 0 _____ H 0 (true) Correct Decision Type I error (an error) H 0 False Type II error (an error) _____

References • Research Methodology Methods and Techniques, 2nd revised edition, C.R. Kothari, New Age International Publishers. • Research Methodology Concepts and Cases, 2nd edition, Dr. Deepak Chawla and Dr. Neena Sondhi, Vikas Publishing House Pvt. Ltd. •

90%

MATCHING BLOCK 63/67

W

Mass Media Research, 9th edition, Roger D. Wimmer & Joseph R. Dominick

Hit and source - focused comparison, Side by Side

Submitted text As student entered the text in the submitted document.

Matching text As the text appears in the source.

1/67

SUBMITTED TEXT

18 WORDS

58% MATCHING TEXT

18 WORDS

is a systematic approach or method of collecting, classifying, and analyzing information in both quantitative and qualitative

is a scientific and systematic way of collecting, classifying and analyzing information of both quantitative and qualitative

W <http://www.ddegjust.ac.in/2021/6/MSM-511.pdf>

2/67

SUBMITTED TEXT

29 WORDS

48% MATCHING TEXT

29 WORDS

Objectives After reading this unit students will be able to:
- Understand the meaning of communication research -
Understand the steps involved in the process of research
-

SA M. Com. II Research Methodology all.pdf (D142211243)

3/67

SUBMITTED TEXT

23 WORDS

100% MATCHING TEXT

23 WORDS

formulation of a problem is far more essential than its solution, which may be merely a matter of mathematical or experimental skill.

formulation of a problem is far more essential than its solution, which may be merely a matter of mathematical or experimental skill".

W <https://mu.ac.in/wp-content/uploads/2022/08/MMS-Business-Research-Methods.pdf>

4/67**SUBMITTED TEXT**

37 WORDS

30% MATCHING TEXT

37 WORDS

must be conducted, how the data is analyzed, and even indirectly affects the quality of data collected for the analysis. The characteristics of a hypothesis include it to be specific and limited to the

SA Business Research methods M.Com II semester.docx (D146772727)**5/67****SUBMITTED TEXT**

26 WORDS

44% MATCHING TEXT

26 WORDS

has to be tested. It limits the periphery of the research by limiting the area of research, to keep the researcher on the right track.

SA Business Research methods M.Com II semester.docx (D146772727)**6/67****SUBMITTED TEXT**

20 WORDS

60% MATCHING TEXT

20 WORDS

Descriptive Research, Analytical Research, Basic research or fundamental research, Applied research, Quantitative research, Qualitative research, Conceptual research, Empirical research,

SA BSYS-32 - eng Research Methods final 17.04.23.pdf (D164300869)**7/67****SUBMITTED TEXT**

50 WORDS

100% MATCHING TEXT

50 WORDS

The researcher must remember that ideally in the course of a research study, there should be constant interaction between initial hypothesis, empirical observation, and theoretical conceptions. It is exactly in this area of interaction between theoretical orientation and empirical observation that opportunities for originality and creativity lie." 2.2

SA RESEARCH METHODOLOGY.docx (D133844009)**8/67****SUBMITTED TEXT**

16 WORDS

100% MATCHING TEXT

16 WORDS

Example Kothari, C.R., Quantitative Techniques, New Delhi, Vikas Publishing House Pvt. Ltd., 1978.

SA RESEARCH METHODOLOGY.docx (D133844009)

9/67	SUBMITTED TEXT	41 WORDS	64% MATCHING TEXT	41 WORDS
<p>It should contain all those works which the researcher has used. - It should be arranged alphabetically. - It may contain two parts - the names of books and pamphlets, and the names of magazine and newspaper articles.</p>				
<p>SA RESEARCH METHODOLOGY.docx (D133844009)</p>				

10/67	SUBMITTED TEXT	24 WORDS	83% MATCHING TEXT	24 WORDS
<p>bibliography, we usually mention the page numbers of the article or the total pages in the book. - In the footnote, the</p>				
<p>bibliography, we generally mention the page numbers of the article or the total pages in the book. However, in a footnote, the</p>				
<p>W https://alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/5/___UG_B.B.A_Banking_122%2051_Resarc ...</p>				

11/67	SUBMITTED TEXT	21 WORDS	81% MATCHING TEXT	21 WORDS
<p>Example Robert G. Voosa, "Coping with Short-term International Money Flows", The Banker, London, September 1971, p. 995. 2.3.2</p>				
<p>SA RESEARCH METHODOLOGY.docx (D133844009)</p>				

12/67	SUBMITTED TEXT	14 WORDS	88% MATCHING TEXT	14 WORDS
<p>reporting is based on the order in which they occur in the text,</p>				
<p>reporting is based on the sequence in which they occur in the text.</p>				
<p>W https://alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/5/___UG_B.B.A_Banking_122%2051_Resarc ...</p>				

13/67	SUBMITTED TEXT	66 WORDS	47% MATCHING TEXT	66 WORDS
<p>referred to or in giving an explanation of a certain concept referred to in the text. The referencing rules for a footnote and bibliography are different as: - In a footnote, we give the 'first name' first and then the surname. Though in the bibliography we give the surname first and then the 'first name'. - In the footnote, we mention the</p>				
<p>referred to or it may be an explanation of a particular concept referred to in the text. The referencing protocol of a footnote and bibliography is different. In a footnote, one gives the first name of the person first and the surname next. However, this order is reversed in the bibliography. Here we start first with the surname and then the first name. In a bibliography, we generally mention the</p>				
<p>W https://alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/5/___UG_B.B.A_Banking_122%2051_Resarc ...</p>				

14/67	SUBMITTED TEXT	24 WORDS	73% MATCHING TEXT	24 WORDS
<p>the scope and objectives of the study, the methodology, and the results obtained, etc. in a brief and concise manner. If the research</p>		<p>the scope and objectives of the study to the methodology employed and the results obtained, have to be presented in a brief and concise manner. In case the research</p>		
<p>W https://alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/5/___UG_B.B.A_Banking_122%2051_Resarc ...</p>				
15/67	SUBMITTED TEXT	12 WORDS	95% MATCHING TEXT	12 WORDS
<p>The executive summary can be divided into four or five sections</p>		<p>The executive summary essentially can be divided into four or five sections.</p>		
<p>W https://alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/5/___UG_B.B.A_Banking_122%2051_Resarc ...</p>				
16/67	SUBMITTED TEXT	47 WORDS	63% MATCHING TEXT	47 WORDS
<p>the study background, - the scope, and objectives of the study, - the execution, including the sample details and the methodology of the study, - the findings and results obtained, and - the conclusions based on the opinion of the researcher. -</p>		<p>the study background, scope and objectives of the study, followed by the execution, including the sample details and methodology of the study. Next comes the findings and results obtained. The fourth section covers the conclusions which are more or less based on the opinion of the researcher.</p>		
<p>W https://alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/5/___UG_B.B.A_Banking_122%2051_Resarc ...</p>				
17/67	SUBMITTED TEXT	21 WORDS	80% MATCHING TEXT	21 WORDS
<p>in brief, the research problem, the methodology, the significant findings, and the conclusions formed from the research results.</p>				
<p>SA RESEARCH METHODOLOGY.docx (D133844009)</p>				
18/67	SUBMITTED TEXT	18 WORDS	87% MATCHING TEXT	18 WORDS
<p>In the _____, the reporting is based on the order in which they occur in the text,</p>		<p>in the footnote the reporting is based on the sequence in which they occur in the text.</p>		
<p>W https://alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/5/___UG_B.B.A_Banking_122%2051_Resarc ...</p>				
19/67	SUBMITTED TEXT	14 WORDS	87% MATCHING TEXT	14 WORDS
<p>bibliography it is generally arranged alphabetically depending on the author's name. 2.3.3.</p>		<p>bibliography is generally arranged alphabetically depending on the author's name,</p>		
<p>W https://alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/5/___UG_B.B.A_Banking_122%2051_Resarc ...</p>				

20/67	SUBMITTED TEXT	11 WORDS	100% MATCHING TEXT	11 WORDS
<p>is generally arranged alphabetically depending on the author's name.</p>		<p>is generally arranged alphabetically depending on the author's name,</p>		
<p>W https://alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/5/___UG_B.B.A_Banking_122%2051_Resarc ...</p>				
21/67	SUBMITTED TEXT	20 WORDS	80% MATCHING TEXT	20 WORDS
<p>in brief, the research problem, the methodology, the significant findings, and the conclusions formed from the research results. ? "</p>				
<p>SA RESEARCH METHODOLOGY.docx (D133844009)</p>				
22/67	SUBMITTED TEXT	25 WORDS	90% MATCHING TEXT	25 WORDS
<p>Mass Media Research, 9th edition, Roger D. Wimmer & Joseph R. Dominick</p>		<p>Mass Media Research: An Introduction - 9th Edition Roger D. Wimmer & Joseph R. Dominick</p>		
<p>W https://www.csus.edu/indiv/s/stonerm/wimmer-dimmic--massmediaresearch.pdf</p>				
23/67	SUBMITTED TEXT	43 WORDS	27% MATCHING TEXT	43 WORDS
<p>observation can be structured or unstructured. If the observation is characterized by certain definitions, the mode of observed information, standard conditions of observation, and filtering the relevant data, then the observation is said to be structured observation. While, if the observation is</p>				
<p>SA MSW (Social Work Research and Statistics) Paper-II.pdf (D165578133)</p>				
24/67	SUBMITTED TEXT	34 WORDS	42% MATCHING TEXT	34 WORDS
<p>the general form of a questionnaire, it can be structured or unstructured. Structured questionnaires comprise pre-determined, definite, and concrete questions. The questions are being quoted in the same wordings and order to all</p>				
<p>SA RESEARCH METHODOLOGY.docx (D133844009)</p>				
25/67	SUBMITTED TEXT	14 WORDS	87% MATCHING TEXT	14 WORDS
<p>Objectives At the end of this unit, you will be able to, ?</p>				
<p>SA MKTG 321- MARKETING RESEARCH MODULE.doc (D40556488)</p>				

26/67	SUBMITTED TEXT	15 WORDS	89% MATCHING TEXT	15 WORDS
<p>Mass Media Research: An Introduction, 9th edition, Roger D. Wimmer and Joseph R. Dominick,</p> <p>W https://www.csus.edu/indiv/s/stonerm/wimmer-dimmic--massmediaresearch.pdf</p>		<p>Mass Media Research: An Introduction - 9th Edition Roger D. Wimmer & Joseph R. Dominick</p>		
27/67	SUBMITTED TEXT	26 WORDS	94% MATCHING TEXT	26 WORDS
<p>involves the researcher participating, overtly or covertly, in people's daily lives for an extended period of time, watching what happens, listening to what is said,</p> <p>W https://elearning.shisu.edu.cn/pluginfile.php/35310/mod_resource/content/2/Research-Intro-Flick.pdf</p>		<p>involves the ethnographer participating, overtly or covertly, in people's daily lives for an extended period of time, watching what happens, listening to what is said,</p>		
28/67	SUBMITTED TEXT	15 WORDS	89% MATCHING TEXT	15 WORDS
<p>Mass Media Research: An Introduction, 9th edition, Roger D. Wimmer and Joseph R. Dominick,</p> <p>W https://www.csus.edu/indiv/s/stonerm/wimmer-dimmic--massmediaresearch.pdf</p>		<p>Mass Media Research: An Introduction - 9th Edition Roger D. Wimmer & Joseph R. Dominick</p>		
29/67	SUBMITTED TEXT	25 WORDS	67% MATCHING TEXT	25 WORDS
<p>in fact, gathering whatever data are available to throw light on the issues that are the emerging focus of inquiry". -Hammersley and Atkinson (2007)</p> <p>W https://elearning.shisu.edu.cn/pluginfile.php/35310/mod_resource/content/2/Research-Intro-Flick.pdf</p>		<p>in fact, collecting whatever data are available to throw light on the issues that are the focus of the research. (Hammersley and Atkinson 1995,</p>		
30/67	SUBMITTED TEXT	22 WORDS	66% MATCHING TEXT	22 WORDS
<p>The visual representation of the findings in the form of lines, boxes, and bars makes it easier to comprehend and interpret</p> <p>W https://alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/5/___UG_B.B.A_Banking_122%2051_Resarc ...</p>		<p>The visual representation of the findings in the form of lines or boxes and bars relative to a number line is easy to comprehend and interpret.</p>		
31/67	SUBMITTED TEXT	17 WORDS	84% MATCHING TEXT	17 WORDS
<p>some standard rules and procedures for this. There are computer programs like MS Excel and SPSS</p> <p>W https://alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/5/___UG_B.B.A_Banking_122%2051_Resarc ...</p>		<p>some standard rules and procedures available to the researcher for this; also there are computer programs like MS Excel and SPSS,</p>		

32/67	SUBMITTED TEXT	15 WORDS	78% MATCHING TEXT	15 WORDS
<p>the extent to which an instrument actually measures what it is supposed to measure.</p>				
<p>SA RESEARCH METHODOLOGY.docx (D133844009)</p>				

33/67	SUBMITTED TEXT	33 WORDS	67% MATCHING TEXT	33 WORDS
<p>Such data are known as statistics of variables and are classified based on class intervals. For example, classifying persons whose incomes are within Rs 201 to Rs 400 into one group</p>				
<p>SA Business Research methods M.Com II semester.docx (D146772727)</p>				

34/67	SUBMITTED TEXT	30 WORDS	69% MATCHING TEXT	30 WORDS
<p>Line and curve graphs: When the objective is to demonstrate trends and patterns in the data, a line chart is the best option a researcher can use. The line</p>				
<p>Line and curve graphs: Usually, when the objective is to demonstrate trends and some sort of pattern in the data, a line chart is the best option available to the researcher as the line</p>				
<p>W https://alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/5/___UG_B.B.A_Banking_122%2051_Resarc ...</p>				

35/67	SUBMITTED TEXT	58 WORDS	90% MATCHING TEXT	58 WORDS
<p>an upper as well as a lower limit. The difference between the two class limits is known as class magnitude. We may have classes with equal class magnitudes or with unequal class magnitudes. The number of items that fall in a given class is known as the frequency of the given class. 5.3.2</p>				
<p>SA Business Research methods M.Com II semester.docx (D146772727)</p>				

36/67	SUBMITTED TEXT	36 WORDS	57% MATCHING TEXT	36 WORDS
<p>Area or stratum charts: Area charts are like the line charts and are usually used to describe changes in a pattern over some time. Here multiple lines are essential components of the original composite data.</p>				
<p>Area or stratum charts: Area charts are like the line charts, usually used to demonstrate changes in a pattern over a period of time. However, here there are multiple lines that are essentially components of the original composite data.</p>				
<p>W https://alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/5/___UG_B.B.A_Banking_122%2051_Resarc ...</p>				

37/67	SUBMITTED TEXT	16 WORDS	100% MATCHING TEXT	16 WORDS
<p>The areas between the various lines indicate the scale or volume of the relevant factors</p>		<p>The areas between the various lines indicate the scale or volume of the relevant factors/</p>		
<p>W https://alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/5/___UG_B.B.A_Banking_122%2051_Resarc ...</p>				
38/67	SUBMITTED TEXT	34 WORDS	39% MATCHING TEXT	34 WORDS
<p>logical, clear, accurate, and simple presentation of data. ? We can arrange data in a table on chronological, geographical, alphabetical, or any facilitating way. The table must suit the needs and requirements of</p>				
<p>SA SSOU_MBA_Research Methodology & Statistical Quantitative Methods_Text 412.pdf (D27372178)</p>				
39/67	SUBMITTED TEXT	35 WORDS	70% MATCHING TEXT	35 WORDS
<p>another way of describing the area or stratum or sectional representation. Though, the main difference between a line and pie chart is that the pie chart does not show changes over time.</p>		<p>Another way of demonstrating the area or stratum or sectional representation is through the pie charts. The critical difference between a line and pie chart is that the pie chart cannot show changes over time.</p>		
<p>W https://alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/5/___UG_B.B.A_Banking_122%2051_Resarc ...</p>				
40/67	SUBMITTED TEXT	88 WORDS	87% MATCHING TEXT	88 WORDS
<p>the chart indicate the ratio of that section to the total area.</p>		<p>the pie indicate the ratio of that section to the total area</p>		
<p>W https://alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/5/___UG_B.B.A_Banking_122%2051_Resarc ...</p>				
41/67	SUBMITTED TEXT	27 WORDS	80% MATCHING TEXT	27 WORDS
<p>variation of the bar chart, where the bars are vertical and the height of each bar indicates the relative or cumulative frequency of that particular variable.</p>		<p>variation of the bar chart is the histogram (Figure 14.8) here the bars are vertical and the height of each bar reflects the relative or cumulative frequency of that particular variable.</p>		
<p>W https://alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/5/___UG_B.B.A_Banking_122%2051_Resarc ...</p>				
42/67	SUBMITTED TEXT	22 WORDS	84% MATCHING TEXT	22 WORDS
<p>be classified as - simple and complex tabulation. Simple tabulation gives information about one or more groups of independent questions.</p>				
<p>SA RESEARCH METHODOLOGY.docx (D133844009)</p>				

43/67	SUBMITTED TEXT	24 WORDS	90% MATCHING TEXT	24 WORDS
<p>Mass Media Research, 9th edition, Roger D. Wimmer & Joseph R. Dominick</p> <p>W https://www.csus.edu/indiv/s/stonerm/wimmer-dimmic--massmediaresearch.pdf</p>		<p>Mass Media Research: An Introduction - 9th Edition Roger D. Wimmer & Joseph R. Dominick</p>		
44/67	SUBMITTED TEXT	11 WORDS	100% MATCHING TEXT	11 WORDS
<p>two types of errors - Type-I error and Type-II error</p> <p>W https://mu.ac.in/wp-content/uploads/2022/08/MMS-Business-Research-Methods.pdf</p>		<p>two types of errors. Type I error and type II error.</p>		
45/67	SUBMITTED TEXT	16 WORDS	62% MATCHING TEXT	16 WORDS
<p>Stratified random Sampling: In stratified random sampling the population shall be divided into sub-groups and</p> <p>SA MSW (Social Work Research and Statistics) Paper-II.pdf (D165578133)</p>				
46/67	SUBMITTED TEXT	19 WORDS	58% MATCHING TEXT	19 WORDS
<p>each member of the population shall not be getting an equal chance of being selected in the sample.</p> <p>SA BSYS-32 - eng Research Methods final 17.04.23.pdf (D164300869)</p>				
47/67	SUBMITTED TEXT	19 WORDS	100% MATCHING TEXT	19 WORDS
<p>alternative hypothesis. The null hypothesis is generally symbolized as H_0 and the alternative hypothesis as</p> <p>SA EVS 505 revised.pdf (D142266657)</p>				
48/67	SUBMITTED TEXT	76 WORDS	53% MATCHING TEXT	76 WORDS
<p>H_1 is not true. The former is known as Type I error and the latter is known as Type II errors. Type-I errors mean rejection of hypotheses that should have been accepted and type II errors mean accepting the hypothesis that should have been rejected. Sometimes Type I error denoted by alpha errors, also called the level of significance of test; and type II errors are denoted by beta known as</p> <p>SA Business Research methods M.Com II semester.docx (D146772727)</p>				

49/67	SUBMITTED TEXT	92 WORDS	91% MATCHING TEXT	92 WORDS
<p>The probability of Type I errors is usually determined in advance and is understood as the level of significance of testing the hypothesis. If Type I error is fixed at 5 %, it means that there are about five chances in 100 that will reject H 0 when H 1 is true. We can control Type I error just by fixing it at a lower level ". 3 For instance, if we fix it at 1 percent, we will say that the maximum probability of committing</p>				
<p>SA EVS 505 new.pdf (D165734380)</p>				

50/67	SUBMITTED TEXT	79 WORDS	85% MATCHING TEXT	79 WORDS
<p>with fixed sample size, n, when we try to reduce Type I errors the probability of committing type II errors increases. Both types of errors could not be reduced simultaneously. There is a trade-off between these two types of errors, which means that the probability of making one type of error can only be reduced if we are willing to increase the probability of making other types of errors. To deal with this trade-off in business situations, decision- 2</p>				
<p>SA EVS 505 revised.pdf (D142266657)</p>				

51/67	SUBMITTED TEXT	36 WORDS	95% MATCHING TEXT	36 WORDS
<p>Chi-square, symbolically written as χ^2 (Pronounced as Ki-square), is a statistical measure used in the context of sampling analysis for comparing a variance to a theoretical variance. 7 As a non-parametric test,</p>				
<p>SA RESEARCH METHODOLOGY.docx (D133844009)</p>				

52/67	SUBMITTED TEXT	99 WORDS	86% MATCHING TEXT	99 WORDS
<p>Decision Accept H 0 Reject H 0 H 0 (true) Correct Decision Type I error (an error) H 0 False Type II error (an error) Correct Decision</p>				
<p>SA Business Research methods M.Com II semester.docx (D146772727)</p>				

53/67	SUBMITTED TEXT	15 WORDS	100% MATCHING TEXT	15 WORDS
<p>test enables us to explain whether or not two attributes are associated. For instance,</p>				
<p>SA Business Research methods M.Com II semester.docx (D146772727)</p>				

54/67	SUBMITTED TEXT	25 WORDS	84% MATCHING TEXT	25 WORDS
<p>chi-square can be used as a test of goodness of fit and as a test of independence. 8 a. "goodness of fit-test":</p> <p>SA RESEARCH METHODOLOGY.docx (D133844009)</p>				
55/67	SUBMITTED TEXT	49 WORDS	80% MATCHING TEXT	49 WORDS
<p>first calculate the expected frequencies and then work out the value of χ^2. Now on the calculated value of χ^2: - If it is less than the table value at a certain level of significance for given degrees of freedom, he can conclude that the null hypothesis</p> <p>SA MSW (Social Work Research and Statistics) Paper-II.pdf (D165578133)</p>				
56/67	SUBMITTED TEXT	14 WORDS	100% MATCHING TEXT	14 WORDS
<p>But if the calculated value of χ^2 is greater than its table value,</p> <p>SA MSW (Social Work Research and Statistics) Paper-II.pdf (D165578133)</p>				
57/67	SUBMITTED TEXT	20 WORDS	65% MATCHING TEXT	20 WORDS
<p>with the null hypothesis that the two attributes i.e 'new vaccine' and 'common flu' are independent, which means that</p> <p>SA Business Research methods M.Com II semester.docx (D146772727)</p>				
58/67	SUBMITTED TEXT	18 WORDS	100% MATCHING TEXT	18 WORDS
<p>null hypothesis does not hold good which means the two attributes are associated. And the</p> <p>SA Business Research methods M.Com II semester.docx (D146772727)</p>				
59/67	SUBMITTED TEXT	39 WORDS	95% MATCHING TEXT	39 WORDS
<p>Here, χ^2 is not a measure of the degree of relationship or the form of relationship between two attributes but is simply a technique of judging the significance of such association or relationship between two attributes. 6.5</p> <p>SA Business Research methods M.Com II semester.docx (D146772727)</p>				

60/67	SUBMITTED TEXT	39 WORDS	47% MATCHING TEXT	39 WORDS
<p>rank correlation coefficient': Table 6.1 Steps to workout Spearman's Rank Correlation 15 First step: replace the actual observations by their ranks, giving rank 1 to the highest value, rank 2 to the next highest value, and</p>				
<p>SA S.J. Parmar Book - RM.doc (D36735628)</p>				

61/67	SUBMITTED TEXT	11 WORDS	100% MATCHING TEXT	11 WORDS
<p>two types of errors - Type-I error and Type-II error</p>				
<p>two types of errors. Type I error and type II error.</p>				
<p>W https://mu.ac.in/wp-content/uploads/2022/08/MMS-Business-Research-Methods.pdf</p>				

62/67	SUBMITTED TEXT	24 WORDS	68% MATCHING TEXT	24 WORDS
<p>Scaling is considered - an extension of measurement. Measurement is a process of assigning numbers or symbols to the characteristics of an object.</p>				
<p>SA MSW (Social Work Research and Statistics) Paper-II.pdf (D165578133)</p>				

63/67	SUBMITTED TEXT	12 WORDS	90% MATCHING TEXT	12 WORDS
<p>Mass Media Research, 9th edition, Roger D. Wimmer & Joseph R. Dominick</p>				
<p>Mass Media Research: An Introduction - 9th Edition Roger D. Wimmer & Joseph R. Dominick</p>				
<p>W https://www.csus.edu/indiv/s/stonerm/wimmer-dimmic--massmediaresearch.pdf</p>				

64/67	SUBMITTED TEXT	15 WORDS	100% MATCHING TEXT	15 WORDS
<p>asked to check in a list the statements with which they agree. 6.7.3</p>				
<p>SA RESEARCH METHODOLOGY.docx (D133844009)</p>				

65/67	SUBMITTED TEXT	25 WORDS	58% MATCHING TEXT	25 WORDS
<p>The procedure for developing a Likert Scale is as: - Collect a large number of statements relevant to the attitude. Some of the statements</p>				
<p>SA RESEARCH METHODOLOGY.docx (D133844009)</p>				

66/67	SUBMITTED TEXT	24 WORDS	68%	MATCHING TEXT	24 WORDS
<p>Scaling is considered - an extension of measurement. Measurement is a process of assigning numbers or symbols to the characteristics of an object.</p>					
<p>SA MSW (Social Work Research and Statistics) Paper-II.pdf (D165578133)</p>					

67/67	SUBMITTED TEXT	98 WORDS	77%	MATCHING TEXT	98 WORDS
<p>Decision Accept H 0 _____ H 0 (true) Correct Decision Type I error (an error) H 0 False Type II error (an error) -----</p>					
<p>SA Business Research methods M.Com II semester.docx (D146772727)</p>					