M.A. MASS COMMUNICATION
2nd SEMESTER

MSM-511

COMMUNICATION RESEARCH

Directorate of Distance Education
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COURSE CODE: MSM-511	AUTHOR: PROF MANOJ DAYAL
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STRUCTURE

1.0 LEARNING OBJECTIVES

The objectives of this lesson are as follows:

- Understand the need for research.
- Define the meaning and concept of research.
- Discuss the role of research.
- Describe the importance of research.
- Explain the functions of research.

1.1 INTRODUCTION

Research is generally described as an attempt to discover something. It is a search for the facts which are hidden and which have not been discovered as yet. But the more is discovered, the more questions are left for others. Since it becomes a continuous ongoing process of examination and re-examination, success or failure, so you always have a success and always have a failure. Absolute success remains a myth.

It is because of these reasons it becomes important and relevant to discuss here the need for research, meaning and concept of research, role of research, importance of research and functions of research.

1.2 NEED FOR RESEARCH

First of all, we must understand the need for research. In absolute sense even a dog is a researcher. It struggles for its food, smells it and then rushes after it to acquire it. A man being an intelligent creature on this earth performs a lot of work with his common sense. But sometimes common sense does not work and cuts a sorry figure. Sometimes there are conflicts and confusions and in order to solve the conflicting theories, a specific research in a scientific manner is required. What efficiently works in one situation for one condition may not work so efficiently in another situation. The common sense procedure may overlook the impact of external factors. But professionals in all walks of life cannot take a bit of risk at the cost of heavy investments. So research not in an absolute sense but in specific sense is needed beyond common sense. Meticulously systematic, scientifically evaluative, properly organized and controlled research helps researchers to test and compare different theories, models, paradigms, methods, techniques and approaches. It tests different methods and learn from self-experience as well as experiences of others. Thus it helps researchers to rule out external factors which may be adversely affecting the results. Moreover, the results can be recorded to statistically analyse whether the results are significant. With the help of such quantitative research, the results can be generalized to a wider and larger population. Similarly quantitative data can be either quantified or generalized with the help of objectives.

From the age of ‘stones and spear’ to the age of electricity and relativity, man has been getting motivated to go in for research due to his keen desire of confronting the challenges in solving the

unsolved problems and complexities, to acquire academic and intellectual pleasure of doing some innovative creation for service to the society and his own social status. Curiosity as a whole is the basic motivation for research. Ever since Adam tasted the forbidden fruit of knowledge due to his curiosity, he became the first ever researcher. Since then onwards, the human quest for knowledge has been continuing and increasing. Man in all ages has been struggling to divulge and dig out the mysteries of nature, life and the cosmos. He has looked upon the stars, skies and seas with a sense of awe and wonder. From the time immemorial, man has been discovering new frontiers of knowledge. At a supersonic speed, he has been cutting across the physical confines of the globe. Rockets and space ships are the new vehicles for travel. Nano technology and super computers are new means of expanding our knowledge of both man and the universe. Where 'angels fear to tread', man has ventured into realms of science and research with the human spirit of inquiry.

Research of all fields is a quest for scientifically ordered knowledge. It may be the study of natural phenomena or the rational study of the relations between the concepts in which these phenomena are expressed. The knowledge is to be scientifically gathered, organized, systematized, tested, authenticated and validated with the help of objective observation. Observation is an intelligent way of making use of our sensory apparatus. It provides an insight to know and comprehend facts, relations and events. If the observation is scientific and precise, the results will be more reliable.

As discussed earlier, the term research to some means an attitude of inquiry. It is an honest, intelligent and exhaustive search for facts. It is the quest for the unknown and also about the known, to reveal the secrets of this world. Research is the process of reaching dependable solutions of problems through the scientific planning and systematic collection, analysis and interpretation of data. Research tries to inquire the conditions under which certain phenomenon occurs. Research is an aspect of science and a discipline. It is a scientific and systematic way of collecting, classifying and analyzing information of both quantitative and qualitative nature. It is an attempt to elicit facts and scientifically analyse them once they have been collected to get the remedies and solutions for a variety of research problems and questions.

Thus, due to consequential advantages and social identity also, a man is voraciously desirous of pursuing a research degree of M.Phil, Ph.D or D.Litt./D.Sc. There may be a few more valid reasons for such motivational forces like governmental directives for projects, employment conditions for

promotion, inquisitiveness to comprehend causal relations, social consciousness and perception, etc. Hence, people are often motivated to carry on research.

More scientifically speaking, research is desperately needed because of the following reasons:

First, it defines and redefines problems pertaining to man and society in a systematic and scientific manner.

Second it frames a research topic with objectivity, impartiality and unbiasedness and without editorialisation and ambiguity.

Third, it reviews the old and existing literature in a very systematic and scientific manner.

Fourth, it frames the broader objectives and specific objectives with crystal clarity in a definite and scientific manner.

Fifth it takes a general hypothesis first and then converts it into statistical and scientific hypothesis which is tested with or without parameters for authenticity, reliability, validity, etc. for scientifically proving or disproving the results.

Sixth, it uses a scientifically and universally approved methods and techniques for scientific results.

Seventh, It leads to scientific collection, analysis and interpretation of data and facts.

Eighth, the research report is written in a systematic and scientific manner with proper chapterisation, research design and citing due references of manual and electronic informations.

Thus research is objective and scientific and hence verifiable. The data and facts gathered can be tested and verified. It involves an empirical process. It is dependent on empirical evidence or observable experiences. It studies such problems as can be verified through empirical observation. It requires rigorous and valid data collecting procedures. It can be replicative and transmitted in various set-ups and on different occasions. In an attempt to replicate, the existing thought processes can be confirmed or it may lead to raising a volley of questions about the conclusions of past researches. It has a specific purpose of exploring solutions to some problems. It seeks to form generalizations, principles, models, paradigms and theories. It even endeavours to forecast future events. It requires diligent and keen observation at the stage of gathering of facts. It involves time, money, energy and resources. The informations and data so collected has to be recorded as precisely as possible with a view to paving the way for future and further research. The techniques, methods and procedures to be adopted for research have to be meticulously selected. They have to be both vigorous and rigorous involving indepth

interpretation. Research requires care, patience and diligence. An impatient mind is not worth researching. Haste, carelessness and impatience hamper true research.

1.2.1 MEANING AND COCEPT OF RESEARCH

After discussing the need for research, it becomes extremely relevant and important to understand the actual technical meaning and concept of research. The word 'Research' is derived from the French word 'Rechercher' which means to scientifically investigate something thoroughly, to search for information, to try to find out about something that is of interest. According to the advanced Learner's Dictionary of current English, "Research is an art of scientific and careful investigation or inquiry especially through search for new facts in any branch of knowledge". Barrendo and Ramirez define research as the scientific method of exploring the issues from different areas of knowledge and of finding solutions to those issues by the application of your intelligence, experiences and observations. Clarifying the meaning of research, Redman and Mory Writes, "Research is a scientific and systematized effort to gain new knowledge". According to Clifford Woody," Research comprises defining and redefining problems, formulating hypothesis or suggested solutions; collecting, organizing and evaluating data, making deductions and reaching conclusions to determine whether they fit the formulating hypothesis". D. Slesinger and M. Stephenson have defined research in the Encyclopedia of Social Sciences as " The manipulation of things, concepts or symbols for the purpose of scientifically generalizing to extend, correct or verify knowledge, whether that knowledge aids in construction of theory or in the practice of an art.

When you go to purchase potato in a vegetable market and systematically ask its price in different shops, then would you call it a research? No it is an enquiry. But when you compare the average price of one vegetable market to another vegetable market, then it is research. Similarly when a police man investigates about a crime or a criminal, it is not a research, but an investigation. This is because it lacks evaluation, comparison and scientific approach. Thus, research may be defined as a scientific, systematic, comparative and evaluative method of finding the truth or testing the already established truth. It is also developing new methods or tools for finding the new facts or testing the old facts. It is a process of searching again and again. It is an innovative and original contribution and expansion of knowledge.

1.2.2 ROLE OF RESEARCH

It is very important and relevant to discuss the role of research after understanding the technical meaning and concept of research. Research can solve many problems on this earth if it is systematically organized and scientifically executed. When we talk of role of research, we generally mean role with execution of a good research. Whereas a good researcher needs patience, perseverance and the ability to challenge the established knowledge or the urge to find new things, a good research must be purposive. It must be carefully planned and timely executed.

To execute the research properly, the researcher must have foresight and an open mind and clarity of purpose. Everything must be planned with utmost care and precision. Its objectives, hypothesis and methodologies must be made clear beforehand. Objectivity has been described as the core of all good research. Personal biases and subjectivity must be kept out from the research as far as possible. The emphasis should be on testing, verifying and exploring the ultimate truth. One can accept something as truth only when it is scientifically verifiable. Only then it becomes reliable. What is true in UK must be true in India under the similar conditions. Without conformability and verifiability of the processes, procedures and conclusions, no science is possible.

Research has to be a committed and professional issue involving scientific, accurate and expert handling of the research problem. Data and facts have to be collected through clear objective systematic planning and dogged determination to reach the conclusion. It has to be carried out by having control on data gathering techniques. The data so gathered has to be subjected to vigorous and rigorous interpretation. Inferences and generalizations have to be mentioned in crystal clear and precise language.

A good research should take care of facts. The researcher has to establish a balance between the quantitative and qualitative facts. Facts become relevant and significant only when interpreted in the light of accepted standards and assumptions which are normative in character. It is only by analysis and evaluation determined by the purpose that facts can be associated with each other in the larger and wider context.

All research of high quality presupposes foresight, insight, hindsight and imagination in the researcher. These are needed to analyse, explain and draw conclusions. They are equally necessary for planning, collection of data, analysis and reporting etc. Many complexities and problems can be solved by using insight, hindsight and foresight.

A quality research should encourage interdisciplinary and multidisciplinary to the study of man and society and the solution of problems. Most of the disciplines are interconnected in one way or the other.

A quality research should contribute to the expansion of knowledge and to the solutions of problems facing human society. Ethical and moral issues are relevant and highly important in scientific research which is concerned with the discovery of facts.

There are various reasons why should we undertake any research of human problems in a spirit of scientific inquiry and research. Among them the most common reasons that may be conclusively described as the role of research and that can be enumerated as follows:

First, a research helps us to think rigorously, vigorously and critically. It trains us to meticulously test research evidence that is advanced for acceptance in a variety of popular and scholarly applications.

Second, it equips the researcher to learn how to find solutions to the problems facing mankind.

Third, it enables the researcher to get skills and techniques to study research problems in particular social and communication field situations. He is also enabled to learn how to sort through research for a solution.

Fourth, due to accelerated development in science, technology and other fields, research has become imperative of our times. The development and discrimination of knowledge is not possible without research. Research contributes to innovative ideas which are necessary for professional competence and growth.

Research adds tremendously to new facts and generalizations. It keeps the professional researcher abreast with the latest progress and happenings in the subject. It enables him to develop, interpret or reinterpret facts and concepts in the light of changing and emerging world scenario.

Research creates an urge for further studies in one's subject. It modifies all partial theories, models and paradigms and helps dispel myths and antiquated practices by examining them on the anvil of scientific validity. Without research, there is no progress, no growth and no development of knowledge.

Research requires control over such processes as observing events with a clear mission and vision, knowledge of several research methods, handling data statistically, analyzing and interpreting inferences and writing research project reports.

1.2.3 IMPORTANCE OF RESEARCH

Since research helps us to think rigorously, vigorously and critically, so it becomes important and relevant in testing evidences and proofs of multiple problems. It helps the researcher to find and explore solutions to the problems. Hence it is very useful and important in solving so many problems of the society as a whole.

It solves many social and communication problems as it enables the researcher to get skills and techniques to study research problems.

Research is important because the development and discrimination of knowledge is not possible without research. Research adds to newness and innovation in a big way which are essential for professional competence and growth.

Research becomes relevant and important because it adds tremendously to new facts and generalisations.

It is very useful and important because it creates an urge for further studies. It helps in modifying all partial and incomplete theories, models and paradigms. It also helps in dispelling myths and old practices by studying them on the anvil of scientific validity. It has been already explained that without research, there is no progress, no growth and no development of knowledge.

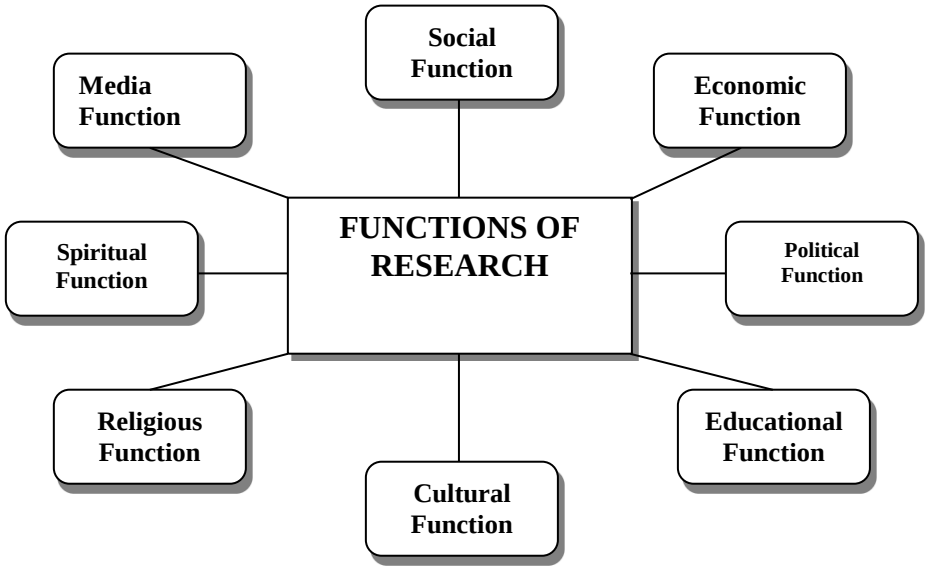
1.2.4 FUNCTIONS OF RESEARCH

Research is not only a systematic, scientific, comparative and evaluative study of finding new facts, but it also tests old facts, theories, models, paradigms, etc. Hence, its function is to study systematically and present it in proper sequence. The approach of a research work should be coherent. Again, it should function in a scientific manner where there should be justification of everything. Every ‘why’ and ‘how’ should be answered at every step and there should be a relationship between cause and consequence. The research must compare the different variables and sub variables. The function of a research is to evaluate and quantify. It should quantify even the qualitative data.

Research should also test whether the old theories, models and paradigms are still relevant and useful today. It must check the contemporarity of the concepts of different theories, paradigms and models. Developing a new methodology or scale or technique is also the function of a research.

Research also solves the various problems of the society, economy, polity, education, culture, religion and spiritualism.

Thus, the functions of a research may be categorized in the following manner which may be depicted with the help of the following diagram:



(Fig.1.1: Drawn by Lily Sinha)

1. **Social Function**: Research is instrumental in solving various issues of the society relating to children, youths, women, and old aged persons. It may be child abuse, child labour, youth violence, female feticide, dowry death, women exploitation, insult to senior citizens by younger people, etc. Research not only explores the problems, but also finds out solutions directly or indirectly either by suggesting or recommending or by developing any basic theories, models or paradigms of social issues.
2. **Economic Function:** It solves many economic problems relating to the primary sector, secondary sector and tertiary sector of the Indian economy. It searches problems relating to agriculture like farmers' suicide, low-productivity in agriculture, debt trap of agricultural labourers, etc. It searches problems relating to industrial dispute, work-culture of the industry,

working environment of the industry for the women, industrial retrenchment, etc. Again, it searches problems relating to infrastructural issues like water pollution, frequent power failure, road connectivity in villages transport availability, communication and technological issues, etc. The function of a research is not only to explore such problems. It has to find a way out to solve such problems. Or at least it should suggest or recommend some solutions of such research problems. It may develop some basic theories, models, paradigms relating to economic issues.

3. **Political Function:** The function of a research is to search political issues like political instability, democratic threats, etc. It also finds problems relating to parliament, Lok Sabha, Rajya Sabha, legislative assembly, legislative council, ministries, etc. The research is also supposed to give suggestions or recommendations to solve such problems.
4. **Educational Function:** A research must explore problems relating to education and campus issues. It may search problems of higher education, technical education, professional education, vocational education, secondary education, primary education, etc. It should either develop some basic theories, models, paradigms or suggest or recommend in solving such problems.
5. **Cultural Function:** A research is supposed to find out the fundamental problems relating to cultural invasion, threats to Indian culture, westernization or western impact Indian culture, loss of cultural identity, economic development at the cost of cultural loss, etc. The research should also provide their solutions directly or indirectly by way of developing a new theory or model or paradigm or by suggesting or recommending some suitable solutions.
6. **Religious Function:** The function of a research is also to explore the problems relating to religious issues like Hinduism, religious conflicts, communal riots, Buddhism, Islamism, Sikhism, Jainism, etc. Again the research should either develop some fundamental or basic or pure theories or models or paradigms or should provide suggestions or recommendations to solve such problems.
7. **Spiritual Function:** A research must dig out and explore issues relating to spiritualism. Such problems are relating to self-exploration or are relating to self-knowledge, humanity, existence of God, meditation, penance, etc. The function of a research is to definitely find some solutions either directly or indirectly. It may develop new theories or models or paradigms or it may provide suitable suggestions or recommendations to solve such problems.

8. **Media Function:** The function of a research is also to explore the problems relating to the issues of media, print media, electronic media, social media, traditional media, etc. It may explore commercialization of media, yellow journalism in print media, paid news in electronic media, webertising in social media, vanishing traditional media, etc. Again, the research should develop some pure theories or models or paradigms or should provide suggestions or recommendations to solve such problems.

1.3 CHECK YOUR PROGRESS

Note: 1) Use the space below for your answers.

2) Compare your answers with those given at the end of this lesson.

A. CHOOSE THE RIGHT OPTION.

1. Research is
   (a) Searching again and again
   (b) Finding solution to any problem
   (c) Working in a scientific way to search for truth of any problem
   (d) None of the above
2. The word Research is derived from
   (a) French word "Resercher"
   (b) Latin word "Researcheris"
   (c) Greek word "Researchure"
   (d) None of the above.
3. The role of research is to enable us
   (a) To think rigorously, vigously and critically
   (b) To perform smoothly
   (c) To determine the goal
   (d) None of the above.
4. The importance of research is that
   (a) It helps the researcher to find and explore solutions to the problems
   (b) It helps to handle various issues
   (c) It monitors the subjectivity

(d) None of the above.

5. The need for a research is that

(a) It is ambiguous

(b) It is complex

(c) It defines and redefines problems

(d) None of the above

B. FILL IN THE BLANKS

1. Research may be defined as a systematic, scientific, comparative and ……method of finding the truth.
2. Research is needed because it defines and redefines …….pertaining to man and society in a systematic and scientific manner.
3. Role of research is that it enables us to think rigorously, vigorously and……..
4. Importance of research is that it helps the researcher to find and explore ……to the problems.
5. Functions of research is that it is to study systematically and present it in proper sequence. It evaluates and quantifies. It should ……..even the qualitative data.

1.4 SUMMARY

- Understanding the technical meaning and concept of research is the most vital to proceed any further. The word 'Research' is derived from the French word 'Rechercher' which means to scientifically investigate something thoroughly, to search for information, to try to find out about something that is of interest. Research may be finally defined as a systematic, scientific, comparative and evaluative method of finding the truth. It is an innovative and original contribution and expansion of knowledge.
- Research is needed because it defines and redefines problems pertaining to man and society in a systematic and scientific manner. It frames a research topic with objectivity, impartiality and unbiasedness and without editorialisation and ambiguity. It reviews the old and existing literature in a very systematic and scientific manner. It frames the broader objectives and specific objectives with crystal clarity in a definite and scientific manner. It takes a general hypothesis first and then converts it into statistical and scientific hypothesis which is tested with or without parameters for authenticity, reliability, validity, etc. for scientifically proving or

disproving the results. It uses a scientifically and universally approved methods and techniques for scientific results. It leads to scientific collection, analysis and interpretation of data and facts. The research report is written in a systematic and scientific manner with proper chapterisation, research design and citing due references of manual and electronic informations. It has a specific purpose of finding solutions to some problems. It seeks to develop generalizations, principles, models, paradigms and theories. It even endeavors to forecast future events. It requires keen and diligent observation at the stage of data collection. It involves time, money, energy and resources. The information so gathered has to be recorded as precisely as possible with a view to paving the way for further research. The procedures, methods and approaches to be adopted for research have to be meticulously selected. They have to be worth vigorous and rigorous involving in-depth interpretation. Research requires care, patience and diligence.

- Research has a variety of role to play as it can solve many problems on this earth if it is systematically organized and scientifically executed. It enables us to think rigorously, vigorously and critically. It trains the researcher to minutely test research evidence that is advanced for acceptance in a variety of popular and scholarly applications. It equips the researcher to learn how to find solutions of problems facing mankind. It enables him to get skills and techniques to study research problems in particular social and communication field situations. He is also enabled to learn how to sort through research for a solution. It adds to innovative ideas so necessary for professional competence and growth. It adds to new facts and generalizations. It keeps the professional researcher abreast with the latest progress and development in the subject. It helps him to develop, interpret and reinterpret facts and concepts in the light of changing and emerging world scenario. It creates an urge for further studies in the subject. It modifies all partial theories, models and paradigms and helps dispel myths and antiquated practices by examining them on the anvil of scientific validity. Without research, there is no progress, no growth, and no development of knowledge.
- Since research helps us to think rigorously, vigorously and critically, so it becomes important and relevant in testing evidences and proofs of multiple problems. It helps the researcher to find and explore solutions to the problems. It is very useful and important because it creates an urge for further studies. It helps in modifying all partial and incomplete theories, models and

paradigms. It also helps in dispelling myths and old practices by studying them on the anvil of scientific validity. The function of a research is to study systematically and present it in proper sequence. The approach of a research work should be coherent. Again, it should function in a scientific manner where there should be justification of everything. Every 'why' and 'how' should be answered at every step and there should be a relationship between cause and consequence. The research must compare the different variables and sub variables. The function of a research is to evaluate and quantify. It should quantify even the qualitative data.

- Research should also test whether the old theories, models and paradigms are still relevant and useful today. It must check the contemporarity of the concepts of different theories, paradigms and models. Developing a new methodology or scale or technique is also the function of a research.
- Research also solves the various problems of the society, economy, polity, education, culture, religion and spiritualism. Hence, the research has social function, economic function, political function, educational function, cultural function, religious function, spiritual function and media function
- The concept of research, its need and role will be further strengthened if we continue our discussions on elements of research followed by types of subject specific research, i.e., different types of communication research. Hence in the next lesson, we will focus on the basic elements of research. Then we will move to types of communication research.

1.5 KEYWORDS

Research: It may be defined as a systematic, scientific, comparative and evaluative method of finding the truth.

Need for Research: It is needed because it defines and redefines problems pertaining to man and society in a systematic and scientific manner.

Role of Research: It enables us to think rigorously, vigorously and critically.

Importance of Research: It helps the researcher to find and explore solutions to the problems.

Functions of Research: Its function is to study systematically and present it in proper sequence. It evaluates and quantifies. It should quantify even the qualitative data.

1.6 SELF-ASSESSMENT TEST

1. What do you mean by research? Discuss the need for research in the light of the emerging challenges of our society.
2. Define research. Explain the importance of research.
3. Explain the need for research.
4. Describe the role of research in the light of changing world scenario.
5. Discuss the importance of research.
6. Throw light on the functions of research.
7. Write short notes on the followings:
   (i) Research
   (ii) Need for research
   (iii) Role of research
   (iv) Importance of research
   (v) Functions of research
   (vi) Social function of a research
   (vii) Economic function of a research
   (viii) Political function of a research
   (ix) Educational function of a research
   (x) Cultural function of a research
   (xi) Religious function of a research
   (xii) Spiritual function of a research
   (xiii) Media function of a research

1.7 ANSWERS TO CHECK YOUR PROGRESS

A. CHOOSE THE RIGHT OPTION.

1. (c) Working in a scientific way to search for truth of any problem
2. (a) French word "Resercher"
3. (a) To think rigorously, vigously and critically
4. (a) It helps the researcher to find and explore solutions to the problems

5. (c) It defines and redefines problems

B. FILL IN THE BLANKS

1. Evaluative
2. Problems
3. Critically
4. Solutions
5. Quantify

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SUBJECT: COMMUNICATION RESEARCH	
COURSE CODE: MSM-511	**AUTHOR: PROF MANOJ DAYAL**
LESSON NO.: 2	
SOCIAL AND COMMUNICATION RESEARCH, BASIC ELEMENTS OF RESEARCH	

STRUCTURE

2.0 LEARNING OBJECTIVES

The objectives of this lesson are as follows:

- To differentiate between social research and communication research
- To describe the elements of research;
- To understand the interrelation between elements of research;
- To explain the role of each element of research.

2.1 INTRODUCTION

Mass communication is a part of communication and communication is a part of society. Hence social research has a wider and larger range and domain than communication research. There are some similarities between them. And of course, some differences, too. Elements of research, though a bit

interrelated, yet different from elements of research design, elements of research proposal, elements of research methods, elements of research paper and elements of research report.

Research is a scientific study. In order to have a scientific approach, it must have a systematic inquiry, comparative analysis and evaluative in nature while finding new facts or testing old facts. Hence, its elements are basically those which make it scientific in its approach, of course with ethics and usefulness. It is because of these reasons, it becomes important and relevant to discuss here the difference between social research and communication research, elements of research, interrelation between elements of research and role of each element of research.

2.2 SOCIAL RESEARCH & COMMUNICATION RESEARCH

In fact, there are more similarities between social research and communication research than the differences between these two. This is because communication is an integral part of society. Both are two sides of the same coins. Both are complimentary and dependent on each other. So media will be as is the society. If marketisation dominates in the society, the market forces will also dominate in the media. If the democratic tendency is strong in the society, then media will also enjoy the freedom like democracy. Since there is dictatorship in Pakistan, so their media is also dictatorial. Since there is democracy in India, media relatively enjoys more freedom.

Media is both mirror and torch of society. Society keeps on changing and lots of alternatives regularly emerge in the society. Hence, the society is sometimes confused. Under such circumstances, media gives or tries to give new direction to the society. Thus, both media and society influence each other. So we cannot assess media in isolation from society. This is because, the development of media depends on overall development of the society like economic development, political development, social development, cultural development, religious development, educational development and spiritual development. Thus, the methods and techniques of both social research and communication research are same. Factuality, accuracy, balance and objectivity are common objectives of both these researches.

As a matter of facts, the methods and techniques of sociology, economics, political science, psychology and anthropology have been borrowed in communication research, so the data collection and analysis in communication research are executed scientifically and systematically like that of social

science research. Both researches adopt qualitative and quantitative analysis. Moreover inferences, conclusions and replications are derived in both researches in a similar way.

Hence, there is no difference between these two researches internally rather there is more similarities and equalities. But externally and meticulously, there are some differences between social research and communication research, which can be shown as follows:

Social Science Research	Communication Research
1. Social science research is a systematic, scientific, comparative and evaluative method of finding facts about social truth and events.	1. Communication research is a systematic, scientific, comparative and evaluative method of finding facts about intrapersonal communication, interpersonal communication, group communication, public communication, mass communication etc.
2. The objective of Social research is to highlight the social behavioural aspects of man.	2. The objective of Communication Research is to make people apprise of important events and facts.
3. This is centered to the development of knowledge.	3. This is centered to communication with the people.
4. This is centered to the individual or citizen.	4. This is centered to the target audience.
5. New technology is normally used in social research. But not scientifically like mass communication research.	5. New technology is an integral part of mass media. A new word called 'Compunication' has emerged out of the marriage between communication and computer. Moreover, the word 'Multi-media' has also emerged by the combination of media and computer.
6. It has given birth to communication research.	6. It has given new direction and dimension to social research.
7. It has already reached its climax and saturation point. Now it is reversing.	7. It is struggling to reach a stage of boyhood from childhood.
8. It is not only confined to training institutes but it has fully reached different organizations, voluntary institutes and industries.	8. It is mainly confined to training institutes.
9. Due to its division into marketing research, media research, management research,	9. This is expanding due to new dimension and new technology.

economic research, political research, etc. its area has reached very close to the saturation point.	
10. Its research journals contain more of research based articles as compared to mass communication research.	10. Its research journals contain more of idea-based articles rather than research based articles.
11. This is mainly basic research or fundamental research or pure research.	11. This is mainly practical research and applied research.

2.2.1 ELEMENTS OF RESEARCH

Research has already been defined earlier. It has several important elements which are as follows:

(1) Research Topic: The research topic is the most important element of the research. The topic must be scientific in nature and hence it should be as objective as possible and as assessable as possible within the stipulated period of time. It is basically generated from your research problem which may come to your mind in a vague manner. But while converting the research problem into research topic, scientific approach and scientific temper must be in our mind. While getting it approved, it should be objective, unbiased, and impartial without any editorialisation, short, simple, catchy, innovative and highly communicative. At the time of topic selection at personal level, supervisor level, departmental level or organizational level, the researcher must keep an eye on the following points:

a) Is there any innovation in the topic?
b) Is the topic short, simple and manageable?
c) Is the topic researchable?
d) Is the topic suitable to the interest of the researcher?
e) Is the topic socially relevant?
f) Is the topic objective?
g) Are the data of said study analysable?
h) Is the topic measurable?
i) How much time, money, energy and resources, the topic will consume?
j) Is the topic socially not objectionable?
k) Is the topic conceptual and worth constructing?

If any of the above is missing in the topic, then the researcher should edit and modify the topic with a scientific approach keeping in mind that research is a scientific inquiry and get it reapproved. Though every effort should be made at the time of registration of the topic to make it accurate and perfect so that it may not be changed at the time of submission or report writing.

(2) Scientific Approach: There should be a scientific approach in research. Since research is a scientific study, so its data collection and data analysis must be done scientifically leading to a scientifically based results. When we say that the glass is half-filled or half-empty, then we are biased in both the cases. In the former, we are positively biased. And in the latter, we are negatively biased. But when we say there are 65.23 ml water and 68 cc air in the class, then we are more scientific in our approach. A research demands scientific means, scientific approach, scientific mission and scientific vision.

(3) Systematization: Since research is a scientific inquiry, so it must be systematic in its approach. As mentioned earlier, it must be conceptual and worth constructing in a systematic manner. So it is fundamentally based on concepts and constructs.

A concept is an abstract idea which is synonymous with notion, conception, abstraction, conceptualization, theory, opinion, view, image, impression, picture, etc. It is a generalized term which expresses abstract idea from experiences or the results of a transformation of ideas. It simplifies the research process by combining specific features, objects or people into generalized categories. It also simplifies communication among those who have a shared understanding of them .A researcher must use concept to construct and organize into sensible summaries for others.

On the other hand, a construct is an idea or theory containing various conceptual components which are not generally or directly observable. It is basically a construction and combination of several concepts.

Therefore, systemization in research is not only important but essential. It must be scientifically executed step by step in a well-defined sequence with the help of a construct to develop a concept useful for the society.

(4) Comparison: When we say a research is a scientific approach, it must be comparative as well. Otherwise there will be no difference between an inquiry or investigation or research as discussed extensively in the previous lesson. Comparison makes the study scientific. Therefore in a research we

compare the coverage of different newspapers or magazines or channels to make the study research-oriented. In research, when we try to prove something good or bad, high or low, heavy or light, it is always compared. Even within good it is good, better, best and even in bad it is bad, worse and worst. Similarly high, higher, highest, low, lower and lowest, heavy, heavier and heaviest and light, lighter and lightest. Comparison helps in proper evaluation which is yet another element of a research.

(5) Evaluation: It is an element of research which is basically a calculation of the amount, number or value of something and a scientific determination of a subject's merit, worth and significance using criteria governed by a set of standards. It is an essential component of research whether descriptive or analytical, applied or basic, conceptual or empirical, qualitative or quantitative. It is synonymously used as assessment, appraisal, rating, estimation and ranking of a research proposal or project to ascertain the extent of achievement regarding objectives and findings of any such work that has been completed.

(6) Assessable Research Problem: Research problem is yet another important element of a research. This problem must be assessable and approachable within the stipulated time, budget and resources. In Practical parlance the research problem occurs first in the mind of the researcher even before finalizing the topic. But, theoretically the topic is written first whether it is the cover page or inside page, even though the topic emerges from the problem. Research problems are generally research questions, which gradually become the base of the research objectives and the research hypothesis. Research problem is presented in its detailed form in major project or thesis.

But it is kept to a minimum in published research reports in any research journal. It should be preferably be written in question form. But there is no such hard and fast rule. It may be kept plain depending upon the research formats and issues. Thus assessable research problem is an integral part of research and hence described as an element of research.

(7) Methodological Rigour: This type of rigor is another very important element of research which adopts scientifically approved methods for the research problem. A methodology is a science of methods or a systematic study of method. A research methodology which is a sub set and an integral part of research design, includes research methods, research techniques/tools/apparatus and statistical testing including scientific hypothesis. Thus, the methods, tools and statistical testing are all scientifically approved devices. There are so many types of qualitative research methods, quantitative research methods and a triangulation (combination of both with a problem as a third point).A qualitative

research is objective-driven whereas a quantitative research is hypothesis –based. Therefore, a researcher must be aware of merits and demerits of all the research methods. Then only, he can decide which method/methods is/are most suitable for his research problem. Similarly, the researcher should also be fully aware of all the research tools and statistical testings. Only then he can best judge which one/ones are most appropriate for his particular research problem.

Thus, the main function of the methodology of the research report is to inform the intended general public/audience and the experts what was done to solve the problem. Therefore, research methodology should not only be selected scientifically, systematically and properly, but it should also be written effectively in a research report. Hence methodological rigour is described as an important element of research.

(8) Variable: Without variation, no research is possible. That is why a variable is an important element of research and it is such a force which changes some phenomena or it gets changed by some other forces. Variables are those measures of any phenomenon whose nature is basically dynamic. It varies in its natural process and such variability may be dependent or independent on other factors. The nature or traits or characteristics or features or qualities of any individual or any object or any group or any community or any society are called variables. For example, heights, weights, intelligence level or economic status of reporters of a newspaper are different. That is why height, weight, intelligence or economic status here is called variables. Other examples are: gender, caste, religion, race, marital status, age, income, education, high, low, short, tall, social class, organizational productivity, occupational mobility, level of aspiration, attitude, aptitude, anxiety, religious preference, political affiliation, ego, conformity, introversion, achievement, etc. Variables are of various types which may be represented with the help of the following figure:

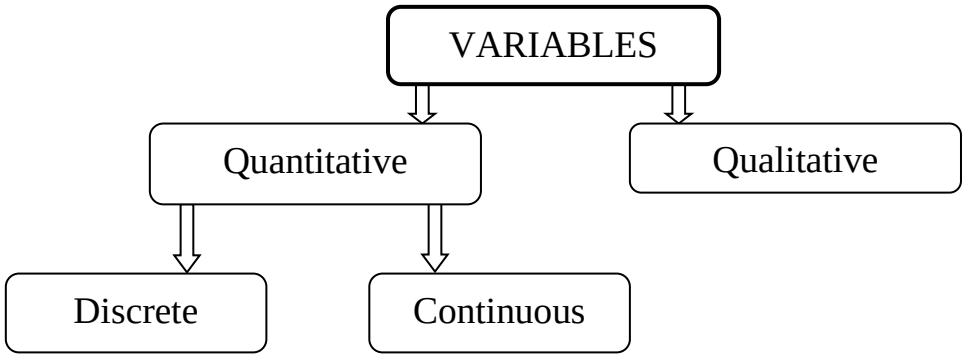


Fig. 1. The above diagram illustrates the types of variables as per measurability

(i) Discrete variable and Continuous variable

(ii) Qualitative variable and Quantitative variable

(iii) Dependent variable and Independent variable

(i) A discrete variable is a whole number in which the basic unit of measurement cannot be sub-divided. For example, number of children in a family, number of magazines in a city or number of reporters in a newspaper. It can be 1, 2, 3, 4…….. and cannot be 2.43.

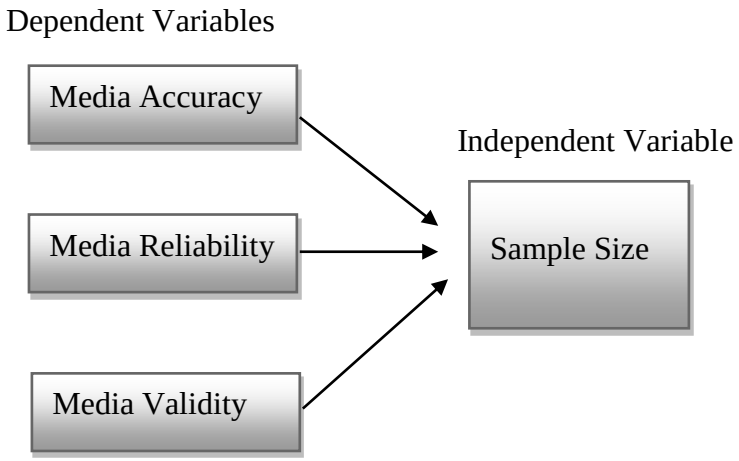
But a continuous variable can have any value (including fractions) and can be sub- divided into smaller subsections. A good example of such a variable is time spent in listening to radio. Person X spent 1.2315 hours viewing television, while person Y spent 1.2314 hours viewing television. The average number of students in a Dept. of Mass Communication is a continuous variable. Thus, it is important to mention here that there are 300.42 students. It is important to mention here that most of measures in research tend to be discrete approximations of continuous variables.

(ii) A qualitative variable is the trait or quality of a person or an object or a group. For example, beauty, health, happiness, nature, behavior, character, attitude, aptitude, aggression, attitude, aptitude, politeness, aspiration, ego, achievement etc. It can be measured in qualitative terms like good, bad etc. However their exact quantification is impossible but by assigning numerical codes to each trait they can be quantified to some extent and made easy for further analysis.

But a quantitative variable can be expressed numerically. For example, length, height, time, number of persons, etc.

(iii) A dependent variable is a consequence of some course. That is why it is also called uncontrolled variable, result variable, outcome variable, effects variable, consequence variable, criterion variable or attribute variable.

But an independent variable is the cause of some event. It is also called controlled variable or cause variable or activevariable or predictor or antecedent variable. The dependent and independent variables may be presented with the help of the following figure:



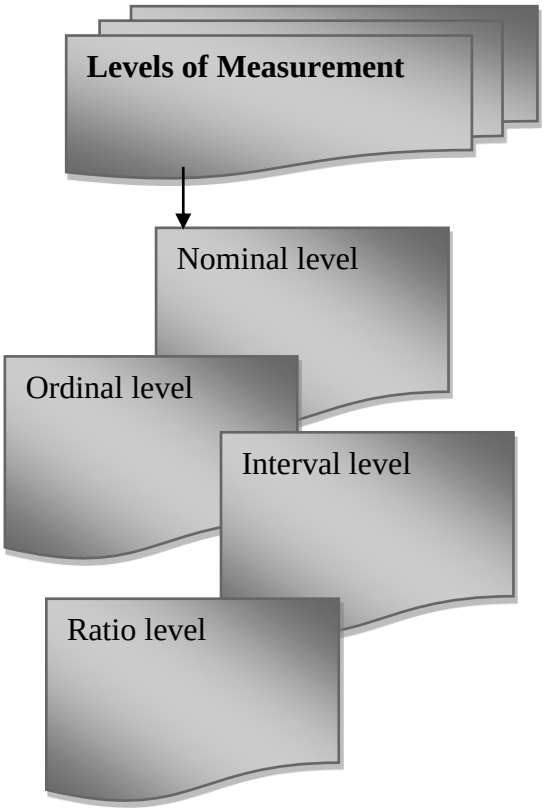
(Fig. 2. Diagram drawn by the author depicts the types of variables as per cause and effect)

For example, accuracy, reliability, validity of a research depends on the sample size. Here sample size is dependent variable and media accuracy is independent variable. Similarly, the communication effectiveness is inversely proportional to the size of the audience. Here, the size of the audience is dependent variable and communication effectiveness is independent variable.

(9) Measurability: This is yet another element of research which gives a scientific status to the data of a research. It is the ability of measurement which is the assignment of numerals to objects, events or properties in accordance with some definite rules. These objects or events or properties can be compared with other objects events and properties. The scope of measurability is fundamentally based on context and discipline. A prominent mathematician S.S. Stevens has classified measurement into four levels of measurement, according to the rules that are used to assign numbers to objects or events. The four levels of measurement are as follows:

(i) Nominal level of measurement
(ii) Ordinal level of measurement
(iii) Interval level of measurement
(iv) Ratio level of measurement

These levels of measurement may be depicted with the help of the following diagram:



(Fig.3: Diagram drawn by author's scholar Dr Bhupender Singh indicates different levels and types of measurement)

These are also called nominal data, ordinal data, interval data and ratio data.

(10) Authenticity: It is yet another equally important element of research which means the quality of being authentic, true or accurate. It is synonymously used as genuineness, authentication, rightfulness, bonafides, etc. and it concerns the truthfulness of origins, attributes, commitment, devotion and sincerity. It is thus an integral part of a research whether conceptual or empirical or any other type of research.

(11) Reliability: Reliability is essential for a research to be a scientific study. That is why it is called an important element of research .It is a property of a measure that consistently provides the same answer at different times. Reliability in research is used to make evaluative estimations of measurement instruments called tests, surveys or data collection methods. A reliable method or instrument provides consistent findings in various applications. Thus reliability is the overall consistency of a measure

which is said to be high if it produces the same results under consistent situations. That is to say that if results from a research are replicated consistently, that means they are reliable.

(12) Validity: Validity is yet another essential element of a research. The word "Valid" has been derived from the Latin word 'Validus' which means strong. It is the extent to which a test actually measures what it purports to measure. It is the quality of being logically or factually sound. It is the state of being legally or officially binding or acceptable. It is a kind of legal acceptability.

Thus, validity of a measurement tool is considered to be the extent to which the tool measures what it claims to measure.

(13) Scales: Another element of research is a scale which is a form of measurement representing a composite measure of a variable. It is a classification which explains the nature of information within the numerals assigned to variables. Scales are generally not used with simple variables, but complex variables. There are various types of scales in research like simple rating scales, transforming scales and specialized rating scales like Thurstone scales, Gutman scales, Likert scales and semantic differential scales.

(14) Objectivity: It is another extremely important element of research which is responsible for the scientific approach of a research. Objectivity means no personal comments/opinions, no editorialisation, no biases. It is synonymously used as impartiality; absence of biases or prejudice, fairness, equitableness, equitability, justness, neutrality, etc. Thus objectivity means lack of bias, judgment or prejudice. It is an idea that accounting decisions should be made freely, fairly and independently of biases. It is the state or quality of being true even outside of a subject's individual biases, partialities, prejudices interpretations, feelings and imaging.

(15) Justification: In research, every 'why' should be answered? If we give a comment, we must justify where it has been taken from with due references in the bracket, footnote and a comprehensive references at the end. There should be establishment of a relationship between the cause and the consequence. Even if there is a specific information or data or intimation, it must be quoted with suitable source and due reference. Further, every statement should be justified and supported with suitable description and analysis.

(16) Research Ethics: As explained earlier that the components which give scientific approach to a research are elements of research with ethics and usefulness. Hence ethics in research is significantly

relevant element of a research. Research ethics focuses on the analysis of ethical issues which are raised time and again when people are associated as participants in the research project .It focuses on the disciplines that study standards of conduct like honesty, integrity carefulness, openness, respect for intellectual property, confidentiality, social responsibility, non-discrimination, competence, etc.

(17) Social Usefulness: This is yet another significantly valid element of a research. A research has no meaning until and unless it adds to the knowledge of its discipline and leads to the expansion of thoughts and theories useful for the society. Thus, the social usefulness of a research is reflected in its capacity to give well validated remedies of the prevailing social problems involving human interactions.

2.2.2 INTERRELATION BETWEEN ELEMENTS OF RESEARCH

Since research is derived from French word 'Rechercher' which means scientific discovery or scientific inquiry or scientific investigation of facts, so all discoveries or investigations or inquiries are not research. What a police man inquires about a particular crime or what a journalist investigates about a particular news is not described as research. Only scientifically inquired facts or only scientifically investigated fact is research. That is why a scientific inquiry about a particular type of crime with scientific analysis or interpretation is described as crime research which leads to a well-established scientific results about a particular type of crime. Similarly, when a journalist collects news with a huge data about pre-poll survey or exit poll survey in a scientific manner leading to a scientific results, then it is described as precision journalism. This precision journalism is described as research because it is a rare combination of research and journalism. Similarly, a research is used as a tool for reporting, then it is called research or scientific study or precision journalism. This is because in this type of journalism, scientific steps of a research is strictly followed.

Now if a research is studded with scientific approach, then it must be executed with a systematic sequence. In science, systematic sequence or working with proper sequencing is essentially required. This systematic approach must be in accordance with the approved researchable topic. We have already discussed earlier that a research topic should also be selected with a scientific approach after thorough reviewing of literature and without having any biasedness or it should be full of objectivity. Under no circumstances, a research topic should be subjective or editorialized. There should be no advocacy or judgment or reform or suggestive approach in the topic itself. It should be as short, simple and clear as

possible. Hence, research topic, scientific approach and systematization are automatically inter-related and inter-linked.

Similarly, comparison is an essential element of science. If we take one newspaper for the study, then we must compare it with another worth-comparing newspaper. Hence, comparison becomes an essential part in the discussion in the discussion of the topic, scientific approach and systematization. Next comes evaluation scientific inquiry or investigation must be evaluative. Even if it is a qualitative data, it must be evaluated. Again the topic must emerge from an assessable research problem. Though the research problem is written later yet in practice, it comes prior to research topic. A topic is in fact generated from the research problem. Objectives are also created depending upon the research topic and research problem. For achieving the framed objectives, a methodological rigour must be there. It must be based on scientifically approved or universally well-accepted research methodology. The scientific method may be used to create or innovate another methodology. This is because developing another methodology based on scientifically approved methodology is also described as research process or an integral part research like developing a research scale by Likert, Gutman, Thorndike, etc. Even developing a random sampling method was well accepted as a research and was universally accepted as a method of research or an important survey method. Variables, measurability, reliability, validity and objectivity are all inter-related, inter-linked and inter-woven as these are all integral components of any scientific approach. Moreover, a fake data collection will automatically lead to a complete failure of even the best methodology or the best use of statistical analysis. Hence, research ethics has been considered as an integral and an indispensable element of research which is quite inter-related as explained. Last but not the least important is social usefulness. If a research does not add to the knowledge of the subject or it has no social significance or no rationale, it leads to useless and unaccepted research. Any research must have a social usefulness directly or indirectly, somehow or other, sooner or later. Some basic or fundamental research often appears to be useless, but they have a very long-term approach, which is directly or indirectly contributory. Thus we may assert that all the elements or components of research are inter-related, inter-linked and inter-woven.

2.2.3 ROLE OF EACH ELEMENT OF RESEARCH

Each and every element of research right from the selection of a researchable topic with objectivity to the social usefulness are highly important ingredients for any research. As discussed earlier as to how

scientific approach is inter-linked to systematization, comparison, evaluation, assessable research problem, methodological rigour, variable, measurability, authenticity, reliability, validity, scales, objectivity, justification, research ethics and social usefulness. Hence, each and every element has a significant, relevant, useful and important role in carrying out a research.

2.3 CHECK YOUR PROGRESS

Note: 1) Use the space below for your answers.

2) Compare your answers with those given at the end of this lesson.

A. CHOOSE THE RIGHT OPTION.

1. Research topic must be…..
   (a) scientific in nature
   (b) artistic in nature
   (c) subjective in nature
   (d) None of the above.
2. Research is a
   (a) Systematic study
   (b) Any new facts
   (c) News
   (d) None of the above
3. Variables are those measures of any phenomenon whose nature is basically:
   (a) Dynamic
   (b) Static
   (c) Combination of static and dynamic
   (d) None of the above
4. Objectivity means no personal comments/opinions, no editorialisation and :
   (a) No biases
   (b) Views generation
   (c) Thought production
   (d) None of the above
5. Validity is a kind of following acceptability :

(a) Economic

(b) Social

(c) Political

(d) Legal

B. FILL IN THE BLANKS

1. Research is a …….study.
2. Scale is a form of……. representing a composite measure of a variable.
3. Variable is an important……. of research.
4. Research ethics focuses on the analysis of ……issues
5. Mass communication is a part of …… and communication is a part of ……...

2.4 SUMMARY

- Elements of research, though a bit interrelated yet different from elements of research design, elements of research proposal, elements of research methods, elements of research paper and elements of research report.
- Research is a scientific study. In order to have a scientific approach, it must have a systematic inquiry, comparative analysis and evaluative in nature while finding new facts or testing old facts. Hence, its elements are basically those which make it scientific in its approach, of course with ethics and usefulness. Thus the elements of research are: research topic, systematization, comparison, evaluation, assessable research problem, methodological rigour, variables of different types like discrete variable, continuous variable, qualitative variable, quantitative variable, dependent variable (uncontrolled variable, result variable, result variable, outcome variable, effects variable, consequence variable, criterion variable, attribute variable), independent variable (controlled variable, cause variable, active variable, predictor or antecedent variable) ,qualitative variable, quantitative variable, measurability of various types like nominal level of measurement ,ordinal level of measurement, interval level of measurement, ratio level of measurement(also called nominal data, ordinal data, interval data, ratio data) authenticity, reliability, validity, scales, objectivity, research ethics, social usefulness, etc.
- Only scientifically inquired facts or only scientifically investigated fact is research. That is why a scientific inquiry about a particular type of crime with scientific analysis or interpretation is

described as crime research which leads to a well-established scientific results about a particular type of crime. Similarly, when a journalist collects news with a huge data about pre-poll survey or exit poll survey in a scientific manner leading to a scientific results, then it is described as precision journalism. This precision journalism is described as research because it is a rare combination of research and journalism. Similarly, a research is used as a tool for reporting, then it is called research or scientific study or precision journalism. This is because in this type of journalism, scientific steps of a research is strictly followed.

- Now if a research is studded with scientific approach, then it must be executed with a systematic sequence. In science, systematic sequence or working with proper sequencing is essentially required. This systematic approach must be in accordance with the approved researchable topic. We have already discussed earlier that a research topic should also be selected with a scientific approach after thorough reviewing of literature and without having any biasedness or it should be full of objectivity. Under no circumstances, a research topic should be subjective or editorialized. There should be no advocacy or judgment or reform or suggestive approach in the topic itself. It should be as short, simple and clear as possible. Hence, research topic, scientific approach and systematization are automatically inter-related and inter-linked.
- Similarly, comparison is an essential element of science. If we take one newspaper for the study, then we must compare it with another worth-comparing newspaper. Hence, comparison becomes an essential part in the discussion in the discussion of the topic, scientific approach and systematization. Next comes evaluation scientific inquiry or investigation must be evaluative. Even if it is a qualitative data, it must be evaluated. Again the topic must emerge from an assessable research problem. Though the research problem is written later yet in practice, it comes prior to research topic. A topic is in fact generated from the research problem. Objectives are also created depending upon the research topic and research problem. For achieving the framed objectives, a methodological rigour must be there. It must be based on scientifically approved or universally well-accepted research methodology. The scientific method may be used to create or innovate another methodology. This id because developing another methodology based on scientifically approved methodology is also described as research process or an integral part research like developing a research scale by Likert, Gutman, Thorndike, etc.

Even developing a random sampling method was well accepted as a research and was universally accepted as a method of research or an important survey method. Variables, measurability, reliability, validity and objectivity are all inter-related, inter-linked and inter-woven as these are all integral components of any scientific approach. Moreover, a fake data collection will automatically lead to a complete failure of even the best methodology or the best use of statistical analysis. Hence, research ethics has been considered as an integral and an indispensable element of research which is quite inter-related as explained. Last but not the least important is social usefulness. If a research does not add to the knowledge of the subject or it has no social significance or no rationale, it leads to useless and unaccepted research. Any research must have a social usefulness directly or indirectly, somehow or other, sooner or later. Some basic or fundamental research often appears to be useless, but they have a very long-term approach, which is directly or indirectly contributory. Thus we may assert that all the elements or components of research are inter-related, inter-linked and inter-woven. Each and every element of research right from the selection of a researchable topic with objectivity to the social usefulness are highly important ingredients for any research. As discussed earlier as to how scientific approach is inter-linked to systematization, comparison, evaluation, assessable research problem, methodological rigour, variable, measurability, authenticity, reliability, validity, scales, objectivity, justification, research ethics and social usefulness. Hence, each and every element has a significant, relevant, useful and important role in carrying out a research.

2.5 KEYWORDS

Research Topic: The topic must be scientific in nature and hence it should be as objective as possible and as assessable as possible within the stipulated period of time.

Scientific Approach: Since research is a scientific study, so its data collection and data analysis must be done scientifically leading to a scientifically based results.

Systematization: Since research is a scientific inquiry, so it must be systematic in its approach.

Comparison: Comparison makes the study scientific. Therefore in a research we compare the coverage of different newspapers or magazines or channels to make the study research-oriented.

Evaluation: It is basically a calculation of the amount, number or value of something and a scientific determination of a subject's merit, worth and significance using criteria governed by a sSet of Standards.

Assessable Research Problem: It must be assessable and approachable within the stipulated time, budget and resources.

Methodological Rigour: A research methodology which is a sub set and an integral part of research design, includes research methods, research techniques/tools/apparatus and statistical testing including scientific hypothesis.

Variable: Variables are those measures of any phenomenon whose nature is basically dynamic. It varies in its natural process and such variability may be dependent or independent on other factors.

Measurablity: It is the ability of measurement which is the assignment of numerals to objects, events or properties in accordance with some definite rules.

Authenticity: It means the quality of being authentic, true or accurate. It is synonymously used as genuineness, authentication, rightfulness, bonafides, etc. and it concerns the truthfulness of origins, attributes, commitment, devotion and sincerity.

Reliability: It is used to make evaluative estimations of measurement instruments called tests, surveys or data collection methods.

Validity: It is a kind of legal acceptability.

Scale: It is a form of measurement representing a composite measure of a variable. It is a classification which explains the nature of information within the numerals assigned to variables. Scales are generally not used with simple variables, but complex variables.

Objectivity: It means no personal comments/opinions, no editorialisation, no biases.

Research Ethics: It focuses on the analysis of ethical issues which are raised time and again when people are associated as participants in the research project .It focuses on the disciplines that study standards of conduct like honesty, integrity carefulness, openness, respect for intellectual property, confidentiality, social responsibility, non-discrimination, competence, etc.

Social Usefulness: It is reflected in its capacity to give well validated remedies of the prevailing social problems involving human interactions.

2.6 SELF-ASSESSMENT TEST

1. What is social research? Differentiate between social research and communication research.
2. What is communication research? Differentiate between social research and media research.
3. What is media research? Differentiate between media research and communication research.
4. Describe the various elements of research.
5. Explain the inter-relation between the elements of research.
6. Discuss the role of each element of research.
7. What is a research topic? How is it selected?
8. What are the precautions in selecting a research topic?
9. Discuss the role of scientific approach in research.
10. What do you mean by systematic approach in research? How is it executed?
11. Describe the role of comparative approach in research.
12. What is evaluation in research? How will you evaluate the qualitative data in research?
13. What is a research problem? Discuss its role in the entire research process.
14. What do you mean by research methodology?
15. Differentiate between research tool, research method and research methodology?
16. What is a variable? Describe the various types of variables?
17. What do you mean by objectivity in research?
18. Throw light on the role, function and importance of objectivity in research.
19. Describe the significance, function and importance of research ethics in social research and mass communication research.
20. Discuss the role, function, relevance and significance of social usefulness of a research.
21. Discuss the interrelation between research topic and research problem.
22. Explain the interface between scientific approach and systematization.
23. Describe the role of a research topic while pursuing a prestigious degree or a project.
24. Describe briefly the levels of measurement.
25. Write short notes on the followings :
    - **(a)** Research topic
    - **(b)** Scientific approach
    - **(c)** Systematisation

(d) Comparison

(e) Evaluation

(f) Assessable research problem

(g) Methodological rigour

(h) Variable

(i) Measurability

(j) Authenticity

(k) Reliability

(l) Scale

(m) Validity

(n) Objectivity

(o) Research ethics

(p) Social usefulness.

2.7 ANSWERS TO CHECK YOUR PROGRESS

A. CHOOSE THE RIGHT OPTION

1. (a) scientific in nature
2. (a) Systematic study
3. (a) Dynamic
4. (a) No biases
5. (d) Legal

B. FILL IN THE BLANKS

1. Scientific
2. Measurement
3. Element
4. Ethical
5. Communication, Society

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SUBJECT: COMMUNICATION RESEARCH	
COURSE CODE: MSM-511	AUTHOR: PROF MANOJ DAYAL
LESSON NO.: 3	
TYPES OF RESEARCH	

STRUCTURE

3.0 LEARNING OBJECTIVES

- To explain descriptive vs analytical research.
- To describe applied vs fundamental research.
- To discuss conceptual versus empirical research.

- To throw light on historical vs contemporary research.
- To explain conclusion-oriented vs decision-oriented research.
- To describe one time vs longitudinal research.
- To discuss clinical vs diagnostic research.
- To throw light on field vs laboratory research.
- To describe quantitative vs qualitative research.
- To discuss disciplinary research vs interdisciplinary research.

3.1. INTRODUCTION

Types of research are very much intermixed, intermingled and interconnected with the types of research methodology, types of research proposal, and types of research design. Hence it will be more appropriate to describe the types of research in paired forms. Thus, the types of communication research which focus and address more specifically on communication aspects, issues and problems are descriptive vs analytical, applied vs fundamental, conceptual vs empirical, historical vs contemporary, conclusion-oriented vs decision-oriented, one time vs longitudinal, clinical vs diagnostic, field vs laboratory, quantitative vs qualitative disciplinary vs interdisciplinary research. In this lesson, the students will be acquainted with various types of research.

3.2 TYPES OF RESEARCH

Here we discuss the various types of research. They are…

- Descriptive vs. Analytical Research
- Applied vs. Fundamental Research
- Conceptual vs. Empirical Research
- Historical vs. Contemporary Research
- Conclusion-oriented vs. Decision-oriented Research
- One-time vs. Longitudinal Research
- Clinical vs. Diagnostic Research
- Field vs. Laboratory Research
- Qualitative vs. Quantitative Research
- Disciplinary vs. Interdisciplinary Research

3.2.1 DESCRIPTIVE VS. ANALYTICAL RESEARCH

Descriptive research describes the features of a population or phenomenon being studied. It does not provide the solutions of the problems about how, when and why these features occurred. It describes what is or what exists and helps to uncover new facts and meaning. It is survey-based and relies on fact-finding enquiries of various types. In media research or social science research, it is synonymously used as Ex post facto research in which the researcher does not have any control over the variables. It can be either quantitative or qualitative or both. It uses descriptive statistics like measures of central tendency, measures of dispersion, measures of asymmetry, measures of relationship and also multivariate analysis. While taking the qualitative data, it uses statistical tool like spearman's rank correlation analysis, etc.

On the other hand, in analytical research, the researcher has to use the secondary or tertiary data which already exist. He analyses these facts and information for the critical appraisal.

Thus a descriptive research tries to describe what is, whereas analytical research tries to establish why it is that way or how it came to be. On the other hand while descriptive research uses description, classification, measurement and comparison whereas analytical research generally focuses on cause-effect relationship. For example, the study of changing trends of media is descriptive research, while explaining why and how the media trends are changing in a particular way over time is an illustration of analytical research. Though these two researches are quite different, yet they are interdependent as a combination of both makes research more fruitful.

3.2.2 APPLIED VS. FUNDAMENTAL RESEARCH

Applied research (or action research) tries to solve a problem of the society or an industry.

Basic research (or pure research or fundamental research), on the other hand, focuses on generalization and formulation of a theory. It gathers knowledge for knowledge's sake.

Thus, the applied research discovers a solution for some pressing and emerging practical problem, whereas basic research gains knowledge that has a broad base.

The distinction between them has mainly emerged from basic science vs. applied science like physics and engineering. Physics is a basic science which explores a theory or a principle whereas engineering pays attention to practical solutions and applications to the real world. Similarly research by Sigmund Freud on psychoanalytical theory or dream theory or by Harold D. Lasswell of his prominent

communication model are examples of basic research of social and communication studies. On the other hand 'A study of cost minimization of newspaper production' is an example of applied research.

Though these two researches are different in nature, yet they are interdependent. The theories, principles, models, paradigms etc. developed by basic research are often used in applied research and it should be preferably used. Similarly applied research helps a lot in the execution of basic research in the sense that the findings of applied research are highly instrumental in basic research. Hence applied research can grow and flourish only in the lap of basic research.

3.2.3 CONCEPTUAL VS. EMPIRICAL RESEARCH

Conceptual research relates to some thought or theory or concept or abstract idea. It is also called pen and paper research as no experiment is required in this type of research. It is usually practiced by thinkers, philosophers and opinion makers and brain storming activists with a view to building up new concepts or testing the old and exiting concepts. It mainly focuses on conceptual dimension or theoretical framework that explains or describes the phenomenon being studied.

On the other hand, empirical research is that type of a research which uses empirical evidence. It is a process of acquiring knowledge by direct or indirect observation or experience mostly without proper respect for the system and theory. It is data-oriented research with certain conclusions which can be tested or verified by observation or experiment. It is also described as experimental type of research. It is always dependent on primary data where the first hand informations are collected and the researcher actively and seriously goes about carrying out certain things to stimulate the production of the required facts. Under the empirical research, the researcher must formulate a hypothesis and must anticipate an assumed result. Then the researcher should collect the basic facts to prove or disprove his hypothesis. Such an experimental research is often characterized by the experimenter's control over the variables under study and its deliberate manipulation of one of them to examine its effects. But empirical research is suitable only when proof is sought that certain variables are influencing other variables directly or indirectly.

A combination of both conceptual research and empirical research is described as scientific research which experiments and conceptualise. As a matter of fact when these two researches are combined, they become more fruitful, useful, relevant and applicable.

3.2.4 HISTORICAL VS. CONTEMPORARY RESEARCH

Historical research is that which uses historical sources like documents, remains, relics, artifacts, etc. to deeply study and investigate events or ideas of the past ,including the philosophy of individuals, groups, communities, associations and societies at any remote point of time. It involves interpreting past events to forecast the futures.

In this type of research, the researcher is supposed to find the idea and figure out the research question. That is to say that he has to isolate the research problem. Second step involves figuring out where to explore sources and how to reach them. That means he has to collect source materials, including primary and secondary sources. Third step is that the researcher does not take any decision to solve his problems directly. He only evaluates the source material. Fourth step is that the researcher has to formulate the hypothesis and then analyse the collected data. Fifth, he is supposed to analyse the sources of data and get ready to interpret findings and write the report.

Thus, historical research is a procedure supplementary to observation in which the researcher tries to test and verify the authenticity of the report or observations made by others. The basic advantages of this method are that the research is not physically involved in the situation under the study. There is no danger of experimenter-subject interaction. Moreover, documents are located by the researcher, data is collected and conclusions are drawn out of sight.

On the other hand, contemporary research is a current and topical research in which the facts and informations remain close to the source either time-wise or location-wise. It studies a person or an event belonging to the same time or period with another or others. Though these two researches are quite different, yet a judicious balance of the two gives more fruitful results. So they are interdependent. It is only in the lap of historical research; the contemporary research can sprout, bud and bloom.

3.2.5 CONCLUSION-ORIENTED VS. DECISION-ORIENTED RESEARCH

In conclusion-oriented research, a researcher is completely free to pick up a research problem or a research topic, reshape or redesign the enquiry as he moves on his execution and is fully ready and aptly prepared to conceptualise as per his choice and desire.

Decision-oriented research, on the other hand, is always for the need of a decision-maker and the researcher in this case is not at all free to initiate the research process according to his own choice and

interest. Operation research is a glaring example of decision-oriented research. This is because it is a scientific method of giving executive departments with a quantitative basis for decisions about operations under their control.

Thus, both these researches relate to freedom and control to initiate a research process according to researcher's inclination. While the former relates to freedom of selection, the latter relates to control of choice.

3.2.6 ONE-TIME VS. LONGITUDINAL RESEARCH

In one-time research, it is confined to a single period. It is not frequently or repeatedly executed, whereas in longitudinal research, it is carried on various points of time. Unlike one-time research, a longitudinal research is practiced to study individuals at different stages in their lives. Under this study, a community or group or association or society can also be studied at different points of time. It is basically a correlational study which involves frequent and repeated observations of the same variables over a very long period of time. It is a kind of observational examining of research at different points of time.

3.2.7 CLINICAL VS. DIAGNOSTIC RESEARCH

It is a branch of healthcare sciences which is mainly based on case study methods and observation methods or indepth approaches to find out the causes of the problem or to establish the basic causal relations. This type of studies generally dives deep into the causes and problems of things or events that interest us. In such studies, very small samples are used and very profound data collecting tools are applied to make an indepth study. It directly involves a particular person or community or group or association or society that uses materials from human, such as their behaviours or samples of their tissue. It follows a pre-defined plan or protocol.

The diagnostic research, on the other hand, focuses on the development and investigation of methods for the assessment of medical tests in healthcare. When both these are combined, it becomes more useful, relevant and problem-solving.

3.2.8 FIELD VS. LABORATORY RESEARCH

In field research, the researcher has to go in the field to talk to his respondents and get the answers either with the help of interview or schedule whereas a laboratory research is carried out in a laboratory under certain control conditions. Both these researches are different in nature, but often interdependent in process. That is why usually the process of research moves from lab to land and land to lab.

3.2.9 QUALITATIVE VS. QUANTITATIVE RESEARCH

Qualitative research explains the qualitative phenomenon. It relates to immeasurable variables like beauty, happiness, nature, behavior, health, character, attitude, aptitude, etc. It uses small samples, inductive method of data analysis, open, flexible and standard questions with a lot of follow up. It uses different methods like observation method, intense interview method, case study method, focus group method, content analysis method, projective test method and ethnographic method. Observation method is further divided into uncontrolled observation, controlled observation, mass observation, participant observation, non-participant observation, quasi-participant observation. Intense interview method may be divided into personal interview, structured interview, unstructured/uncontrolled interview, focused interview and informal interview. Case study method may be divided into individual case study method and social case study method. Projective method may also be divided into Rorschach inkblot test, thematic appreciation test, word association test, picture association test sentence completion test verbal projection test doll drawing test. And ethnographic method may also be divided into macro ethnography and micro ethnography.

On the other hand, quantitative research relates to measurement of quantity or amount like length, height, time, number of persons, etc. It is a scientific and systematic investigation of observable phenomena with the help of mathematical, statistical and computational techniques. It is designed to develop mathematical models, theories and hypothesis relating to a phenomenon. Measurement is the core of this type of research as it gives the basic connection between empirical observation and mathematical expression of quantitative relationships. It uses different methods like census method, probability sampling method and content analysis method. Probability sampling methods are further divided into simple random sampling, systematic random sampling, stratified random sampling, cluster sampling, whereas non-probability sampling method may be divided into purposive or judgmental

sampling, convenience sampling, quota sampling, multi-staged sampling, multi-phased sampling content analysis, self-selected sampling, area sampling, panel sampling, etc.

Both qualitative method and quantitative method have their own merits and demerits. Though these two methods are just contrast to each other, yet a combination of both to solve a research is far better, more complete and extremely fruitful. A combination of qualitative method, quantitative method to solve a research problem is called triangulation .Primarily, the concept of triangulation has been borrowed from navigational and land surveying technique that determine a single point in space with the convergence of measurements taken from two other distinct points(Rothbauer,2008). Altricher et al. (2008) contend that triangulation 'gives a more detailed and balanced picture of the situation'. Wimmer and Dominick (2003) define triangulation as a 'combined quantitative and qualitative approach to solve a problem'. According to O' Donoghue and Punch (2003), triangulation is a 'method of cross-checking data from multiple sources to search the regularities in the research data.'

Chhen and Manion (2000) define it as an 'attempt to map out, or explain more fully, the richness and complexity of human behavior by studying it from more than one standpoint'.

3.2.10 DISCIPLINARY VS. INTERDISCIPLINARY RESEARCH

By disciplinary research, we mean research designed to improve a particular discipline like communication research or media research. But interdisciplinary research involves two or more disciplines which really solve a problem. Hence interdisciplinary research may be sometimes called as multidisciplinary research, is also called problem-solving research. For example an interdisciplinary research on commercialization of media involving economics, psychology, sociology and political science. Similarly communication components of Naxal Issues involving politics, economics, sociology, defense, human rights and psychology can be problem solving which research of communication studies alone cannot do.

3.3 CHECK YOUR PROGRESS

Note: 1) Use the space below for your answers.

2) Compare your answers with those given at the end of this lesson.

A. CHOOSE THE RIGHT OPTION.

1. Descriptive research describes

(a) The features of a population or phenomenon being studied

(b) The subjectivity of the research

(c) The objectivity of the research

(d) None of the above

2. Analytical research is
   (a) Dependent on secondary and tertiary data
   (b) Research which is searched again
   (c) Research within a research
   (d) None of the above
3. Basic research relates to
   (a) The facts and figures.
   (b) The development of theories and models
   (c) The achievement of the work
   (d) None of the above
4. Empirical research is
   (a) The analysis of the data
   (b) The description of the facts
   (c) Uses empirical evidence
   (d) None of the above
5. Conceptual research
   (a) Relates to some thought or theory
   (b) Relates to basic facts
   (c) Relates to data analysis
   (d) None of the above.

B. FILL IN THE BLANKS

1. The study of changing trends is ……research.
2. ……research tries to establish why it is that way or how it came to be.
3. A research which is carried on various points of time is called……..research.
4. A research which involves two or more disciplines is described as …… research.

5. …….. research relates to immeasurable variables like beauty, happiness, nature, behavior, health, character, attitude, aptitude, etc.

3.4 SUMMARY

- There are so many types of communication research like : descriptive research, analytical research, applied or action research, fundamental or basic or pure research, conceptual research, empirical research, historical research, contemporary research, conclusion-oriented research, decision-oriented research, one-time research, longitudinal research, clinical research, diagnostic research, quantitative research, qualitative research, disciplinary research and interdisciplinary research.
- The study of changing trends of media is descriptive research, while explaining why and how the media trends are changing in a particular way over time is an illustration of analytical research. The applied research discovers a solution for some pressing and emerging practical problem, whereas basic research gains knowledge that has a broad base. The distinction between them has mainly emerged from basic science vs. applied science like physics and engineering. Physics is a basic science which explores a theory or a principle whereas engineering pays attention to practical solutions and applications to the real world. Similarly research by Sigmund Freud on psychoanalytical theory or dream theory or by Harold D. Lasswell of his prominent communication model are examples of basic research of social and communication studies.
- On the other hand 'A study of cost minimization of newspaper production' is an example of applied research. Conceptual research relates to some thought or theory or concept or abstract idea. It is also called pen and paper research as no experiment is required in this type of research whereas empirical research is that type of a research which uses empirical evidence.
- Empirical research is data-oriented research with certain conclusions which can be tested or verified by observation or experiment and is also described as experimental type of research. Historical research is that which uses historical sources like documents, remains, relics, artifacts, etc. to deeply study and investigate events or ideas of the past, including the philosophy of individuals, groups, communities, associations and societies at any remote point of time, whereas contemporary research is a current and topical research in which the facts and informations remain close to the source either time-wise or location-wise.

- Conclusion-oriented and decision-oriented research relate to freedom and control to initiate a research process according to researcher's inclination. While conclusion-oriented research relates to freedom of selection, decision-oriented research relates to control of choice. One-time research is confined to a single period, whereas longitudinal research is carried on various points of time.
- Clinical research is mainly based on case study methods and observation methods or indepth approaches to find out the causes of the problem or to establish the basic causal relations whereas diagnostic research focuses on the development and investigation of methods for the assessment of medical tests in healthcare. In field research, the researcher has to go in the field to talk to his respondents and get the answers either with the help of interview or schedule whereas a laboratory research is carried out in a laboratory under certain control conditions.
- A qualitative research relates to immeasurable variables like beauty, happiness, nature, behavior, character, attitude, aptitude, etc. It uses small samples, inductive method of data analysis, open, flexible and standard questions with a lot of follow up whereas a quantitative research is a scientific and systematic investigation of observable phenomena with the help of mathematical, statistical and computational techniques.
- Disciplinary research is designed to improve a particular discipline like communication research or media research whereas interdisciplinary research involves two or more disciplines which really solve a problem.
- The concept of types of communication research will be further strengthened if we continue our discussions on research design: concept and types followed by types of subject specific methods of research, i.e., methods of communication research. Hence in the next lesson, we will focus on research design: concept and types. Then we will move to methods of media research.

3.5 KEYWORDS

Types of Research: There are so many types of communication research like: descriptive research, analytical research, applied or action research, fundamental or basic or pure research, conceptual research, empirical research, historical research, contemporary research, conclusion-oriented research, decision-oriented research, one-time research, longitudinal research, clinical research, diagnostic research, quantitative research, qualitative research, disciplinary research and interdisciplinary research.

Descriptive Research: It does not provide the solutions of the problems about how, when and why these features occurred. It describes what is or what exists and helps to uncover new facts and meaning.

Analytical Research: It tries to establish why it is that way or how it came to be.

Applied Research: It discovers a solution for some pressing and emerging practical problem.

Fundamental Research: It gains knowledge that has a broad base.

Conceptual Research: It mainly focuses on conceptual dimension or theoretical framework that explains or describes the phenomenon being studied.

Empirical Research: It is that type of a research which uses empirical evidence.

Historical Research: It involves interpreting past events to forecast the futures.

Contemporary Research: It is a current and topical research in which the facts and informations remain close to the source either time-wise or location-wise. It studies a person or an event belonging to the same time or period.

Conclusion-Oriented Research: It relates to freedom of selection.

Decision-Oriented Research: It relates to control of choice, like operation research.

One-Time Research: It is confined to a single period. It is not frequently or repeatedly executed.

Longitudinal Research: It is carried on various points of time.

Clinical Research: It follows a pre-defined plan or protocol.

Diagnostic Research: It focuses on the development and investigation of methods for the assessment of medical tests in healthcare.

Qualitative Research: It relates to immeasurable variables like beauty, happiness, nature, behavior, health, character, attitude, aptitude, etc.

Quantitative Research: It relates to measurement of quantity or amount like length, height, time, number of persons, etc.

Disciplinary Research: It is designed to improve a particular discipline like communication research or media research.

Interdisciplinary Research: It involves two or more disciplines which really solve a problem.

3.6 SELF-ASSESSMENT TEST

1. Discuss briefly the various types of research.
2. Describe the different types of communication research.

3. Explain descriptive research. How is it different from analytical research?
4. What is fundamental research? Compare and contrast it with applied research.
5. Describe the interdependence between basic research and action research.
6. Do you think a combination of pure research and applied research will be more fruitful? Justify.
7. Differentiate between conceptual research and empirical research.
8. Explain up to what extent conceptual research and empirical research are independent and interdependent?
9. Distinguish between historical research and contemporary research. Do you think if these two are combined, the results will be more fruitful? Explain.
10. What is conclusion-oriented research? How is it different from decision-oriented research?
11. Differentiate between one-time research and longitudinal research.
12. Is clinical research a qualitative research? Justify.
13. Distinguish between clinical research and diagnostic research.What is field research? Do you think it is different from laboratory research? Explain.
14. Do you think field research and laboratory research are interdependent? Explain.
15. What is qualitative research? Discuss the limitations of a qualitative research?
16. Do you think qualitative research lacks objectivity and is more subjective? Give answer and justify.
17. What is a quantitative research? Explain the strength of a quantitative research.
18. Do you think a combination of both qualitative and quantitative research will be more result-oriented and relevant? Explain.
19. What is triangulation? Do you think it will be extremely fruitful and relevant?
20. Differentiate between disciplinary and interdisciplinary research.
21. Compare and contrast disciplinary research and interdisciplinary research.
22. Do you think interdisciplinary research is more problem solving than the disciplinary research? Give answer and justify.
23. Why is interdisciplinary research described as problem-solving research? Justify.

3.7 ANSWERS TO CHECK YOUR PROGRESS

A. CHOOSE THE RIGHT OPTION.

1. (a) The features of a population or phenomenon being studied
2. (a) Dependent on secondary and tertiary data
3. (b) The development of theories and models
4. (c) Uses empirical evidence
5. (a) Relates to some thought or theory

B. FILL IN THE BLANKS

1. Descriptive
2. Analytical
3. Longitudinal
4. Inter-disciplinary
5. Qualitative

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SUBJECT: COMMUNICATION RESEARCH	
COURSE CODE: MSM-511	AUTHOR: PROF MANOJ DAYAL
LESSON NO.: 4	
RESEARCH DESIGN	

STRUCTURE

4.0 LEARNING OBJECTIVES

The objectives of this lesson are as follows:

- Understand Research Design.
- Discuss the types of Research Design.

4.1 INTRODUCTION

The preparation of research plan and its profile is essential for the most efficient, effective and systematic research with the minimum time, cost and energy. This plan of research and its profile is called research design.

In this lesson, the students will be acquainted with the concepts of research design and types of research design.

4.2 RESEARCH DESIGN

The research design depends on the research problem and the research hypothesis so that the research work can be well oriented and directed. Research design converts research questions of media problems into a testing project. So, the research design depends on research objectives and research questions also of media field. Every research design has its positive and negative aspects. The research design generally is a research plan, a research lay- out, a research blue- print for research dealing with what, where, when, how much and by what means concerning an inquiry or a research study constitute a research design. That means research design deals with the basic problems like what questions to study, what data are relevant, what data to collect and how to analyse the results.

Claire Seltiz and others in his book "Research Methods in Social Sciences" defined research design as," A research design is the arrangement of conditions for collection and analysis of data in a manner that aims to combine relevance to the research purpose with economy in procedure.

The different communication scientists, media researchers and social scientists have defined research design in different ways. According to F.N. Kerlinger, "Research design is the plan, structure and strategy of investigation conceived so as to obtain answers to research questions and to control variance."

R.L. Ackoff defined research design as " Design is the process of making decisions before the situation arises in which the decision is to be carried out". He further described it and underlined, "A research design is the specification of methods and procedures for acquiring the information needed to structure or to solve problems. It is overall operational pattern or framework of the project that stipulates the information to be collected, the sources from which information can be collected and the procedures for collection of information". According to P.V.Young, "A research design is the logical and systematic planning and directing of the piece of research." Vimal Shah defines research design as "The design is the plan of study, and as such it is planned in every study, uncontrolled as well as controlled and subjective as well as objective."

Thus, the research design is the conceptual structure, the outline, the lay- out, the design, the blue- print, the framework, the scheme, the paradigm of the operation of the variables. It constitutes the plan for the collection, measurement and analysis of data. A research design assists the researcher obtain answers to the question of research and also helps him to control the experimental, extraneous,

and error variance of the particular research problem. It enables the researcher to answer research questions validly, objectively, accurately and economically in an effective manner. Thus, a research design must contain a clear- cut statement of the research problem, procedures and techniques to be used for collection of data, the population to be studied and the methods to be used in processing and analyzing data. A research design is prepared in the following references:

1. What is the research problem?
2. Why is research being done on this problem?
3. Where will this research be conducted?
4. What kinds of data are required?
5. Where will the required data be made available?
6. How much time is required in research?
7. What will be the sample design?
8. Which method of data collection will be adopted?
9. How will the data be analyzed?
10. In what style will the report be prepared?

4.2.1 TYPES OF RESEARCH DESIGN

Based on the studies of social scientists like Seltiz, Jahoda, Deustch, Cook, A.J. kanha and E.A. Schuman, the research designs in communication, mass communication or media may be categorized into the following five types:

(i) Exploratory or Formulative

(ii) Descriptive

(iii) Diagnostic

(iv) Experimental

(v) Longitudinal

(i) Exploratory Research Design: When in a communication and media research, the objective is to explore the inherent causes of media or communication events, then such an outline of a research is called exploratory research design. It may also be termed as formulative research design. The main purpose of such a research is formulating a problem for more precise inquiry or investigation or of developing the working hypothesis from an operational angle. Such a study emphasizes on the

discovery of ideas and insights. Flexibility is the most important characteristics of such type of a research design. An exploratory research may also serve as basis for clarifying concepts, establishing priorities for further research, gathering information about practical possibilities for carrying out research in real life settings. Katz defines exploratory research as, "Exploratory studies represent the earlier stage of a science". Normally in this type of research design, three essential conditions are fulfilled:

(a) Review of Pertinent Literature

(b) Experience Survey

(c) Analysis of insight Stimulating Cases

(a) Review of Pertinent Literature: In this first stage, the researcher will fully explore from the different pertinent literature. Thus, this may be considered an initial step consisting of problem finding and formulating and developing hypothesis to be followed by other steps consisting of problem solving or hypothesis testing in a continuous research process. Without hypothesis developing it would be like beating about the bush or like shooting an arrow in the dark. The researcher should also take care whether the already stated hypothesis suggests new hypothesis. Thus, the research should look into the works already conducted by others. In case, the hypothesis has not been formulated then his task is to study the available data for deriving the relevant hypothesis.

(b) Experience Survey: This is the second stage in which the researcher discovers the problems and tests the hypothesis. Thus, an experience survey can provide information about the practical possibilities for doing different kinds of research.

(c) Analysis of insight Stimulating Cases: This is the third and final stage of research in which the hypothesis is tested and a new insight is developed. Seltiz, Jahoda, Deutch and Cook have indicated towards the following specific types of persons:

1. Strangers or new comers. The observations of strangers or new comers may highlight the features of a culture or community that might otherwise be overlooked by an investigator reared in the culture. A newcomer's eye is more sensitive to social customs and practices as he has an outside view plus inside view. So, he has a total view. Thus, a way of seeing is indeed also a way of not seeing.

2. Marginal individual who keeps on moving from one cultural grouping to another and thus, on the periphery of both groups are exposed to the conflicting pressures of these groups. Hence, he or his group can reveal the vital effects operating in both the groups.
3. That individual who is in transition from one stage of development to the next, has turned out to be productive in providing insights into the relations between culture and personality development. The study of the individual or group transition may be of value in better grasping the process of social change.
4. Individual, deviated individuals or pathological cases may highlight even more common situations or cases. The research of deviants may throw light on the normative reference from which they are moving away as also the types of pressures to conform and the social- psychological consequences of non- conformity. The psychoanalytical support to understand personality are the examples of the insights that may be obtained by a research of pathological cases that often serve to underscore the fundamental process in diagonally opposite cases like normal cases or non- pathological cases.
5. The features of those individuals, who are highly adjustable or highly unadjustable, provide important and vital clues about the nature of the situation. The difference in the nature of two opposite individuals provides insight into the nature of a group or community.
6. An overall view of any circumstance can be obtained provided the individuals for the research are chosen in such a manner that they represent different positions in the prevailing social structure. Individuals having various positions are probable to see a given situation from various outlooks and perspectives and this very difference is highly fruitful for insights.
7. A re-observation of individual's own experience who are involved into the inquiry and investigation and a systematic examination of their personal reactions as they try to project themselves into the situation of the subjects they are researching may turn out to be an important source of insights. As study reveals that most of Sigmund Freud's remarkable insight emerged from his endeavour to understand himself. No doubt, this involves subjective appraisal on the part of the associated investigators.

Thus, we may say that cases that provide crystal clear distinctions or have unique characteristics are likely to be most fruitful. It is important to mention here that the exploratory research rarely leads to insights or hypothesis and such research must be treated as a first step. Hence, more

controlled and careful researches are required whether the hypothesis coming out of exploratory research have a general applicability.

(ii) Descriptive Research Design: The main objective of descriptive research design is to accurately present the descriptive details about the related data and information of mass communication research problems. If we have to present the descriptive details of the structure of the newsroom of a newspaper or radio or television or changing facets of advertising or stages and status of public relations, changing standard of social marketing, development communication: direction and dimension, credibility of internet journalism, etc., then it is essential for us to collect the related data and information with the help of scientifically approved methodologies. For this, it is important to develop a research design keeping an eye on the research objectives. Thus, in the descriptive research design, data and information may be collected through any scientific research methodology. In descriptive research, interview, schedule, questionnaire, direct observation, participatory observation, etc. may also be combined.

(iii) Diagnostic Research Design: The purpose of any research is not only to gain knowledge, but also to find out the causes of the research problem and to present the solutions in a scientific manner. That means the research which finds out the solutions for the specific problems is called diagnostic research design. In this type of research, the researcher presents the causes and solutions of the problem in a scientific way. But he is not supposed to solve the problems himself. For example, to solve the problems of a discipline called mass communication is the job of the government, media managers, media organizers, media institutions, media reformers, etc. Thus, the diagnostic research design is concerned with discovering and testing whether certain variables are associated or not. For example, is urban readership more inclined to a particular newspaper than that of rural readership? Are journalists having joint family background are more society- oriented than those from the nuclear family background? Hence, both descriptive and diagnostic research designs have some common requirements and these can be grouped together because from research point of view, both of these share certain important nature. The first step in both these studies is to define the questions that are to be answered. The second step is the methods to be selected for the data collection. Techniques for collecting the data must also be devised. The researcher must keep an eye on the nature of the problem, the scope of the study, the nature of respondents, type of information needed,

the degree of accuracy required and so on. Once the data collection tools are prepared, they must be pre-tested and examined for completeness, comprehensibility, consistency and reliability. Data analysis includes coding the responses, tabulating the data and performing statistical and mathematical computations.

(iv) Experimental Research Design: An experiment is such an act in which interviewing and probing are conducted with the respondents. But all interviewing and probing are not an experiment. An experiment is definitely a controlled interviewing and a controlled probing. The outline of an experiment like physical sciences in solving the problems of media or communication is called experimental research design. Experimental research design relates to hypothesis- testing in which the researcher tests the hypothesis of causal relationships between variables. Such a research needs procedures that will not only reduce biases and increase reliability, but will permit drawing inferences about causality. Such a requirement can only be fulfilled by an experiment. Hence, when we talk of this type of research design, we automatically mean the design of experiments, which is very much associated with the name of Professor R. A. Fisher. He is considered to be the pioneer of such a research design as he developed it when he was working at Rothamshed Experimental Station which is well- known as Centre for Agricultural Research in England. So, the experimental design was originated in field of agricultural research. Fisher thoroughly observed that by dividing fields or plots into different blocks and then by comprehensively conducting experiments in each of these blocks, whatever information is collected and inferences drawn from them, happens to be more reliable. This highly motivates him to develop certain experimental designs for the testing of hypothesis relating to scientific inquiries or investigations. Though this experimental design has been borrowed from agriculture, yet it is extensively and widely used in the field of social sciences including mass communication.

Prof. R.A. Fisher has described three basic principles of experimental designs, which are following:

(a) Principle of Replication
(b) Principle of Randomization
(c) Principle of Local control

(a) **Principle of Replication:** This principle suggests that the experiment must be repeated more than once. That means every treatment is applied in several experimental units instead of one. This will raise the precision of the research by increasing the statistical accuracy of the experiment. The whole experiment can be repeated again and again till reliable inference. The reliability and validity of such inference will be more than the one without applying the principle of replication. It minimises standard deviation, variance deviation, standard error and experimental error. Thus, replication is used to increase the precision and appropriateness of a research.

(b) **Principle of Randomization:** This principle suggests random assignment of members of a group of subjects of experimental and control groups. The process of assignment must give equal chance to each subject of being assigned to any of the alternative groups. That means this principle signifies that the experiment should be so designed that the variations caused by the extraneous factors can be clubbed together under the heading "chance". It raises the precison of the research by minimizing standard deviation, variance deviation and standard error.

(c) **Principle of Local control:** It controls extraneous factors to minimize experimental error. In this principle, the experiment is so planned or designed that we can perform a two- way analysis of variance in which the variability of information is distributed into three elements attributed to the treatment.

Experimental research design may be divided into informal experimental designs and formal experimental designs. Informal experimental designs include:

(i) Before-After Experiment

(ii) After-only with control design

(iii) Before-and-after with control design

(i) Before-After Experiment: In this only one test group is selected. The same is tested before and after a particular situation. The differences of these two studies are observed. This difference will be treated as result. For example, if we have to study the impact of agricultural innovations on the farmers of a village, then we will try to know through a schedule as to how much the present agricultural innovations are influencing the farmers of that village. These informations will be described as "Before Experiment" informations. After that we will give informations to the same group of farmers about agricultural innovations with the help of radio or television for a fixed period

of time regularly. After that fixed period will be over, then with the help of the same schedule it will be tested as to how much the agricultural innovations have influenced the same group of farmers. These informations will be described as "After Experiment" informations. The difference between "After Experiment" informations and "Before Experiment" informations is treated as result. G.D. Hursh in his study has presented this Before- After Experiment in a linear and graphic form which may be depicted as follows:

First Level	Second level	Third level
Measurement Before Experiment (X)	Treatment Period (TP)	Measurement After Experiment (Y)

Therefore, Result= (Y)- (X)

In the above said linear and graphic presentation, in first level the impact of agricultural innovations was measured which has been represented as (X). In the second phase the same group of farmers were given knowledge through radio or television for a fixed period of time regularly, which may be described as Treatment Period (TP). In the third phase the impact of agricultural innovations on the same farmers was measured after the treatment. When the scores of first level is subtracted from that of third level, then the remainder is treated as result. In the above figure, the result has been shown as (Y)-(X).

(ii) After-only Experiment: In this type two groups of similar natures and characteristics are selected. Between these groups, any one group is selected as controlled group and the other group is selected as Experimental group. Then an attempt is made to bring about change in the Experimental group by creating new circumstances, while controlled group is kept away from those new circumstances. In third stage, the difference in both these groups is measured. On the other hand, if the differences between these two groups are insignificant, then it is accepted that the new circumstances could not influence the Experimental group. This research design was used by Chapin, Stouffer and Lazarsfield, which may be presented in linear and graphic form like the following:

Controlled Group A		Level of phenomenon without treatment (Y)
Experimental Group B	Treatment Introduced	Level of Phenomenon after treatment (Z)

Result (Treatment Effect or Influence of New Circumstances) = (Z) – (Y)

For example, if there are two groups A (Controlled Group) and B (Experimental Group) which are quite similar in nature and characteristics. The Group B was exposed to a television programme on portrayal of women in advertisement. After some time, when Group A and Group B were compared, then some significant difference between these groups were observed. Group A considered the portrayal of women as a little negative, while Group B consideredthe portrayal of women as very much negative. This difference is the real difference due to the new circumstances created on Group B.

At present in the field of mass communication, media or sociology of communication, the importance of After- Only Experiment is continuously expanding. In America, Waisanan and Rogers have made serious and significant study on the basis of this experiment. In India also, Prof. Pradipto Roy studied the impact of radio programme on villagers in the earlier phase and also studied the impact of television programme on villagers in his later phase by using this Experimental Research Design. But this design also has some limitations : (i) like physical sciences, it is almost impossible to get two groups of similar natures and characteristics in communication sciences or any social sciences. But similarity and homogeneity of groups is the first and foremost criteria in this design. (ii) In present era, it is difficult and complex to describe any group as controlled as there is the possibility of extraneous variation entering into the treatment effect. (iii) When Experimental Group is influenced by one factor, then other factors also starts influencing the Group. Under such circumstances, it becomes very difficult to judge which factor has influenced the group up to what extent? However, data can be collected in Only After experiment without the introduction of problems with the passage of time. Thus, this design is far superior to Before After Experiment.

(i) **Before-After Control Design:** This is a basic, widely and extensively used design in all research areas. In this type of design, two areas are selected. Then the dependent variable is measured in both the areas for equal time period before the treatment. Again after the treatment, the dependent variable is measured in both for equal time period. Thereafter, the result is derived by subtracting the change in the dependent variable in the control area from the change in the dependent variable in test area. This can be depicted in a linear and graphic form as follows:

Time Period I		Time Period II
Level of phenomenon before treatment (X)	Treatment Introduced	Level of phenomenon after treatment (Y)
Level of phenomenon before treatment (A)		Level of phenomenon without treatment (Z)

$$\text{Result} = (Y - X) - (Z - A)$$

If a significant difference is found it is assured that the treatment introduced was the main cause. This design is much superior to the previously discussed designs in the sense that it ignores extraneous variables resulting both from time to time and from non- comparability of the test and control areas. However, sometimes in the absence of historical facts, time or a comparable control area, one should select one of the above said designs.

In addition, Don Campbell and Stanley in 1963 and Cook and Campbell in 1979 emphasized on the use of Quasi Experimental Design. In this type of design, the researcher cannot randomly assign subjects to experimental conditions. For example, a media researcher wants to see the effects of ownership on the morale of the employees. The researcher measures the morale of a sample of employees at the station before and after sale. Simultaneously, the researcher gets the data on morale from a sample of employees at a comparable station in the same community. This design is similar to the After- Before Control group design. Thus, quasi- experiments are a variable source of information and in this type of research design, random selection and random assignment of the subject is not possible. There are two types of quasi- experimental designs: (i) Before- after Non equivalent Control Group Design (ii) Interrupted time Series design

(i) Before-after Nonequivalent Control Group Design: This procedure is normally applied by the hypothetical researcher studying employee morale at radio stations. One group is experimented, while the other group is control. The Before and after differences are compared whether it has a significant value. This can be presented in its linear and graphic form with the help of the following diagram:

Before- After Nonequivalent Control Group Design
G1 x G2
G3 G4
The dividing line between groups shows that there is no random selection or random assignment

In its simplest form, it requires Before and After test for a treated and comparison group. It is identical to the Analysis of Covariance (ANOCOVA) randomized experimental design except that the groups are through random assignment and random selection.

(ii) **Interrupted time Series design**:In this procedure, a continuous series of measurements is formed of a group. The series of measurements is interrupted by the experiment. This can be presented in its linear and graphic form with the help of following diagram:

(Interrupted Design of Time Series)
G1 G2 G3 G4 G5 G6 G7 G8
G9 G10

Donohew, Lorch and Palamgreen (1998) explained an interrupted time series design with an example of monthly samples of 100 teenagers in which these teen agers were interviewed about their exposure to anti- marijuana public service announcements and their attitudes toward marijuana use in two matched cities over a 32 month period. Comparison between monthly data focused changes in behaviours and attitudes.

In addition, there are some other quasi- experiments that have specific applicability or noteworthy features including the Proxy- Pretest Design, Double Pretest Design, Pattern Matching Design, Nonequivalent Dependent Variables Design, Pattern Matching Design and Regression Point Displacement Design.

(v) Longitudinal Research Design: In this procedure the data is collected over different points of time and its profile is called longitudinal research design. An internationally known communication scientist Lazarsfield, Berelson and Gaudet used Longitudinal Research in 1944 in "The People's Choice" which gave birth to the two- step flow model. After that Katz and Lazarsfeld in 1955 used longitudinal research in "Personal Influence" in which the role of public opinion leaders were examined. Then Lefkwitz, Eron, Walder and Huesmann in 1972 used longitudinal research in the Surgeon General's Report on "Television and Social Behaviour". The results of this research indicates that viewing violence on television caused subsequent aggressive behaviour. After 10 years, i.e, in 1982, Pearl, Bouthilet and Lazar established a relationship between television violence and aggression by Longitudinal Research Procedure. Thus, longitudinal research method is normally not used in mass communication research. But it can produce theoretically and socially important results.

Longitudinal design is often used in the behavioural sciences like psychology. But its use in mass communication research is quite limited. Sociologists studying the 1924 election campaign did a very important and pioneering work in political science, in which longitudinal design was used.

Lazarsfed used the panel technique in which so many questions are asked with one person at different point of time, occasions and places. The other type of longitudinal research is trend studies in which one question is asked to so many persons at different point of time and occasions. The Ropper organization conducted the most ever popular trend studies in which continuing survey was conducted on the credibility of media. Trend studies conducted by Gallup and Harris also gained momentum.

Yet another procedure called Cohort Analysis also became equally popular recently, which was pioneered and developed by demographers.

Thus, there are three types of Longitudinal Research Design which are following:

1. Trend Studies
2. Cohort Analysis
3. Panel Studies

1. **Trend Studies:** This is a very popular method of communication and media research. In this study, the same question is asked to so many people or group of people or sample of people on different point of time and occasions. In this study, different samples are selected from the same population

on different point of time. In US the trend studies have been and are being used more often than not specially during presidential election. For example, if a sample of voters has been selected four months before the Lok Sabha election, in which 60% voters were in the favour of the candidate 'A' and 40% voters were in the favour of the candidate 'B'. when the survey was conducted after two months, then it was found that only 55% voters were in the favour of the candidate 'A' and 35% voters were in the favour of the candidate 'B'. This is the trend study in which after two months there was a decline of 5% in the favour of the candidate 'A'. However, this study fails to examine as to how many voters shifted from the candidate 'A' to the candidate 'B' or how many voters were in the favour of the candidate 'A'. It is important to mention here that economists, on the one hand, in the measurement of health variable have developed a regular trend indicator, the mass communication scientists have yet to develop any similar media indicator so far.

2. **Cohort Analysis:** In this procedure, a specific population is studied in a given period of time. In Roman the meaning of the word 'Cohort' is described as the tenth part of a military. In view of a research, a cohort is a group of persons who are interlinked in some way or the other and who have experienced the same significant event of life in a given period of time. For example, there can be different types of cohort like the editors of all the newspapers who were appointed between 1960 to 1970 or all those Indian journalists who were tortured during emergency between 1975-77 or all those people who were born between 1980-85.

   When in any study, the measurement of characteristics of one or more cohort is calculated in different period of time ,say for example, in advertising research and in marketing research, the cohort analysis is used more often than not. Renitz and others (1983) studied a cohort analysis of consumers born in four time periods: 1931-40, 1941-50, 1951-60, 1961-70. Cohort analysis is also used in public opinion poll. Wood (1986) presented his study as to how in marketing the 'Time' magazine used the cohort analysis and cohort certificate and explained how old people are more dependent on newspapers as compare to the young people. Jhoo (1990) also applied the effects of cohort on the anti- reporting attitudes of the journalists.

3. **Panel Study:** Unlike trend studies, in panel study, so many questions are asked to one person or one sample at different points of time. For example, Milavsky (1982) conducted a large and extensive panel study for the National Broadcasting Company. In this study aggression among children due to

violence on television was researched. In the study with 1200 children between 7-12 years, the same questions were asked at the intervals of six months. In this way the research work was continued for three years. But, every year the size of the sample was reduced. In the first year the size of the sample was reduced by 7%. In the second year the size of the sample was reduced by 37% and in the third year the size of the sample was reduced by 63%. This study reflects as to how panel study affects the statistical analysis. The results of the research indicates that there is no statistical relationship between television violent programmes and children's aggression. The researchers found that if at all there is any relation between television violent programmes and children's aggression, then it is merely based on the Theories of Probability.

Similarly, yet another very popular media research panel study was scientifically conducted by the A.C. Nelson Company in America on 4000 viewers of television. In the houses of these viewers, People's Meters were kept, which indicated that in which house, who is watching which TV programme on which channel for what period of time? Thus, panel research design is even today considered to be the most popular technique for the study of television violence. On the other hand, Singer, Desmond, Hirsch and Nicol (1988) used the technique to study the effects of family communication patterns, parental meditation and TV viewing on children perceptions of the world and their aggressive behavior. It was concluded that those children who view the television to a great extent and their parents don't meditate between them, such children are the most affected ones. Potter (1992) applied a three- wave panel research across five years to study as to how adolescent's perceptions of television's reality changed over time. Out of 287 original respondents in wave1, 196 were tested again in wave2. Out of 443 original respondents in wave2, 115 were also measured in wave3. Similarly, Koolstra and Van Der Voort (1996) collected informations for panel study from elementary school children at three successive one year intervals to measure the impact of TV on children's leisure time reading. In the process of this research, almost 20% of the sample was lost to attrition. In the same way Rosengrain and Windahal conducted a study in late 90's in which school children of Sweden were researched through panel design. This study was conducted at different point of time in 1976, 1978 and 1980. In this four –year- long study, the maximum number of respondents, i.e, 1867 remained associated with this study. Thus, a low attrition rate was found in

the study. The researchers in conclusion from this study also found that those children who watch violence on television to a great extent, are having the maximum anti- social behaviour.

Thus, there are so many merits of panel study which are following:

1. Probability of study of tendencies of behaviour.
2. Possibility of comprehensive study and identity of changeable persons.
3. From the administrative point of view, this study is more comfortable.

This study has the following demerits:

1. It is avoided in research because of enormous expense.
2. Getting respondents to commit for anything more than one interview is one of the most difficult problems in this type of research.
3. It is highly criticisable on the ground that one of the most common causes of attrition in the panel study is the inability to locate the original respondents for a follow- up study. Some people may leave the place, while some may also die. Some are not able to answer the questions due to physical and mental illness and some people get themselves detached to the study as they feel irritated to frequent questioning at regular interval.

4.3 CHECK YOUR PROGRESS

Note: 1) Use the space below for your answers.

2) Compare your answers with those given at the end of this lesson.

A. CHOOSE THE RIGHT OPTION.

1. In longitudinal research design, the data is collected :

(a) Over different points of time

(b) With primary sources only

(c) With secondary sources only

(d) None of the above.

2. Experiment research design relates to :

(a) Sample testing

(b) Hypothesis testing

(c) Universe testing

(d) None of the above.

3. Research design converts research questions into……

(a) A testing project

(b) A research problem

(c) A testing hypothesis

(d) None of the above.

4. The main objective of descriptive research design is to accurately present

(a) Descriptive details

(b) Argumentative details

(c) Analytical details

(d) None of the above

5. The research which finds out the solutions for the specific problems is called:

(a) Diagnostic research

(b) Descriptive research

(c) Analytical research

(d) None of the above

B. FILL IN THE BLANKS

1. There are five types of research design:(i) Exploratory or formulative, (ii) Descriptive, (iii) Diagnostic, (iv) ……(v) Longitudinal.
2. There are three types of longitudinal research design: (i) Trend studies, (ii) ……(iii) Panel studies.
3. ……..research design relates to hypothesis testing.
4. Prof. Ronald Aylmer Fisher has described three basic principles of experimental designs: (i) Principle of Replication, (ii)…… , (iii) Principle of Local Control.
5. Panel study was scientifically conducted by the ……in America on 4000 viewers of television.

4.4 SUMMARY

- Research design converts research questions into a testing project. So, the research design depends on research objectives and research questions also. Every research design has its positive and negative aspects. The research design is a research plan, a research lay- out, a research blue- print for research dealing with what, where, when, how much, by what means

concerning an inquiry or a research study constitute a research design. That means research design deals with the basic problems like what questions to study, what data are relevant, what data to collect and how to analyse the results. There are five types of research design: (i) Exploratory or formulative, (ii) Descriptive, (iii) Diagnostic, (iv) Experimental, (v) Longitudinal. When in a communication and media research, the objective is to explore the inherent causes of media or communication events, then such an outline of research is called exploratory research design. It may also be termed as formulative research Design. The main purpose of such a design is formulating a more precise inquiry or investigation or of developing the working hypothesis from an operational angle. Such a study encompasses on the discovery of ideas and insights. Normally in this type of research design, three essential conditions are fulfilled: (a) Review of Pertinent Literature, (b) Experience Survey, (c) Analysis of Insight stimulating cases.

- The research which finds out the solutions for the specific communication problems is called diagnostic research and its outline is called diagnostic research design. Experiment research design relates to hypothesis testing in which the researcher tests the hypothesis of causal relationships between variables. Such a research needs procedures that will not only reduce biases and increase reliability, but will permit drawing inferences about causality. Prof. Ronald Aylmer Fisher has described three basic principles of experimental designs: (i) Principle of Replication, (ii) Principle of Randomization, (iii) Principle of Local Control. The Principle of Replication suggests that the experiment must be repeated more than once. The Principle of Randomization suggests random assignment of experimental and control groups. In Principle of Local Control the experiment is so planned or designed that we can perform a two- way analysis of variance, in which the variability of information is distributed into three elements attributed to the treatment. The experimental research design may be divided into (i) Before- After Experiment, (ii) After- only with control design, (iii) Before- and- After with control design. In addition, Don Campbell and Stanley in 1963 and Cook and Campbell in 1979 emphasized on the use of quasi experimental design in which the researcher cannot randomly assign subjects to experimental conditions. In this type of research design, random selection and random assignment of the subject is not possible. There are two types of quasi experimental designs: (i)

Before- After Nonequivalent control Group Design, (ii) Interrupted Time Series Design. In addition, there are some quasi experiments that have specific applicability or noteworthy features, including the Proxy- Pretest Design, Double Pretest Design, Nonequivalent Dependent variables Design, Pattern Matching Design and Regression Point Displacement Design. On the other hand, in longitudinal research design, the data is collected over different points of time. There are three types of longitudinal research design: (i) Trend studies, (ii) Cohort analysis, (iii) Panel studies.

4.5 KEYWORDS

Research Design: The research design is a research plan, a research lay- out, a research blue- print for research dealing with what, where, when, how much, by what means concerning an inquiry or a research study constitute a research design.

Types of Research Design: There are five types of research design: (i) Exploratory or formulative, (ii) Descriptive, (iii) Diagnostic, (iv) Experimental, (v) Longitudinal.

Exploratory or Formulative Research Design: When in a communication and media research, the objective is to explore the inherent causes of media or communication events, then such an outline of research is called exploratory research design or Formulative Research Design.

Descriptive Research Design: The main objective of descriptive research design is to accurately present the descriptive details about the related data and information of mass communication research problems.

Diagnostic Research Design: The research which finds out the solutions for the specific communication problems is called diagnostic research and its outline is called diagnostic research design.

Experimental Research Design: Experiment research design relates to hypothesis testing in which the researcher tests the hypothesis of causal relationships between variables.

Longitudinal Research Design: In longitudinal research design, the data is collected over different points of time. There are three types of longitudinal research design: (i) Trend studies, (ii) Cohort analysis, (iii) Panel studies.

4.6 SELF-ASSESSMENT TEST

1. Discuss the meaning and concept of research design? Why is it needed?
2. Discuss the various types of research design.
3. Describe the exploratory research design or formative research design.
4. Explain diagnostic research design.
5. Throw light on experimental research design.
6. What is longitudinal research? Describe the various types

4.7 ANSWERS TO CHECK YOUR PROGRESS

A. CHOOSE THE RIGHT OPTION

1. (a) Over different points of time
2. (b) Hypothesis testing
3. (a) A testing project
4. (a) Descriptive details
5. (a) Diagnostic research

B. FILL IN THE BLANKS

1. Experimental
2. Cohort analysis
3. Experiment
4. Principle of Randomization
5. A.C. Nelson Company

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SUBJECT: COMMUNICATION RESEARCH	
COURSE CODE: MSM-511	AUTHOR: PROF MANOJ DAYAL
LESSON NO.: 5	
METHODS OF MEDIA RESEARCH: I	

STRUCTURE

5.0 LEARNING OBJECTIVES

The objectives of this lesson are as follows:

- To know about Census Method
- To understand the merits of Census Method
- To discuss the demerits of Census Method
- To explain Sampling Method
- To describe merits of Sampling Method
- To know about the demerits of Sampling Method

5.1 INTRODUCTION

Communication research is a part of social research and media research is a part of communication research. This is because communication system is a sub system of the social system and media system is the sub system of the communication system. But the methods of research is the same whether it is social research or communication research or media research. Of course, the research problems are different in social research, communication research and media research.

Media research method is the soul of media research problem. If our method is wrong, the research problem can never be solved at all. Thus media research methods cannot be even slightly ignored as this negligence can lead us to a blunder. Broadly speaking, media research methods are quantitative and qualitative. In this chapter, we will mainly discuss the quantitative research which are broadly of two types: census method and sampling method. Since sampling methods relate to a specific type of survey, so it is also called survey method.

5.2 RESEARCH METHODS

Methods of research are:

1. Census Method
2. Sampling Method

5.2.1 CENSUS METHOD

This method is a procedure of complete counting, computation, calculation and enumeration of a universe. It is a technique of scientifically and systematically obtaining and recording information about the members or objects or units of a given population. It is a repeatedly, frequently, and regularly occurring and official count of a particular population. A population may be a place, a group of people or objects or a specific locality through which we obtain the data.

In this method, all the units and the total area of research are studied. For example, the Govt. of India conducts a census of Indian population every ten year and adopts the census method. Similarly if a newspaper is to be published by the people, for the people and of the people from a small village and they have to be motivated. Then in the initial stage, in order to know the opinion of the people, the entire population of the village may be studied, called census method and such census will be called census of the village.

A census method is appropriate under the following circumstances:

1. When the universe is not so vast.
2. When there is sufficient time to collect the data.
3. When the highest degree of accuracy is required.
4. When there is sufficient budget.

MERITS OF CENSUS METHOD

This method has the following merits:

First, it is an indepth study which provides opportunity to the researcher to have an intensive inquiry about a problem.

Second, this method provides the highest degree of accuracy in data. No other method is as accurate as census method is, especially when the universe is reasonably small.

Third, this method is equally applicable when the units are having more heterogeneity or difference among themselves.

Fourth, this method in indispensable in certain cases.

DEMERITS OF CENSUS METHOD

This method has the following demerits:

First, it is a very lengthy process.

Second, this method is possible only in a few cases of data collection.

Third, this method can be used in a limited universe which does not require vast area to study.

Fourth, data obtained with the help of this method will have more statistical errors, omissions and inconsistencies.

5.2.2 SAMPLING METHOD

This method is the most popular method of quantitative media research. Basically A sample is that part of universe or population, which represents that universe or population. This saves time, money, energy, resources, and man-power. For examples, if we have to test accuracy of spelling in English daily, then it is not necessary that all the words used in the newspaper will not be spell- checked. Rather only a few words from different pages will be taken and will be spell- checked. These few words will be treated as sample of entire newspaper. The results from these few words are treated as applicable to the entire newspaper. This whole process will be described as sampling method. William

J. Goode and Paul K. Hatt has defined sampling as "A sample, as the name implies, is a smaller representation of a large whole". According to P.V. Young, "A statistical sample is a miniature picture or cross section of the entire group or aggregate from which the sample is taken".

In the words of Frank Yaton, "The term sample should be reserved for a set of units or portion of an aggregate of material which has been selected in brief that it will be representative of the whole aggregate".

Now the question arises as to what is sampling method?

Bogardus has defined sampling method as, "Sampling is a selection of certain percentage of a group of items according to a predetermined plan."

According to Y. D. Keskar, "In case of a sample enquiry we try to generalize in terms of the whole group though the facts assembled relate only to a part of it. In the words of Fairchild, "Sampling method is a process or method of drawing a definite number of individuals, cases or observation from a particular universe, selecting part of a total group for investigation.

The sampling method is not only used in a scientific study, but also in a practical life." According to Tippett, "The practice of taking a small part of a large bulk to represent the whole is fairly generally understood and widely used. The house- wife will sample a piece of cheese at the shop before making a purchase, and a cotton spinner will buy a bale of cotton having seen only a sample of it".

That means the selected part from the universe should actually represent the whole universe. A study on that part will be treated as study on the whole universe. But how to select this part? The answer of this question is given by the sampling technique.

In the research area, all the units of an universe or population are not always studied, rather a few such units from the universe or population are selected, which represent the whole universe or the whole population. For example, instead of studying all the journalists working in newspapers, if only a few journalists are selected from the universe that represents all the journalists in terms of qualities, traits and characteristics. Then there is no need to study all the journalists, but with the study of only those selected journalists, the results can be obtained. This is called sampling method.

Thus, a sample is a selected portion, a subset of the population that is representative of the entire population and this procedure is called sampling or sampling technique or sampling method.

MERITS OF SAMPLING METHOD

The importance of sampling method is growing day in and day out in mass communication research. This is being used at large scale in the various media researches. This is because there are following merits of a sampling method:

(i) Time Saving: In sampling method, very little time is spent as compared to the census method. This is because only a part of universe is taken for the study. The kind of researches being done in the field of mass communication these days, requires a very quick result. For example, the results of pre- poll surveys and opinion- poll surveys are required very quickly. Under the circumstances, this method proves to be very advantageous and useful.

(ii) Money Saving: The trend of precision journalism is gradually becoming popular in mass communication research. In this kind of journalism, research methods and techniques are used as a tool of journalism. But small and medium sized newspapers often run short of money. But, sampling method saves a lot of money which proves to be helpful and beneficial even for small and medium sized newspapers.

(iii) Energy Saving: Since, only a piece or a part of the whole population is taken in a sampling method, so with the help of only a few persons with little energy, a very good and satisfactory research can be conducted in the field of mass communication.

(iv) Detailed Study: Census method is very large and huge. So, the attention of the researcher in this method is deviated in indefinite units. Hence, a detailed study of Census Method is not possible. But, a very detailed, minute and meticulous study can be conducted by the help of sampling method, which is very much needed in the area of mass communication research these days.

(v) Accuracy of Results: Since, the attention of the researcher is centered on a very few points in the sampling method, so, a very deep and serious study can be conducted through this method. Due to deep and serious study, the results through this method are very close to complete accuracy. Today media research is conducted to execute a media plan. In this type of media planning a huge amount of capital is invested. If the results of media research are far from the reality, then media planners may have to bear a heavy financial loss. Under the circumstances, realistic, accurate, reliable, minute and meticulous results obtained through this method proves to be very useful and beneficial.

(vi) Administrative Convenience: Due to a very few units in the sampling method, its organizing, planning and management becomes very easy and simple. In mass communication research, mostly

media persons or media researchers are associated. They often select readers, listeners, viewers etc. as their respondents. They are generally self- moody people from whom it is very difficult to get the work executed all the time. Motivating them is even more difficult and complex process. Hence, the problems of organizing, planning and management can be minimized in sampling method.

(vii) Essential Use: Looking at the large and huge magnitude of census method, its use in mass communication research sometimes become almost impossible. Moreover, people are so much scattered geographically that every individual cannot be contacted. Sometimes, it becomes even difficult to determine the actual size of the universe. For example, the name of the advertisers of the whole country. Under the circumstances, sampling is the only technique by virtue of which complex and complicated mass communication research can be conducted.

DEMERITS OF SAMPLING METHOD

Though there are several merits, qualities, advantages, utilities and importance of sampling method, yet it cannot be described as error- free. This technique has several demerits, bad aspects and limitations which may be described as following:

(i) Possibility of Prejudice and Bias: Any technique will be considered fully successful only when it is unbiased and unprejudiced. But, due to complexities, uncertainties of mass communication research and faulty sampling technique, it becomes biased and prejudiced. On the basis of unsuitable and inappropriate sampling, the results of a research will be highly erroneous and fallacious.

(ii) Problems of Representativeness: The strongest reason for the reliability and authenticity of a sample is its representative quality. The biggest difficulty in this context arises because there are lots of differences, diversities and pluralities in social units. This is because there are a lot of differences, diversities among respondents. The selection of representative sample will depend on the degree of this difference and diversity. Whether a sample will be representative or not, will depend on the technique of selection of the sample. If any mistake or error is committed in technique of selection, then the sample cannot be representative.

(iii) Need for Special Knowledge: Sampling technique appears to be very simple and easy. But practically it is a very complex and complicated process. With a minor carelessness its representativeness gets destroyed and sampling error increases. Hence, for the proper use of sampling technique, the knowledge of theory of this technique, its limitations and probable errors is a must. In

the absence of any such experience, this technique cannot be used for which it is meant. Thus, only those researchers can suitably use and apply this technique who have special knowledge of its applications and consequences.

(iv) Difficulty in Sticking to Sample: It is often observed that due to a few units in the sampling technique the researcher finds it difficult to conclude. The sampling technique demands that only those units will be studied which have been taken for sampling. But, it is likely that due to geographical distance, social barriers, political situation, etc. Those specific units of the sample may not be contacted. So, it becomes extremely difficult sometimes to stick to the selected units of the sample. As a result, the researcher either drops those units from his or her research or substitutes these units with some other units which may not be equally representative. Sometimes the selected units deliberately refuse to give any data or information or evidence which creates an unnecessary hurdle in the research. Thus, it becomes extremely difficult in sticking to samples.

(v) Impossibility of Sampling Method: It becomes impossible to study some of the subjects by Census method. Similarly in some cases sampling method becomes as useless and redundant. If the size of the universe is very small, then the study of all the units becomes essential in that case. If there is so uniformity in the universe, then the selection procedure of a sample becomes extremely difficult. Under such circumstances, in order to avoid sampling error, Census Method is preferably adopted.

Thus, we can say that despite limitations, sampling method can be very helpful and useful if the area of operation is very wide, the universe is very large, there is lack of time, money, energy, resources, man- power, etc. Under such circumstances, sampling method is the most appropriate and suitable.

5.3 CHECK YOUR PROGRESS

Note: 1) Use the space below for your answers.

2) Compare your answers with those given at the end of this lesson.

A. CHOOSE THE RIGHT OPTION.

1. What is the difference between Universe and population?
   (a) Universe is the concept of the whole population whereas population is explained numerically.
   (b) Universe is the world and population is the globe.

(c) Universe is qualitative whereas population is quantitative.

(d) None of the above.

2. Interviewing each member of a given population is called:

(a) Sample.

(b) Gallup Poll

(c) Census.

(d) None of the above.

3. In census method, the following is studied :

(a) Total area of research.

(b) Partial area of research.

(c) Holistic area of research

(d) None of the above.

4. A sampling method is that in which :

(a) A few such units from the universe are so selected, that they represent the whole universe.

(b) Complete units are selected

(c) Units from the middle are selected.

(d) None of the above.

5. Sampling means following a sequence of stages. Which ONE of the following stages should come before the others?

(a) Proceed with the fieldwork

(b) Find suitable source for the population members

(c) Define the people of interest

(d) Examine the objective of the study

B. FILL IN THE BLANKS

1. Communication research is a part of …….. and media research is a part of communication research.

2. If our method is wrong, the research …….. can never be solved at all.

3. Broadly speaking, media research methods are …….. and qualitative.

4. Census method is a procedure of complete counting, computation, calculation and enumeration of a……
5. In census method, all the …… and the total area of research are studied.
6. A census method is appropriate when the…….is not so vast.
7. A census method is applicable when there is sufficient …….to collect the data.
8. Census method provides the highest degree of ……. in data.
9. Census method is a very …….. process.
10. In sampling method a few …… from the universe are so selected.
11. The merit of sampling method is that it provides the detailed study with ……. results.
12. The demerit of sampling method is that it provides a lot of sampling ……..

5.4 SUMMARY

- Media research method is the soul of media research problem. If our method is wrong, the research problem can never be solved at all. Thus media research methods cannot be even slightly ignored as this negligence can lead us to a blunder. In census method all the units are enumerated and the total area of research is studied. Census method provides the highest degree of accuracy in data. But it is a very lengthy process. In sampling method, all the units of a universe are not always studied rather a few such units from the universe are so selected, that they represent the whole universe. Sampling method is a time saving, money saving, energy saving, resource-saving, detailed study with accurate results, administrative convenience and essentiality of its use. On the other hand, sampling method has prejudice and bias, problems of representativeness, need for special knowledge, difficulty in sticking to sample and impossibility of the method.

5.5 KEYSWORDS

Media Research Method: It is a method adopted scientifically from methodology to solve media research problem. Media research method is the soul of media research problem. If our method is wrong, the research problem can never be solved at all. Thus media research methods cannot be even slightly ignored as this negligence can lead us to a blunder.

Census Method: This is a method in which all the units are enumerated and the total area of research is studied.

Merits of Census Method: This method provides the highest degree of accuracy in data.

Demerits of Census Method: This method is a very lengthy process.

Sampling Method: This is a type of method in which the units of a universe are not always studied rather a few such units from the universe are so selected, that they represent the whole universe.

Merits of Sampling Method: The merits of this method are that these are time saving, money saving, energy saving, resource-saving, detailed study with accurate results, administrative convenience and essentiality of its use.

Demerits of Sampling Method: The demerits of this method are that these have prejudice and bias, problems of representativeness, need for special knowledge, difficulty in sticking to sample and impossibility of the method.

5.6 SELF ASSESSMENT TEST

1. Describe census method. What are the merits and demerits of census method?
2. What is sampling method? Describe its limitations
3. Explain the merits and demerits of sampling method.
4. Differentiate between communication research and media research.
5. How is communication research different from social research?
6. Distinguish between social research and media research.

5.7 ANSWERS TO CHECK YOUR PROGRESS

A. CHOOSE THE RIGHT OPTION.

1. (a) Universe is the concept of the whole population whereas population is explained numerically
2. (c) Census.
3. (a) Total area of research.
4. (a) A few such units from the universe are so selected, that they represent the whole universe.
5. (d) Examine the objective of the study

B. FILL IN THE BLANKS

1. Social research
2. Problem

3. Quantitative
4. Universe
5. Units
6. Universe
7. Time
8. Accuracy
9. Lengthy
10. Units
11. Accurate
12. Error.

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SUBJECT: COMMUNICATION RESEARCH	
COURSE CODE: MSM-511	**AUTHOR: PROF MANOJ DAYAL**
LESSON NO.: 6	
METHODS OF MEDIA RESEARCH: II	

STRUCTURE

6.0 LEARNING OBJECTIVES

The objectives of this lesson are as follows:

- To know about Observation Method
- To understand the types of Observation Method
- To discuss the Case Study Method
- To explain the types of Case Study Method
- To describe Interview Method
- To know about the types of Interview Method

- To know about Focus Group Method
- To understand the Clinical Studies Method
- To discuss the Ethnographic Method

6.1 INTRODUCTION

As we discussed in the last lesson that there are two types of research functionally. One is quantitative research. The other is qualitative research. In our previous lesson, we comprehensively discussed about methods of quantitative research in media. In this lesson, we will focus our discussions on qualitative methods of media research. Qualitative research explains the qualitative phenomenon. It relates to immeasurable variables like beauty, happiness, nature, behavior, health, character, attitude, aptitude, etc. It uses small samples, inductive method of data analysis, open, flexible and standard questions with a lot of follow up. It uses different methods like observation method, intense interview method, case study method, focus group method, content analysis method, projective test method and ethnographic method. In this lesson, the students will be acquainted with the various methods of qualitative research.

6.2 RESEARCH METHODS

Methods of research are:

3. Observation Method
4. Case Study Method
5. Interview Method
6. Focus Group Method
7. Clinical Studies Method
8. Ethnographic Method

6.2.1 OBSERVATION METHOD

Oxford concise dictionary defines the word observation as, "Accurate watching, noting of phenomena as they occur in nature with regard to cause and effect or mutual relations." According to P.V. Young, "Observation-a deliberate study through the eye may be used as one of the methods for scrutinizing collective behavior and complex social institutions as well as the separate units composing a totality."

In the words of C. A. Moser, "In strict sense, observation implies the use of eyes rather than of the ears and the voice."

Thus, it is a direct method of collection of primary data.

TYPES OF OBSERVATION METHOD

This method may be divided into the following types from the point of view of convenience, clarity and simplicity in research of social nature:

(i) Uncontrolled observation

(ii) Controlled observation

(iii) Mass Observation

(iv) Participant observation

(v) Non participant observation

(vi) Quasi-participant observation

(i) Uncontrolled observation: Defining uncontrolled observation, Mrs P.V.YOUNG remarks," In non-controlled observation we resort to careful scrutiny of real life situations making no attempt to use instruments of precision or check for accuracy of phenomena."

Thus when an event in the nature or environment is observed without any control, it is described as uncontrolled observation.

(ii) Controlled observation: In this type of method, both the researcher and the subject of research is controlled. Here the total planning is prepared before observation and then after something is observed. The researcher cannot change the process by changing its ways, means and situations. In order to have controlled observation, there should be a general observation first. Accordingly, an interview will make it more effective, useful and relevant.

(iii) Mass observation: The problem of objectivity has been one of the biggest problems of media and communication research. When an individual makes an independent and uncontrolled observation, then his descriptions of the same are either exaggerated or understated. This is because of individual's effect, past perception, etc. which automatically arises leading to some kind of subjectivity in his observations. Hence observation is given to a group instead of individual. In this process, the bias of different individuals in different directions neuteralises each other leading to more and more objectivity in research. In the

words of Hsin Pao Yang, "Mass observation is a combination of controlled and uncontrolled observation. Mass observation depends on the observing and recording of information by a number of people and the pooling and treatment of their contribution by a control person."

This method was used in 1994 for the study of local conditions of Jaimica. Every month in Jaimica, communication in community life was centered. For this purpose the researchers were sent to every district for the collection of facts. A meeting of all the researchers was regularly convened and after a lot of discussions and brainstorming sessions, conclusions were derived.

That means the entire burden of observation was not given to one individual rather it was suitably distributed among all the members of the group. By this process the individual biases are automatically killed and ultimately the research was of high standard.

(iv) Participant Observation: Though this method had been in use since long, yet this was systematically studied by Lindman in 1942 in his pioneering book "Social Discovery". This method is an integral part of uncontrolled observation and in this method, the researcher directly participates in those activities on which he is supposed to conduct a research study. Simultaneously the researcher observes the research- related activities. That is why it is called Participant Observation.

A senior correspondent of Indian Express Sh. Ashwini Sarin deliberately got himself arrested in Tihar Central Jail to have an investigative study based on participant observation. He later wrote several investigative stories about the pitiable conditions of Tihar Central Jail. Similarly John Howard remained in jail for many years to study the conditions of jail and ultimately he died in jail himself.

(v) Non- Participant Observation: This is also an integral part of uncontrolled observation. In this the researcher remains present in the group of those on which the research is to be conducted. He carefully sees, listens and studies of the said activities as a neutral and outside individual. But he himself does not participate in that activities. In other words, objectivity is the key factor in this study. Here, the researcher instead of entering the community life of the research related problems, he observes keenly the external aspects of the said problem.

(vi) Quasi Participant Observation: Complete participant observation or complete non participant observation is practically not possible on several occasions. Hence quasi participant observation is recommended. In this method, the researcher does participates in the activities related to the research and makes his observations also without getting himself emotionally involved in that activities. With reference to quasi participant observation, it can be said that due to the complexity of the society the perspective of complete unification is impractical. With unification in one group, the researcher loses his contacts with another group. So, it is better and advisable to have a semi neutral approach. For example, participating in social festivity, playing and eating together and yet remain in a quasi-participant stance is the main purpose of the researcher.

6.2.2 CASE STUDY METHOD

In mass communication research there are mainly two types of research being conducted these days? These are quantitative research and qualitative research. If statistical method is a quantitative research, the case study method is a qualitative research. This method excels at bringing an understanding of a complex issue or an object and can extend experience or add strength to what is already known through previous research. This method emphasizes detailed contextual analysis of a limited number of events or conditions and their relationships. According to P.V.Young, "Case study is a method of exploring and analyzing the life of a social unit, be that unit a person, a family institution, cultural group or even entire community."

According to Robert K Yin, "Case study method is an empirical inquiry that investigates the contemporary phenomenon within its real life context, when the boundaries between phenomenon and context are not clearly evident and in which multiple sources of evidence are used"

Thus, case study method is a very deep and intense examination and investigation of an individual, group family ,tribe , institution, community or a social unit.

TYPES OF CASE STUDY METHOD

There are generally two types of case study:

(i) Case study of an individual

(ii) Case study of a community

In case study of an individual, the complete life or the life of a particular event of an individual is studied. For example, if a boy faces particular communication difficulties with girls under such circumstances if the case study of that boy is to be conducted, then attempts will be made to know whether the boy has sisters or not, how has been his communication relations with his mother, paternal aunty, maternal aunty, paternal cousin sisters, maternal cousin sisters and so on? How has been his communications with other boys? If there is particular difference then his psychological aspects will also be studied so as to know about his communication problems. In this context the personal letters, diaries, self-stories, memories, essays, articles, features etc. can also be used for the study.

On the other hand, in case study of community which may be of a unit of a class, caste, family, group or community, a systematic study may be done. The overall study of an internal life of a community is a highly complex process. For data collection of a community the same sources are restored as in case of that an individual.

For case study of a community, high skill, intelligence, experience, precaution and far sightedness are required. For example among the readers of Chandigarh,."The Tribune" (English) is the most liked English daily, as revealed by several studies. Here the overall study of internal life of readers of Chandigarh is a highly complex process. Hence on the basis of intelligence of Chandigarh readers towards "The Tribune" realistic research based on case study may be conducted.

6.2.3 INTERVIEW METHOD

In this method, certain informations are collected by interview itself. It is a verbal method of securing data. According to V.M. Pamar, "The interview constitutes to a social situation between two persons by psychological process involved, requiring both individuals mutually respond though the social research purpose of the interview calls for a very different response from the two parties concerned. In the words of M.N. Basu, "An interview can be defined as a meeting of persons face to face on some points." In the words of P.V.Young, "The interview may be regarded as a systematic method by which one person enters more or less imaginatively into the inner life of another who is generally a comparative stranger to him." Hsin Pao Young has defined interview in the following words, The interview is a technique of field work which is used to watch the behavior of an individual or individuals to record statements, to observe the concrete results of social or group interaction between two persons. G.W. Allport presents it beautifully, "If you want to know how people feel, what they experience and what they remember, what

their emotions and motives are like, and the reasons for acting as they do why not ask them? Goode and Hatt has defined interview as, "Interview has become of greater importance in contemporary because of the reassessment of the qualitative interview." Thus, an interview may be described to be as one of the most commonly used technique of data collection in studies of human behavior.

TYPES OF INTERVIEW METHOD

It may be classified according to its functions. It may also be classified according to the number of persons participating in the process. Yet another criteria of classifying interview is the type of approach employed, e.g, structured or unstructured which are also described as directive or non directive. Yet another typology of interviews derives from whether these are focused or otherwise. Thus, the most important and standard types of interviews are as follows:

(i) Personal Interview
(ii) Group Interview
(iii) Structured interview
(iv) Unstructured interview
(v) Focused interview
(vi) Repetitive interview
(vii) Formal interview
(viii) Informal interview

(i) Personal interview: This type of interview attaches one person with another person or persons. In this type, the interviewer goes on asking questions to the interviewee. The interviewee goes on responding to them. Every answer becomes a motivational force for the creation of another question. The biggest advantage of this type of interview is that there is a continuous process of collection of factual and accurate data. This is because when if the question or the answer is not clear, then it can be accordingly rectified for clarifications leading to crystal clear and interactive communication. The answers may be obtained according to the need of the situation. Simultaneously the answers of even emotional and sensitive questions may also be obtained. By inciting emotions, even the mysterious questions can lead to collection of required answers. This method also has some shortcomings like personal bias and subjectivity of the interviewer. Moreover, it is a very costly and time killing

method. Despite all this, personal interview method is the most common, prevalent and popular method of interview.

(ii) Group interview: In this, more than one person are interviewed simultaneously. The interviewer asks the same question to each member of the group one by one. And each member of the group or some members of the group reply to the queries. This method has many advantages. It is a very simple and easy method of obtaining large scale data. This method contains more objectivity as compare to the personal interview method. This is because the personal bias of so many members neutralizes each other leading to more and more objective approach. Even less skilled members can serve the purpose and this method is less costly, less time consuming, less energy consuming and less resource consuming. The shortcomings of this method are that due to frequent questioning to large group, all the questions are not answered nor every member of the large size understands the question. It lacks factuality, accuracy and reliability.

(iii) Structured interview: In this type, schedule is used. The language of every question and its serial are in the schedule. This interview is in the form of question answer. Whatever answers are collected from the questions mentioned in the schedule the interviewer notes it down. The interviewee also answers only the questions briefly and to the point. In the analysis and interpretation of the answers, he may say something, but that is not noted down.

(iv) Unstructured or Uncontrolled Interview: In this the schedule is not used. As a result, no question is definite. This type of interview is characteristics by far too greater flexibility of approach to questioning the respondents. Thus, it involves relatively much lesser standardization of relevant techniques and operations. Here, the respondents are encouraged to relate freely and frankly their concrete experience with little or no direction from the interviewer. In order to study the psycho-communication effects, this type of interview is considered to be ideally suitable. On the other hand, the study of body language is more appropriately through this method. Special circumstances may excite some of the people, while some other people remain stable even in the odd and unfavourable circumstances. This type of facial expressions, gestures, postures and other reactions or expressions are possible in unstructured or uncontrolled interview.

(v)Focused Interview: W.F. Ogburn is considered to be the father of focused interview. The most important role to this type of interview is to focus attention on the given experience of the respondent

and its consequence. The interviewer is well acquainted with the questions in advance that he has to ask. That means the interviewer has a definite framework of topics to be covered. But at the same time he has the freedom to decide the sequence of the questions. The respondents have the freedom to express completely his own thoughts, yet the direction of the interview is mainly in the commands of the interviewer. This type of interviews have been applied vigoursly and effectively in the development of hypothesis.

(vi) Repetitive Interview: In a method in which informations and data collected by way of frequent interviews, is called repetitive interview method. This type of interview method is used while during media research we have to study the serial effects of some social or psychological process. To study the communication effects of a woman she may be interviewed as an officer at the office, as a housewife at her residence and as a social activist at her social club. Though this method has advantages, yet it is confined to several limitations. It is a very costly and time consuming method.

(vii) Formal method: This involves the application of a set of pre-determined questions and of highly standardized techniques of recording. Hence this type of interview is considered to be the synonym of directed, regulated, governed and controlled interview. With the help of a schedule the answers of pre- decided questions are noted down. Here there is no freedom of asking any extra question or providing any extra answer. The most important aspect of this method is that there is a special kind of control over the interviewer. He can neither ask additional questions out of the schedule nor can he change the wordings of the questions. He has to execute his task well within a preplanned scheme.

(viii) Informal interview: This is called uncontrolled or unstructured or free interview. In this method, there is a complete freedom of asking questions, giving answers and writing the interview. Here no help from a special schedule is taken. The interviewer asks the questions and the interviewees or the respondents may answer their questions in the form of a story or a description. Thus, this method is characterized by a far too greater flexibility of approach to questioning the respondents.

6.2.4 FOCUS GROUP METHOD

In this method, 6 to 10 people are interviewed simultaneously with the help of a moderator, observer and rapporteur by way of unstructured discussion about the focal topic.

In focus group method, this small group of people are frequently asked about their comments, viewpoints, perceptions, visions, ideas, beliefs and attitudes towards a product, service, concept, advertisement, idea, or packaging. Questions are repeatedly asked in an interactive group setting where participants can freely and frankly talk with other group members.

The first focus groups were created at the Bureau of Applied Social Research in the USA by a well-known sociologist Robert K. Merton. This method has a long history and was applied during the Second World War to test the effectiveness of propaganda.

At the collective level, focus group provides the opportunity to interpret the strength with which an individual holds an opinion. If they are communicated with opposing opinions or directly challenged, the individual may either modify their position or defend it. Bringing together all the opinions and comments that an individual makes in order to enable the researcher to determine whether their view changes in the course of discussion. And if so, further examination of the transcript may reveal which contributions by other focus group members brought about the change.

The data obtained through focus group can sometimes reveal shared understandings or common views. However, there is a threat that a consensus can be assumed when not every person has spoken: the researcher will need to consider carefully whether the people who have not expressed a view can be assumed to agree with the majority, or whether they may simply be willing to voice their disagreement (Harding, 2013).Each and every opinion will be given a chance to speak and present their views even if it does not match up with the majority opinion

6.2.5 CLINICAL STUDIES METHOD

In communication or media research, any direct clinical or psychological tests are not conducted. But here we treat projective tests as clinical studies as these are indirectly related and helpful in direct clinical studies. This method includes the presentation of a stimulus situation selected or framed. These techniques were first developed by psychologists and psychiatrists concerned with the diagnosis and treatment of patients who are suffering from mental conflict and emotional disorders. These techniques try to give an overall picture of the individuals' personality structure, his emotional desires and complexities. Earlier these tests were intensively used in the Sociology, Social Psychology and Anthropology. But now these projective tests are also used in communication and media studies because of its strong interrelation and covariance.

Thus, in this technique, the responses of persons to stimuli are not taken at their face value. On the contrary they are analyzed in terms of some pre-established psychological conceptualization of what the person's responses to the stimulus mean. This technique gives emphasis on the perception of the material. That means whatever meaning an individual gives to a particular material, becomes the yardstick of his personality.

There are several types of projective tests which are indirectly treated as clinical studies which may be described as follows:

(i) Ink blot test
(ii) Thematic appreciation test
(iii) Word association test
(iv) Picture arrangement test
(v) Sentence completion test
(vi) Doll drawing test
(vii) Picture story test
(viii)Verbal project test

(i) Ink blot test: This technique was first developed by the Switzerland psychologist Herrmann Rorschach in 1921. This is one of the most frequently used projective techniques. This test consist of 10 cards having print of ink blots. The design is meaningless. Here by showing these cards, the subject is asked, "Why might this be?" According to the response of the subject, his personality can be analysed and tested. The first card will contain the simple or least complex picture while the last card will contain the most complex picture. Thus, by this technique the measurement or the test of personality can be carried out.

(ii) Thematic appreciation test: This consists of a number of pictures about which the subject is asked to respond and tell stories. The stories that subjects tell constitute the basis for the investigator to make certain conclusions about their personality trait, structure expressive and adaptive aspects of behavior etc. Such conclusions depend on the assumption as to what the subject perceives in the test-material represents externalization or projection of processes.

(iii) Word association test: In this test the subject is given a list of words. After each word he is supposed to respond with the first word that comes to his mind. For example if the stimulus word is

Mahatma Gandhi, the subject may respond quietly by uttering "non-violence" or someone respond saying "peace". Someone may describe him as "responsible for India's division". The subject response may indicate his or her areas of emotional disorder and mental conflict.

(iv) Picture arrangement test: This test relates to group administration. It basically consists of 25 plates each containing three sketches which may be organized in different ways to project a sequence of events. Then the subject is asked to arrange them in a series which feels as the most reasonable. Such responses are properly analysed as providing evidence regarding positivism, negativism, conformity to norms, and social orientation of the subject and so on.

(v) Sentence completion test: In this type of test, the first few words are given and the respondent is asked to complete it. Various respondents may complete the sentence in different ways. This technique also gives clues to areas of the subjects emotional disorder and mental conflict.

(vi) Doll drawing test: This test is designed to assess the personalities of children. The child respondent is given a set of dolls representing adults or children of both sexes or members of several racial groups. The respondent may be asked to show how these dolls would act in specified circumstances. The children respondents may be asked to play freely and naturally with the dolls. The manner in which they arrange the dolls will signify their personalities, prejudices, inclinations interests and more importantly their attitudes towards the class of persons represented by the dolls.

All those tests are sometimes doubted about their validity and reliability. But despite all limitations these projective tests have been used in studies relating to individual personality to social and cultural factors.

6.2.6 ETHNOGRAPHIC METHOD

Coined by an American anthropologist Clifford Geertz in early 70s, the term ethnography is a scientific description of human beings about cultural and racial studies with their customs, habits and mutual differences. It aims at cultural interpretation and phenomena and cross cultural comparison. It is a graphic representation (including textual writing) of races and culture of a group of people.

Earlier the ethnographic method of research was confined to anthropology and biology, where it was used as quantitative research with the help of anthrometrics and biometrics. But in the present context, it has been expanded to sociology, political science, psychology, education and communication studies more as a qualitative research. It is a highly systematic and well organized study of races and culture by

observation, diary-keeping analysis of existing documents, photography, videotaping and so on. It studies an issue from participating frame of reference. It is a combination of observation, interview, focus group and case study. There are two types of ethnographic method of research:

i) Macro Ethnography

ii) Micro Ethnography.

Micro ethnography studies an individual or an unit for the racial and cultural analysis, whereas macro ethnography studies the society or group or community for representation of a group of people.

6.3 CHECK YOUR PROGRESS

Note: 1) Use the space below for your answers.

2) Compare your answers with those given at the end of this lesson.

A. CHOOSE THE RIGHT OPTION.

1. What is Observation Method?
   (e) It is a direct method of collection of primary data
   (f) It does not require the uses of our senses
   (g) It is quantitative method
   (h) None of the above
2. In focus group method
   (a) 100 to 200 pe0pe are interviewed simultaneously
   (b) 6 to 10 people are interviewed simultaneously
   (c) Unlimited no. of people are interviewed simultaneously
   (d) None of the above
3. In case study method , the following is studied
   (e) Specific unit is deeply and intensively studied
   (f) Big sample is taken
   (g) Universe is studied
   (h) None of the above
4. What is interview method?
   (e) This method is the verbal method of collecting data
   (f) Most popular method

(g) Solves all the research problems

(h) None of the above

5. What is ethnographic method?

(e) Systematic and well organized study of races and culture

(f) It uses observation, diary-keeping analysis of existing documents, photography, videotaping and so on

(g) Very rarely used in mass communication research

(h) All of the above

B. FILL IN THE BLANKS.

1. Observation method may be divided into five different types like uncontrolled observation, controlled observation, mass observation,…….quasi participant observation.
2. Case study method may be divided into Case study of an individual and Case study of a ……...
3. Interview method is the ……method of collecting data.
4. The most important types of interviews are personal interviews, group interviews, structured interviews, unstructured interviews, focused interview, …… interview, formal interview, Informal interview.
5. ……method is a combination of observation, interview, focus group and case study.

6.4 SUMMARY

- There are several methods of qualitative research like observation method, case study method, interview method, focus group method, content analysis method, projective method, ethnographic method, etc. Observation method is a direct method of collection of primary data. This method may be divided into five different types like uncontrolled observation, controlled observation, mass observation, participant observation, quasi participant observation. Then we have Case study method which is a study of social unit in which some specific units are deeply and intensively studied. That unit may be an individual, a family, a caste, an institution or a whole community. Some of the prominent tools and techniques of case study are diary, letter, life history, collected material, etc. Case study method may be divided into Case study of an individual and Case study of a community. After that Interview method is the verbal method of

collecting data and it is the most commonly used method of securing data. The most important types of interviews are personal interviews, group interviews, structured interviews, unstructured interviews, focused interview, repetitive interview, formal interview, Informal interview. Then comes Content analysis or textual analysis is also known as codification. It focuses on analysis of different types of media and communication contents. The contents may be qualitative, may be quantitative or may be related to fundamental, practical or applied research. The most important uses of content analysis is content description, stimulus response experimentation, reality and Communication image perceptions, etc. Despite several limitations content analysis remains the only scientific method of analyzing the content of media and communication and is getting maturity day in and day out. Then comes focus group method. In this method, 6 to 10 people are interviewed simultaneously with the help of a moderator, observer and rapporteur by way of unstructured discussion about the focal topic Another important method is projective method which gives emphasis on the perception of the material. That means whatever meaning an individual gives to a particular material, becomes the yardstick of his personality. There are several types of projective method like Ink blot test, Thematic appreciation test, Word association test, Picture arrangement test, Sentence completion test, Doll drawing test, Picture story test, Verbal project test. Last but not the least important is ethnographic method which is a highly systematic and well organized study of races and culture by observation, diary-keeping analysis of existing documents, photography, videotaping and so on. It studies an issue from participating frame of reference. It is a combination of observation, interview, focus group and case study. There are two types of ethnographic method of research like macro ethnography and micro ethnography.

6.5 KEYWORDS

Observation Method: Observation method is a direct method of collection of primary data.

Types of Observation Method: This method may be divided into five different types like uncontrolled observation, controlled observation, mass observation, participant observation, quasi participant observation.

Case Study Method: This method is a study of social unit in which some specific units are deeply and intensively studied. That unit may be an individual, a family, a caste, an institution or a whole community.

Types of Case Study Method: This method may be divided into Case study of an individual and Case study of a community.

Interview Method: This method is the verbal method of collecting data and it is the most commonly used method of securing data.

Types of Interview Method: The most important types of interviews are personal interviews, group interviews, structured interviews, unstructured interviews, focused interview, repetitive interview, formal interview, Informal interview.

Focus Group Method: In this method, 6 to 10 people are interviewed simultaneously with the help of a moderator, observer and rapporteur by way of unstructured discussion about the focal topic

Clinical Studies Method: In communication or media research, any direct clinical or psychological tests are not conducted. But here we treat projective tests as clinical studies as these are indirectly related and helpful in direct clinical studies. This method includes the presentation of a stimulus situation selected or framed.

Ethnographic Method: This method is a highly systematic and well organized study of races and culture by observation, diary-keeping analysis of existing documents, photography, videotaping and so on. It studies an issue from participating frame of reference. It is a combination of observation, interview, focus group and case study.

Types of Ethnographic Method: There are two types of ethnographic method of research like macro ethnography and micro ethnography.

6.6 SELF-ASSESSMENT TEST

1. What is observation method? Discuss the merits and demerits of observation method.
2. Discuss the various types of observation method.
3. What is case study method? Discuss the types of case study method.
4. Discuss the qualities and limitations of case study method.
5. What is interview method? Explain the types of interview method.
6. Describe the merits and demerits of interview method.

7. Explain the concept of focus group method with suitable examples.
8. What is content analysis method? Describe the types of content analysis method.
9. What is projective method? Discuss the various types of projective method.
10. What is ethnographic method? Describe the types of ethnographic method.

6.7 ANSWERS TO CHECK YOUR PROGRESS

A. CHOOSE THE RIGHT OPTION.

1. (a) It is a direct method of collection of primary data
2. (b) 6 to 10 people are interviewed simultaneously
3. (a) Specific unit is deeply and intensively studied
4. (a) This method is the verbal method of collecting data.
5. (d) All of the above

B. FILL IN THE BLANKS:

13. Participant observation
14. Community
15. Verbal
16. Repetitive
17. Ethnographic

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SUBJECT: COMMUNICATION RESEARCH	
COURSE CODE: MSM-511	**AUTHOR: PROF MANOJ DAYAL**
LESSON NO.: 7	
TYPES OF SAMPLING	

STRUCTURE

7.0 LEARNING OBJECTIVES

The objectives of this lesson are as follows:

- To know about the concept of sampling
- To understand the types of sampling
- To discuss Simple Random Sampling
- To explain Stratified Random Sampling
- To describe Systematic Random Sampling
- To know about Cluster Random Sampling
- To discuss Convenience Sampling
- To understand Purposive Sampling or Judgmental Sampling
- To discuss Quota Sampling

- To know about Multi Staged Sampling
- To discuss Multi Phased Sampling
- To understand Snowball Sampling
- To describe Self-selected Sampling
- To explain Area Sampling
- To know about Panel Sampling
- To discuss Intercepting Sampling

7.1 INTRODUCTION

Types of sampling are varied which we are going to discuss in this lesson. As we know that measurement is the core of this type of research as it gives the basic connection between empirical observation and mathematical expression of quantitative relationships. It uses different methods like census method, probability sampling method and content analysis method. Probability sampling methods are further divided into simple random sampling, systematic random sampling, stratified random sampling, cluster sampling, whereas non-probability sampling method may be divided into purposive or judgmental sampling, convenience sampling, quota sampling, multi-staged sampling, multi-phased sampling content analysis, self-selected sampling, area sampling, panel sampling, etc.

7.2 SAMPLING

A sample is that part of universe or population, which represents that universe or population. This saves time, money, energy, resources, man-power. For examples, if we have to test accuracy of spelling in English daily, then it is not necessary that all the words used in the newspaper will not be spell-checked. Rather only a few words from different pages will be taken and will be spell- checked. These few words will be treated as sample of entire newspaper. The results from these few words are treated as applicable to the entire newspaper. This whole process will be described as sampling method. William J. Goode and Paul K. Hatt has defined sampling as "A sample, as the name implies, is a smaller representation of a large whole". According to P. V. Young, "A statistical sample is a miniature picture or cross section of the entire group or aggregate from which the sample is taken".

In the words of Frank Yaton, "The term sample should be reserved for a set of units or portion of an aggregate of material which has been selected in brief that it will be representative of the whole aggregate".

Now the question arises as to what what is sampling method?

Bogardus has defined sampling method as, "Sampling is a selection of certain percentage of a group of items according to a predetermined plan."

According to Y. D. Keskar, "In case of a sample enquiry we try to generalize in terms of the whole group though the facts assembled relate only to a part of it. In the words of Fairchild, "Sampling method is a process or method of drawing a definite number of individuals, cases or observation from a particular universe, selecting part of a total group for investigation.

The sampling method is not only used in a scientific study, but also in a practical life." According to Tippett, "The practice of taking a small part of a large bulk to represent the whole is fairly generally understood and widely used. The house- wife will sample a piece of cheese at the shop before making a purchase, and a cotton spinner will buy a bale of cotton having seen only a sample of it".

That means the selected part from the universe should actually represent the whole universe. A study on that part will be treated as study on the whole universe. But how to select this part? The answer of this question is given by the sampling technique.

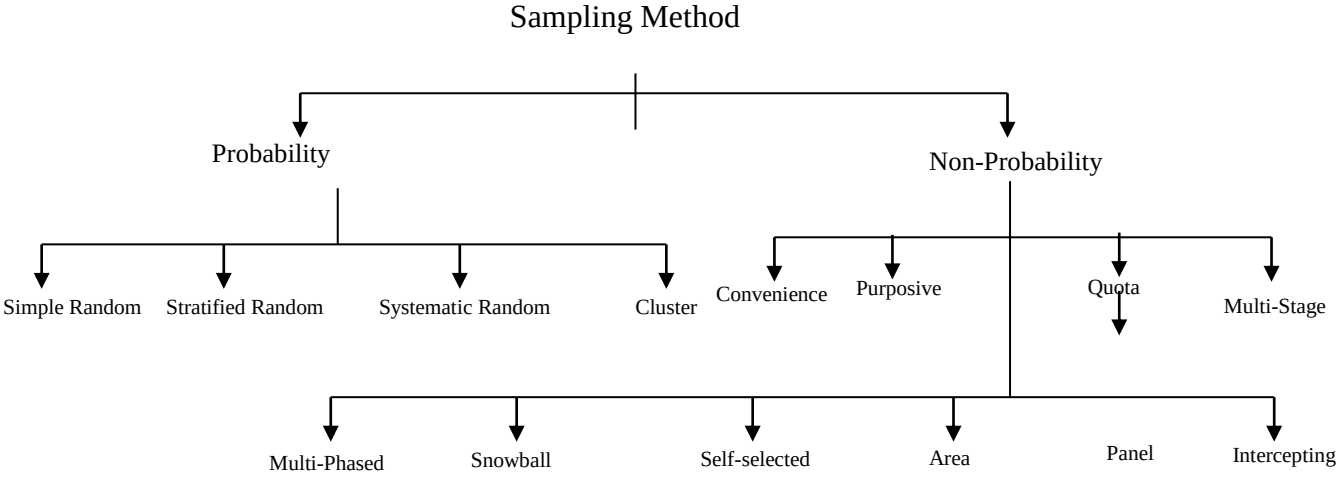
In the research area, all the units of an universe or population are not always studied, rather a few such units from the universe or population are selected, which represent the whole universe or the whole population. For example, instead of studying all the journalists working in newspapers, if only a few journalists are selected from the universe that represents all the journalists in terms of qualities, traits and characteristics. Then there is no need to study all the journalists, but with the study of only those selected journalists, the results can be obtained. This is called sampling method.

Thus, a sample is a selected portion, a subset of the population that is representative of the entire population and this procedure is called sampling or sampling technique or sampling method.

7.2.1 TYPES OF SAMPLING METHOD

The sampling method may be divided into two types. These are probability sampling method and non-probability sampling method.

Probability sampling method consists of simple random sampling ,stratified random sampling, systematic random sampling and cluster random sampling, whereas non probability sampling method may be divided into convenience sampling, purposive sampling, quota sampling, multi staged sampling, multi phased sampling, snowball sampling, self-selected sampling, area sampling, panel sampling and intercepting sampling.



1. SIMPLE RANDOM SAMPLING: This is also called chance factor method. In the words of Chaturvedi, "Simple Random Sampling is selected at random so that no item is given preference. The chance of selection of any one item is the same as that of any other".

That means simple random sampling method is such a method of selection of a sample in which the researcher cannot choose a single unit according to his own choice, but on the basis of chance or probability, the sample is selected and studied. From the list of the universe, giving equal chance or importance to all the units without any bias or prejudice, a few units are selected. Whatever units are thus selected becomes the essential part of the study. Here each and every unit gets an equal chance of getting selected. This method is also called proportionate method, because different units in the sample are in the same proportion as that of the universe. Due to lot of differences among elements of facts relating to mass communication, it is very difficult to have a cent percent proportionate sampling. But it is proportionate to a great extent. Simple random sampling is considered to be an excellent method of sampling.

Thus, the simple random sampling is a fundamental sampling method where a group of subjects (a sample) for study from a larger group (a universe) is selected. Each individual is selected entirely by

chance and each member of the universe has an equal chance of being included in the sample. For example selecting 10 journalists of a newspaper by simple random sampling. The list of all the journalists of that newspaper will be prepared called sampling framing. Suppose a list of 500 journalists are there, then 10 may be selected out of 500 by lottery method.

2. STRATIFIED RANDOM SAMPLING: Though it is primarily a probability sampling, yet may be described as mixed. It includes stratified random sampling as strata is developed on non-probability basis and then further random sampling of the strata is carried out on probability basis. In another case if sampling is carried out in a series of stages, then sometimes both probability and non-probability sampling is combined to make it one design. One or two more stages of sampling can be carried out according to probability basis and the rest of the stages according to non-probability basis. For example, a researcher may start by selecting clusters using probability cluster sampling techniques, but at the final stage, he may select components as a quota sample.

In stratified random sampling, the universe is divided into a number of strata which has been very well defined by Hasin Pao Young as "Stratified sampling means taking from the population sub-samples which have common characteristics, such as types of farming, size of forms, land ownership, educational attainment, income, sex, social class, etc. These elements making up the sub-samples are drawn together and classified as a type or category."

The stratified random sampling may be further divided into proportionate stratified sampling, non-proportionate stratified sampling and stratified weighted sampling.

(a) Proportionate Stratified Sampling: In this type from each strata, units are randomly selected in same proportion as that of the universe of that strata. For example, if in a universe, there are 240 journalists,60 advertisers,80 public relations officers and 120 media managers, then 24 journalists,6 advertisers, 8 public relations officers and 12 media managers will be selected by random sampling method.

(b) Disproportionate Stratified Sampling: In this type, equal number of units are randomly selected from each strata. This is generally described as oversampling of one or more sub-groups. It is also called controlled stratified sampling..For example, if in a universe ,there are 240 journalists,60 advertisers,80 public relations officers and 120 media managers and we have to select 10 per cent sampling, then 50 units from each strata will be randomly selected.

Thus ,proportionate sampling provides equal and better precision than a simple random sampling, more advantageous in terms of precision when values within strata are homogenous whereas in disproportionate sampling, the researcher can maximize precision for a single important survey measure. Hence, if costs and variances are about equal across strata, it is better to select proportionate sampling. If variances and costs differ across strata, it is better to select disproportionate sampling.

3. SYSTEMATIC RANDOM SAMPLING: This type of sampling also has some complications or complexities, in which every nth subject or unit is selected from a universe. To get a sample of 10 from a universe of 200, or a sampling rate of 1/20, a media researcher selects an initial point and an interval of sampling. In this case, it is 10. That means, 21, 31, 41, 51, 61 and so on. This type of sampling is often used in mass communication research and is highly time- saving, money- saving, energy- saving, error- saving and resource- saving as compare to simple random sampling. This procedure is extensively and widely applied to choose subjects from lists such as address directories of media persons or different channels or different newspapers. The reliability and accuracy of this sampling in dependent on the availability and adequacy of the sampling frame. This procedure has several strengths and weaknesses also. The most important strength is that here the selection is very simple and easy. Secondly, here the selection can be more reliable, authentic and accurate than a simple random sampling. Third, this method is normally very cheap and cost-effective. On the other hand, the weaknesses are that a complete list of the universe is required, which is a complex and complicated process. Further, here the periodicity may make the process as biased and prejudiced.

4. CLUSTER RANDOM SAMPLING: This is such a complex random sampling in which a cluster or group or sub- group as units are selected from the universe. Here there is a difficulty in selecting individual units from the universe. So clusters or groups or sub- groups are randomly selected based purely on probability of each cluster or group or sub- group of getting selected is equal. For example, opinion of readers of a country about a newspaper. In this case the country will be divided into several zones, each zone will be divided into different states, each state will be divided into different districts and each district will be divided into different blocks. From all these clusters or groups or sub- groups will be randomly selected for the study. That is why this type of study is also sometimes called Multi-Staged Sampling, though Multi- Staged Sampling will also be discussed separately in this chapter.

Similarly, opinions of different community about a TV channel may also be studied by dividing each community into different castes and each caste into different sub- castes. The main merits of Cluster Sampling is that only part of the universe need to be enumerated. Here the costs are tremendously reduced if clusters are well- designed and properly defined. Third, here in this type of a sampling, estimates of cluster parameters are made and compared to the universe. But, at the same time this type of sampling also has some limitations like here sampling errors or standard errors are likely. Secondly clusters or groups or sub- groups may not be representative of the universe. Third, each unit or subject must be assigned to a specific cluster group or sub- group.

5. CONVENIENCE SAMPLING: This is also called an easily available sample. It is basically a collection of easily, conveniently and readily available units of a universe. Such units are sometimes very helpful in gathering exploratory data, information and evidence. But such units may also be cumbersome and problematic as they contain unidentified number of errors. Media researchers must see the merits and demerits of available units before applying them to their research. It is a highly disputed issue that the data gather through convenience sampling do not represent the Universe and hence it cannot be generalized or used for external validity. convenience sampling can be beneficial in pilot survey or pretesting of a questionnaire or a schedule. Moreover, convenient sampling also turn out to be instrumental in removing major problems in the process of research. It can be also helpful in testing and methodology judgement before going ahead for the actual research execution. An example of convenience sampling is the conveniently available readers of a newspaper in any compartment of a train where the respondents have sufficient time to reply. If one has to study on the respondents of Bihar in New Delhi, then either at railway station or at those trains which are going from New Delhi to Patna, such respondents will be easily and conveniently available. Similarly, if one has to study about different states, and can easily go to Delhi and can comfortably get different data from state bhawans like Haryana Bhawan, Punjab Bhawan, Bihar Bhawan, etc.

6. PURPOSIVE SAMPLING OR JUDGMENTAL SAMPLING: As already discussed earlier, in this method the importance of random selection is almost negligible. When a media researcher selects a few units from the population in view of a special objective for a scientific study, then it is called purposive sampling or judgment sampling. The basis of this type of sampling is mainly the fact that the researcher is well- acquainted with the qualities and the traits of the units of the universe and he or she

selects the sample with his conscience. The basis of selection is the objective of the study and the researcher keeps an eye on his objectives of the study and selects the sample accordingly. This is very useful for those researches of mass communication in which a few units of the universe are especially important. The fulfillment of this need is not at all possible by random method. For example, if we have to study the newspapers of Haryana, then we cannot ignore the newspapers published from Chandigarh. But, if we select the units by random method, then we may select the newspapers of Chandigarh. Under such circumstances, purposive sampling method proves to be highly useful and beneficial. This type of sampling is often used in advertising research, especially in comparing the old products. But, so many statisticians are very critical of purposive or judgment sampling method describing it as a non-scientific method. As a matter of fact, all the non-probability methods are non-scientific. But with the help and use of non-parametric statistics, non-parametric methods may be given a scientific touch.

7. QUOTA SAMPLING: It is form of stratified sampling, in which the selection of units is done on the basis of non-probability sampling. Here the quota is controlled on the basis of gender, age, religion, caste, income, occupation, etc.

8. MULTI STAGED SAMPLING: It is a combination of random sampling and stratified sampling, though it is primarily a non-probability sampling. This method becomes important and relevant when it comes to analyse the information and data of a large and extensive area like nation or state. Here the units of the universe is not prepared in totality but at different stages. For example if we have to select a rural newspaper, we don't need to prepare the list of all the rural newspapers. But in the first stage we will prepare a list of state newspapers and out of state newspapers we will select district newspapers and from district newspapers, we will accordingly select a list of villages and from the villages a list of rural newspapers will be selected as per the requirements.

Here another relevant examples of multi staged sampling may be given from content analysis as content analysis is basically a multi staged sampling. For example, in order to analyse the content of economic news of three English dailies, a sample of English dailies will be decided at first stage called sample stage1. Then a sample of time from the whole one year will be selected called sample stage 2. Thereafter, a sample of economics news will be selected called sample stage 3. After that a sample of readers who read economic news of these English dailies will be selected called sample stage 4. Thus, it

is crystal clear that multi -staged sampling is a rare combination of random sampling and stratified sampling.

9. MULTI PHASED SAMPLING: In this type at every phase, same type of sampling is used but as compare to other units, attempt is made to get more information from the same. From multi phased sampling sufficient economic saving is possible and the burden on respondents may also be minimized. That means under this sampling method from each unit, attempt is made to get at least some informations. But from the subsample of the whole sample, attempt is made to get additional and more elaborate information.

10. SNOWBALL SAMPLING: It is synonymously described as chain sampling or referral sampling or chain referral sampling or cold calling sampling. It is primarily a non-probability sampling where research participants recruit other participants for a test or examination or study. In this type of method, one source leads to another source and another source leads to yet another source. Hence, there becomes a chain of sources.

This technique is used where generally potential participants are very difficult to get. It is called snowball sampling because once you have the ball rolling; it picks up more 'snow' along the way and becomes larger and larger.

It generally consists of two major steps. First is to identify potential subject in the universe. It is very difficult to get even one or two participants initially. Second, the researcher is supposed to ask those subjects to recruit other people.

These steps are frequently and repeatedly used till the required sample size is determined. When individuals are named in this type of research, then it is called cold calling sampling.

This method has the following merits:

First, despite the crisis of participants, it permits for the research to take place where otherwise it would have been almost impossible to execute such study.

Second this type of method may be instrumental to find out features of a universe that were not aware existed.

This method has the following demerits:

First, it is generally impossible to find out the sampling error or draw inferences about populations based on obtained sample.

11. SELF-SELECTED SAMPLING: In this type of sampling, an individual himself becomes the sample by giving his own name and the researcher need not select the sample, then it is called self-selected sampling.

12. AREA SAMPLING: In this type of sampling those samples are considered which is sub divided into smaller blocks selected at random and then sub sampled or fully surveyed. This type of sampling is often applied when a total frame of reference is not available. Area sampling is one of the primary applications of cluster sampling where the clusters are countries, townships, city blocks or other well defined geographical part of the universe.

13. PANEL SAMPLING: In this type of sampling so many questions are asked to one person at different points of time .Hence it is a technique of first selecting a group of participants through a random sampling method and thereafter asking the group the same question again and again at different points of time. Thus each participant is given the questions at two or more points where each period of information gathering is called the wave. Panel sampling comes under longitudinal research. There have been so many proposed techniques of data interpretation like MANOVA, growth curve and structural equation modeling with lagged effects.

14. INTERCEPTING SAMPLING: It is a technique of sampling components in an area whereby a component is sampled if a selected line segment called a "transect" intersects the component.

7.3 CHECK YOUR PROGRESS

Note: 1) Use the space below for your answers.

2) Compare your answers with those given at the end of this lesson.

A. CHOOSE THE RIGHT OPTION.

1. A sample is a part of
   (a) Observation
   (b) Group
   (c) Universe
   (d) None
2. Measurement is the core of
   (a) Qualitative research
   (b) Quantitative research

(c) Focus group

(d) Ethnographic study

3. A population is a superset of

(a) Sample

(b) Mass

(c) Public

(d) None of the above

4. Quota sampling is a :

(a) Probability sampling

(b) Non-probability sampling

(c) Known sampling

(d) None

5. Stratified random sampling is a :

(a) Probability sampling

(b) Non-probability sampling

(c) Mixed

(d) None

B. FILL IN THE BLANKS.

1. In sampling method, all the ……of a universe are not always studied.
2. Simple Random Sampling is also called chance ……. method.
3. Though Stratified Random Sampling is primarily a probability…….., yet may be described as mixed.
4. Systematic Random Sampling has some complications or complexities, in which every nth subject or unit is selected from a……..
5. Quota Sampling is form of stratified sampling, in which the selection of units is done on the basis of……..

7.4 SUMMARY

- In sampling method, all the units of a universe are not always studied rather a few such units from the universe are so selected, that they represent the whole universe. Sampling method is a

time saving, money saving, energy saving, resource-saving, detailed study with accurate results, administrative convenience and essentiality of its use. On the other hand, sampling method has prejudice and bias, problems of representativeness, need for special knowledge, difficulty in sticking to sample and impossibility of the method. There are probability sampling and non-probability sampling. Probability sampling consists of simple random sampling, stratified random sampling, systematic sampling and cluster sampling. Non probability sampling consists of convenience sampling, purposive or judgment sampling, quota sampling, multi staged sampling, multi phased sampling, self-selected sampling, snowball sampling, area sampling, panel sampling, and intercepting sampling. Probability sampling is more scientific in nature than non-probability sampling. But with the help and use of relevant and suitable media metrics (statistics and mathematics in media), both can be given a scientific touch and framework.

7.5 KEYWORDS

Sampling: A sample is that part of universe or population, which represents that universe or population.

Sampling Method: is a time saving, money saving, energy saving, resource-saving, detailed study with accurate results, administrative convenience and essentiality of its use. On the other hand, sampling method has prejudice and bias, problems of representativeness, need for special knowledge, difficulty in sticking to sample and impossibility of the method.

Probability Sampling: It consists of simple random sampling, stratified random sampling, systematic sampling and cluster sampling.

Non-Probability Sampling: It consists of convenience sampling, purposive or judgment sampling, quota sampling, multi staged sampling, multi phased sampling, self-selected sampling, snowball sampling, area sampling, panel sampling, and intercepting sampling.

Simple Random Sampling: This is also called chance factor method. Simple Random Sampling is selected at random so that no item is given preference. The chance of selection of any one item is the same as that of any other.

Stratified Random Sampling: Though it is primarily a probability sampling, yet may be described as mixed. It includes stratified random sampling as strata is developed on non-probability basis and then further random sampling of the strata is carried out on probability basis.

Systematic Random Sampling: This type of sampling also has some complications or complexities, in which every nth subject or unit is selected from a universe.

Cluster Random Sampling: This is such a complex random sampling in which a cluster or group or sub- group as units are selected from the universe.

Convenience Sampling: This is also called an easily available sample. It is basically a collection of easily, conveniently and readily available units of a universe.

Purposive Sampling Or Judgmental Sampling: As already discussed earlier, in this method the importance of random selection is almost negligible. When a media researcher selects a few units from the population in view of a special objective for a scientific study, then it is called purposive sampling or judgment sampling.

Quota Sampling: It is form of stratified sampling, in which the selection of units is done on the basis of non-probability sampling. Here the quota is controlled on the basis of gender, age, religion, caste, income, occupation, etc.

Multi Staged Sampling: It is a combination of random sampling and stratified sampling, though it is primarily a non-probability sampling. This method becomes important and relevant when it comes to analyse the information and data of a large and extensive area like nation or state.

Multi Phased Sampling: In this type at every phase, same type of sampling is used but as compare to other units, attempt is made to get more information from the same. From multi phased sampling sufficient economic saving is possible and the burden on respondents may also be minimized. That means under this sampling method from each unit, attempt is made to get at least some informations. But from the subsample of the whole sample, attempt is made to get additional and more elaborate information.

Snowball Sampling: It is synonymously described as chain sampling or referral sampling or chain referral sampling or cold calling sampling.

Self-Selected Sampling: In this type of sampling, an individual himself becomes the sample by giving his own name and the researcher need not select the sample, then it is called self-selected sampling

Area Sampling: In this type of sampling those samples are considered which is sub divided into smaller blocks selected at random and then sub sampled or fully surveyed.

Panel Sampling: In this type of sampling so many questions are asked to one person at different points of time .Hence it is a technique of first selecting a group of participants through a random sampling method and thereafter asking the group the same question again and again at different points of time.

Intercepting Sampling: It is a technique of sampling components in an area whereby a component is sampled if a selected line segment called a "transect" intersects the component.

7.6 SELF-ASSESSMENT TEST

1. Describe census method. What are the merits and demerits of census method?
2. What is sampling method? Describe its limitations
3. Explain the merits and demerits of sampling method.
4. Describe the different types of probability and non-probability sampling.
5. Differentiate between simple random sampling and stratified random sampling.
6. Describe the various types of stratified random sampling.
7. Explain systematic random sampling and cluster random sampling.
8. Throw light on convenience sampling and purposive sampling.
9. Describe quota sampling. Differentiate between quota sampling and stratified sampling.
10. Differentiate between multi staged sampling and multi phased sampling.
11. What is snowball sampling? Discuss the merits and demerits of snowball sampling.
12. Why is snowball sampling called chain sampling and cold calling sampling?
13. Throw light on self-selected sampling, area sampling, panel sampling and intercepting sampling.

7.7 ANSWERS TO CHECK YOUR PROGRESS

A. CHOOSE THE RIGHT OPTION.

(i) (c) Universe

(ii) (b) Quantitative research

(iii) (a) Sample

(iv) (b) Non-probability sampling

(v) (c) Mixed

B. FILL IN THE BLANKS.

1. Units

2. Factor
3. Sampling
4. Universe
5. Non Probability Sampling

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SUBJECT: COMMUNICATION RESEARCH	
COURSE CODE: MSM-511	**AUTHOR: PROF MANOJ DAYAL**
LESSON NO.: 8	
CONTENT ANALYSIS METHOD	

STRUCTURE

8.0 LEARNING OBJECTIVES

The objectives of this lesson are as follows:

- To know about the concept of Content Analysis
- To discuss the definitions of Content Analysis Method
- To explain the types of Content Analysis Method
- To describe Merits of o Content Analysis Method
- To know about of the demerits of Content Analysis Method
- To understand Steps of Content Analysis Method.

8.1 INTRODUCTION

Content analysis method is a method of research. It is primarily a quantitative method of research. But with the fast development of media research, it is also emerging as a qualitative method of research.

8.2 CONTENT ANALYSIS

Content Analysis or textual analysis is a very important and specific method of communication and media research. It is also known as codification. It focuses on collection and analysis of different types of media and communication contents. These contents may be quantitative, may be qualitative, or may be related to fundamental, practical or applied research.

8.2.1 DEFINITIONS OF CONTENT ANALYSIS METHOD

Bernard Berelson (1952) for the first time defined the content analysis and described it as scientific description of communication. According to him "content analysis is a research technique for objective, systematic and quantitative description of the manifest content of communication" Walizon and Weiner (1978) defined the content analysis as "Any systematic procedure devised to examine the content of recorded information" Krippendorf (1980) defined it as "Replicable and valid refrences of data to their context." F. N. Kerlinger defined it as "content analysis is a method of studying and analyzing communication in a systematic, objective and quantitative manner for the purpose of measureable variables." According to A. Kaplan, "content analysis attempts to characterize the meanings in a given body of discourse in a systematic and quantitative fashion. In the words of Gooe and Hatt," When quantitative coding is applied to the content of various communication media such as magazines, newspapers, radio programmes or similar materials, it is called content analysis. According to P. V. Young " Content analysis is a research technique for the systematic, objective and quantitative description of the content of research data procured through interviews, questionnaires, schedules and other linguistic expressions, written or oral" Earl Babbie defines it as," the study of recorded human communications such as books, websites, paintings and laws. B. K, Kuthiala (1999) defines content analysis as ,"The scientific process of investigating both qualitatively and quantitatively the oral, printed, audio and visual information within a context in view of the intended and the perceived meanings," Farooq Joubish defines it as , "content analysis is considered a scholarly methodology in

the humanities by which texts are studied as to authorship authenticity or meaning. This later subject includes Philology, Hermeneutics, and Semiotics". Ole Hoolsi describes it broadly as, "Any technique for making inferences by objectively and systematically identifying specified characteristics of messages."

Kimberly A. Neuendorf (2002), provides a six decked definition of content analysis, "Content analysis is a summarizing, quantitative analysis of messages that relies on the scientific method (including attention to objectivity, inter subjectivity, a priori design, reliability and hypothesis testing) and is not limited as the types of variables that may be measured or the context in which the messages are created or presented. In the viewpoint of F.N. Kerlinger, "Content analysis is a method of studying and analyzing communication in a systematic, objective and quantitative manner for the purpose of measureable variables." Kerlinger's definition has emphasized on three aspects in content analysis. These are: 1.Systematic, 2. Objective, 3. Quantitative. These three characteristic aspects make content analysis a part of the overall scientific method of investigation of the unknown and creation of new information to understand the events and processes

8.2.2 TYPES OF CONTENT ANALYSIS

The most extensive use of content analysis was conducted by H. D. Laswell who proposed the following communication models. This model is considered to be a good design to comprehend different aspects of communication research. This is as follows.

Model	Research Area
Who says	Source Analysis
What	Message Analysis
To Whom	Receiver Analysis
In Which channel	Channel Analysis
With What effects	Effect Analysis

Here 'who' refers to source analysis, 'What' deals with the message part, 'whom' is targeted as an actual receiver of communication, channel is the medium or the method of communication and effect is the outcome of communication. Thus, content analysis may be classified in two parts from functional point of views and from structural point of view. On the other hand, content analysis is not

only confined to newspaper, but magazine, news agency, radio, television, film, internet, book, story etc.

Content Analysis

Functional	Structural
(i) What (content)	(i) Newspaper
(ii) Who (source)	(ii) Magazine
(iii) Whom (Target Audience)	(iii) News Agency
(iv) Channel (Medium)	(iv) Radio
(v) Effects	(v) Television
	(vi) Film
	(vii) Internet
	(viii) Books
	(ix) Story

The content analysis of news, whether it is related to newspaper or magazine or news agency or radio or television or internet, has been extensively used by H.D. Laswell.

On the other hand, Wright has used a complex method for the content analysis of newspaper in which he selected a few representative statements from the editorials and categorized them according to the suitability of thoughts.

Pierce studied the content analysis of books very deeply and intensively and proved that books are full of national feelings.

On the other hand, Berelson and Salter worked specifically in the area of content analysis of stories.

8.2.3 MERITS OF CONTENT ANALYSIS METHOD

This method has a lot of merits. Some of the most important merits are as follows:

(i) Easy Process of Data Collection: Under this method, the job of data collection is extremely easy and unobtrusive. The researcher can easily analyse and interpret media and communication interaction without the direct involvement of the researcher. Hence, the researcher's presence does not influence the results.

(ii) Transparent: The process of data collection is crytal clear as it is not the individuals but media gives the responses. Hence its transparency level is extremely high.

(iii) Replicable: This method is highly replicable as it follows a systematic procedure which can be easily replicated by other researchers, yielding results with high reliability.

(iv) High Flexibility: This method can be applied at any time, in any location with minimum time, money, energy and resources.

8.2.4 DEMERITS OF CONTENT ANALYSOS METHOD

This method also has so many demerits.

(i) Time Consuming: Manually coding a large volume of texts is extremely time consuming. The task of examining and categorizing large volumes of content is exorbitantly tedious and laborious activities.

(ii) Money Consuming: Since it is an exhaustive process, so it is expensive as well. Purchasing so many newspapers or recording so many audio or video will lead to high cost and it will turn out to be cost-ineffective.

(iii) Energy Consuming: Because it is extremely voluminous task, so it is energy consuming as well.

(iv) Resource Consuming: It is resource consuming because it is voluminour, exhaustive and tough task.

(v) Subjectivity: This method often requires some level of subjective interpretation. Hence it become a non-scientific study leading to the loss of reliability and validity.

8.2.5 STEPS OF CONTENT ANALYSIS METHOD

The following steps may be followed as a rough outline:

1. First of all the research question or hypothesis should be formulated.
2. The population or universe in the question must be defined.
3. An appropriate sample from the universe or population must be selected.
4. A unit of analysis must be defined and selected.
5. The categories of content to be analysed must be framed properly.
6. A quantification system must be set up.
7. Coders must be trained.
8. A pilot study must be conducted.

9. The content must be coded in accordance with the established definitions.

10. The collected data must be analysed.

11. Conclusions must be drawn.

12. Indications should be searched.

8.3 CHECK YOUR PROGRESS

Note: 1) Use the space below for your answers.

2) Compare your answers with those given at the end of this lesson.

A. CHOOSE THE RIGHT OPTION.

1. Content Analysis is also known as:
   (a) Codification
   (b) Tabulation
   (c) Contextualization
   (d) None of the above.
2. Textual analysis is :
   (a) An integral part of content analysis
   (b) Much different from content analysis
   (c) Very much similar to Ethnographic study
   (d) None of the above.
3. The nature of Content Analysis Method is :
   (a) Qualitative
   (b) Quantitative
   (c) Triangulation
   (d) None of the above.
4. Which model of communication is applicable to Content Analysis Method
   (a) Shanon & Weaver Model
   (b) Lasswell Model
   (c) Osgood Model
   (d) Schramm's Model
5. The advantage of Content Analysis Method is that :
   (a) The data collection is very unobtrusive
   (b) The data collection is very complex
   (c) The data collection is field-based
   (d) None of the above.

B. FILL IN THE BLANKS.

1. Content Analysis Method is primarily a …….method of research.
2. Both content analysis and codification are …….used.
3. Content Analysis is also known as……..
4. This method is highly ……..as it follows a systematic procedure.
5. This method often requires some level of ……..interpretation.

8.4 SUMMARY

- Content Analysis Method is primarily a quantitative method of research. But with the fast development of media research, it is also emerging as a qualitative method of research. Content Analysis or textual analysis is a very important and specific method of communication and media research. It is also known as codification. It focuses on collection and analysis of different types of media and communication contents. These contents may be quantitative, may be qualitative, or may be related to fundamental, practical or applied research. The content analysis of news, whether it is related to newspaper or magazine or news agency or radio or television or internet, has been extensively used by H.D. Laswell. On the other hand, Wright has used a complex method for the content analysis of newspaper in which he selected a few representative statements from the editorials and categorized them according to the suitability of thought. Pierce studied the content analysis of books very deeply and intensively and proved that books are full of national feelings. On the other hand, Berelson and Salter worked specifically in the area of content analysis of stories. This method has a lot of merits. Under this method, the job of data collection is extremely easy and unobtrusive. The researcher can easily analyse and interpret media and communication interaction without the direct involvement of the researcher. Hence, the researcher's presence does not influence the results. The process of data collection is crytal clear as it is not the individuals but media gives the responses. Hence its transparency level is extremely high. This method is highly replicable as it follows a systematic procedure which can be easily replicated by other researchers, yielding results with high reliability. This method can be applied at any time, in any location with minimum time, money, energy and resources.

- This method also has so many demerits. Manually coding a large volume of texts is extremely time consuming. The task of examining and categorizing large volumes of content is exorbitantly tedious and laborious activities. Since it is an exhaustive process, so it is expensive as well. Purchasing so many newspapers or recording so many audio or video will lead to high cost and it will turn out to be cost-ineffective. Because it is extremely voluminous task, so it is energy consuming as well. It is resource consuming because it is voluminous, exhaustive and tough task.
- This method often requires some level of subjective interpretation. Hence it become a non-scientific study leading to the loss of reliability and validity. The following steps may be followed as a rough outline in Content Analysis Method. First of all the research question or hypothesis should be formulated. Second, population or universe in the question must be defined. Third, an appropriate sample from the universe or population must be selected. Fourth, a unit of analysis must be defined and selected. Fifth, the categories of content to be analysed must be framed properly. Sixth, A quantification system must be set up. Seventh, coders must be trained. Eighth, A pilot study must be conducted. Ninth, the content must be coded in accordance with the established definitions. Tenth, the collected data must be analysed. Eleventh, conclusions must be drawn. Last but not the least important is that indications should be searched.

8.5 KEYWORDS

Content Analysis Method: Content Analysis Method is primarily a quantitative method of research. But with the fast development of media research, it is also emerging as a qualitative method of research.
Textual Analysis: This is same as Content analysis. But it remains confined to only the written words.
Codification: Both content analysis and codification are synonymously used.

8.6 SELF-ASSESSMENT TEST

1. What is Content Analysis Method. Discuss its merits.
2. Explain the merits and demerits of Content Analysis Method.
3. Describe the different types of Content Analysis Method.
4. Discuss the various definitions of Content Analysis Method.

5. Elaborate the steps of Content Analysis Method.

8.7 ANSWERS TO CHECK YOUR PROGRESS

A. CHOOSE THE RIGHT OPTION.

1. a
2. a
3. c
4. b

B. FILL IN THE BLANKS.

1. Quantitative
2. Synonymously
3. Codification
4. Replicable
5. Subjective

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SUBJECT: COMMUNICATION RESEARCH	
COURSE CODE: MSM-511	**AUTHOR: PROF MANOJ DAYAL**
LESSON NO.: 9	
PREPARATION OF CODE BOOK AND CODING	

STRUCTURE

9.0 LEARNING OBJECTIVES

The objectives of this lesson are as follows:

- To know about the sources of data
- To discuss the presentation of data

9.1 INTRODUCTION

In research, the scientific collection of data, its scientific presentation, scientific analysis, scientific interpretation and systematic report preparation are vital aspects to arrive at right conclusions. After the data collection from various sources it has to be presented and analysed in accordance with the outline laid down for the purpose at the time of research design.

9.2 SOURCES OF DATA

Statistics or information in raw or unoganised or unstructured form are called data. It is basically respondents' responses, contents, observations, etc. as per the directed research aims and plans. In research the data collected, is the subject matter on which the tools are applied to gather as per the research problem, research questions and objectives and through different methods and tools. After that it is presented and analysed as per the objectives, research questions and hypothesis (if any) of the research. Lastly, the properly processed, managed and presented data is analysed as per the findings to draw inferences of the research. Data is usually collected from two kinds of sources: (i) Primary sources, (ii) Secondary sources. Primary Sources are the original sources from where the researcher collects the data directly. Primary data are the first hand information gathered through different methods such as observation, interviewing, mailing, etc. Secondary sources are those sources containing data which have been collected and combined earlier or for other purpose. The secondary sources consist of easily and readily available compendia and already compiled statistical statements and reports whose data may be used in the study e.g, census reports, annual reports and financial statements of companies, statistical statements of reports of government departments.

Hence, the processed data is amenable to be interpreted with the help of statistical tools. The inferences drawn in this way is analysed to draw logical generalisation.

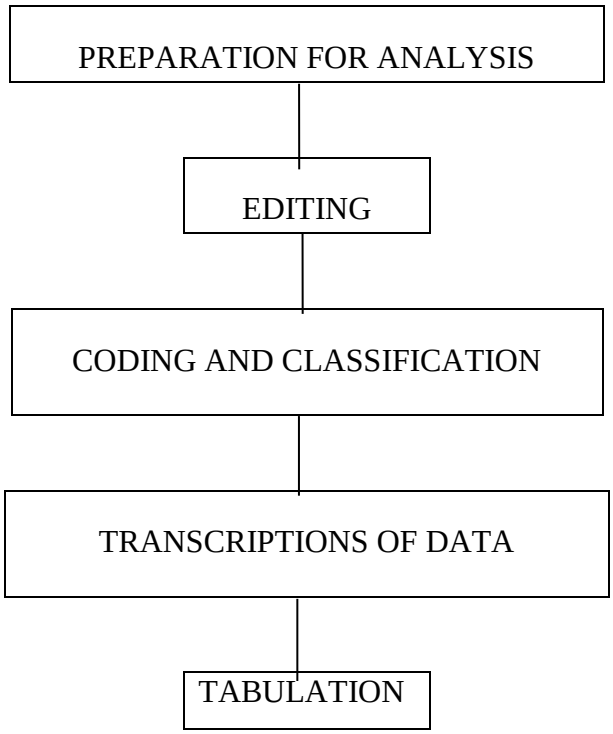
9.2.1 PRESENTATION OF DATA

After the collection of data, the presentation of data is another very important and relevant task. Data presentation relates to editing, coding, classification, transcription, tabulation and general explanation of the table. It is a significant step between data collection and data interpretation. It is primarily the method of presentation of data which finds out the related information and knowledge for coming out with useful conclusions and suggestions. The data gathered from wherever or whichever sources or methods, needs to be made uniform for more analysis. The data collected is usually in various format depending on the data sources. No significant and meaningful interpretations can be directly drawn from such collected data. To arrive at meaningful interpretation, the researcher is supposed to prepare the data as per the research problems and objectives. This is carried out by identifying the structure, i.e, the variables or group of variables, then coding, i.e., assigning some uniform codes to different data to

make it uniform, classification as per categories, editing, transcription, i.e, entering codes to data sheet to present collected data in one uniform form, then tabulation etc. This preparation of data for analysis (as the tables are then used to apply statistical tools) is termed as data processing. Further, the decision of applying statistical techniques depends upon the results of this data processing.

PRESENTATION OF DATA

(Identifying Structures of Collected Data)



The above diagram clearly shows the structures of collected data. Such data collected in the form of questionnaires/ interview schedules/ field notes/ data sheets are mostly in the form of a large volume of research variables. The research variables are recognised as a result of the preliminary research plan, which also sets out the data processing methods beforehand. Processing of data requires advanced planning and this planning may cover such aspects as identification of variables hypothetical relationship among the variables and the tentative research hypothesis.

The first and foremost initiative of data preparation or data processing is to define the variables and sub variables. In manual or mechanical data processing, the variables need to be clearly defined. It is done by preparing data structure. A data structure defines variables or group of variables that are

inter- related to drive at a conclusion. These are usually pre- planned by the researcher to derive the hypothesis or aimed research questions. Then the data is collected through various methods, which makes this process more complex. The inter-related variables are collected in a group to provide ease in understanding and analyzing.

We have already discussed earlier that data processing includes editing, coding, classification and tabulation.

1. **Editing**: It is a combination of mechanism and creativity. It is a procedure and process of converting the raw data into useful by detecting errors and omissions. It includes perusal and careful examination of filled questionnaires and/ or schedules. Editing is an art and craft which is executed to assure that the data are accurate, consistent with other facts gathered, uniformly entered as complete as possible and have been systematically arranged to facilitate coding and tabulation. In the context of data processing, editing may be divided into (i) Field editing and (ii) Central editing. Field editing is unavoidable because individual writing styles can be often difficult for others to decode. This type of editing should be done immediately after the interview is over. Central editing is carried on after completion of all the schedules or forms. This type of editing should be done by single expert editor in case of a small research and by a team of expert editors in case of a large study. Editors are supposed to correct the errors which are crystal clear like entry into wrong column, etc. In case the answer is incorrect or missing, then the editor may find out the correct answer just by observing the other informations in the form/ schedule. Sometimes, the respondents should also be contacted in case of more ambiguity or complexity. All the obvious wrong answers should be finally dropped. Editors must take the following precautions:
   - **(i)** Editors must know and identify the instructions given to them
   - **(ii)** They should make entry in form/schedule in some highlighting colours like red or green
   - **(iii)** They must put their signatures on the corrected or edited replies
   - **(iv)** They must also sign and put a date of rectification on all completed forms or schedules.
2. **Coding:** It is the next step in which the proper placement of the unit of analysis into a particular category is required. It is a method of assigning numerals or symbols to replies from respondents so that the answers can be put into a limited number of categories or classes. It is essential for effective and efficient analysis which will reduce the data to a small number of classes. In case of manual

coding, the standard method is to code in the 'margin with a coloured pencil. Whether the coding is executed electronically or manually, the researcher must see that coding errors are eliminated or minimized. It is better to keep a record sheet of codes, i.e, Code sheet. Coding should be executed while preparing the data instrument. This helps in directly entering the code of each variable to the recording sheet. The codes can be numeric, alphabetic or zero.

Numeric coding: It is like 1, 2, 3, etc. The coding should be compulsorily numeric when the data is subjected to further parametric analysis.

Alphabetic coding: This type of coding is preferable when the data is just to be presented in tabulation and frequency count or geographical representation.

Zero coding: A 'O' code refers to no response. If it is assigned to some response, then it will also be considered. And in case of 'Like', 'Yes' or 'No' then both options are given different codings. For example,

Question Number	**Observation/ Variable**	**Response Categories**	**Code**
1	Organization	Public Private Government	Pb Pt G
2	Owner of Vehicle	Yes No	2 1

It is important to mention here that each and every question is labeled by the variables and sub variables included. And special care should be taken that a label should not be more than 8 characters so as to make it easily feedable in statistical softwares for analysis. Sometimes it is not possible to directly enter the data rather it needs classification. That is to say that a set of responses from a specific class is required. Thereafter the researcher needs to classify and code the responses. For this purpose, classification of the available data is required at the data entry stage.

3. Classification: Yet another important step is classification. The data collected generally becomes a large volume of raw data which must be reduced to homogeneous groups to make meaningful relationships. This is executed by creating classes through classification of data, through the process

of arranging data in groups or classes on the basis of common characteristics. In accordance with the nature of phenomenon, classification may be done as follows:

(i) Classification according to attributes: There are two types of variables: Descriptive or Numerical. The descriptive responses measure the presence or absence only. The descriptive characteristics refer to qualitative aspect which cannot be measured quantitatively such as literacy, gender, etc. Data collected in this way on the basis of some attributes is said to be classification attributes. In this there is simple classification or manifold. In simple type of classification, merely presence or absence is judged, while in manifold two or more attributes are considered simultaneously and divide the data into a number of classes(the attribute classes of final order is given by 2n where n= number of attributes). It must be ensured while deciding attributes that no attribute has possibility of doubt/ ambiguity or should be at least.

(ii) Classification according to class intervals: The qualitative aspect has numerical characteristics which may be measured through statistical units. Data relating to income, production, age, weight, etc. come under this type of category. This type of data are known as statistics of variables and are classified on the basis of class intervals. As for example, the age of respondents may be between class 5 to 10, 10 to 15 etc. This is called class interval. Each class interval has a lower limit and an upper limit. The difference between them is called the length of the class. Here, the data or responses are grouped as their suitable class. In the process of classifying in this way, the following points should be considered:

a) What should be the no. of class interval: The most important and very first question in such classification arises as to what should be the number of classes and their magnitudes. First of all, there is no specific rule to the number of classes. Normally there may be 5 to 15 classes. The magnitude of each class could be equal and in some cases unequal. Therefore, the researchers knowledge of the subject matter plays a very significant role in deciding class intervals. Generally multiples of 2,5,10 are preferred while determining class magnitudes. There are a few exceptions of this case which may be indifferent like- class interval under 500 or Rs 1001 and over. All this is decided as per the nature of quantitative data. Secondly, how to choose class limit. Thirdly, how to determine the frequency of each class.

b) How to choose class limit: The class limit means that grouping the range of qualitative data in which the data may be. In a class limit (also called class interval), there is a lower limit and an upper limit. The quantitative information as per statistics of variable is put among the suitable class limit. To make it feasible and clear, it is preferred that the class limits are located at the multiples of 2, 5, 10, 20,100 and such other figures.

Further there are two types of the class limit: (i) Continuous (ii) Overlapping

(i) In continuous class limit, the data lying between above lower limit and below upper limit is put such as:

0-20

20-40

40-60

which means 0-20, i.e. ,above 0 and below 20 . That means even the exact 20 value would be put in the next class interval, i.e., 20-40. This is also called exclusive series or exclusive class limit.

(ii) In overlapping class limit, the data of the upper limit ‘s value is also considered in the same class interval. For example:

21-40

41-60

61-80

The class limit 21-40 means the value above 21 to 40.9999… and meaning 21to 41.

(iii) How to determine the frequency of each class: The frequency of each class means the number of values put in a single class limit. It can be measured /counted by tally sheets or mechanical sheets. While executing it mechanically the machine or software itself sorts the values under each class limit and counts the number of total values. While counting the frequency on tally sheets, the researcher has to calculate it manually as per following steps:

(i) In the following table, the class groups are written:

Groups	Tally Marks	Total No. (Class Frequency)
Below 50	III	3
50 – 100	𝍸I	5
100 – 150	𝍸I𝍸III II	12

151 – 200	~~IN~~I	5
Total		25

(i) In table on the left side, the class groups are written.

(ii) In front of each class interval, for each value a stroke is marked.

(iii) On the count of five a slant stroke line is marked meaning total 5.

(iv) The same process is further followed:

(v) In bottom and front of each column and row total is written. While determining classes, care should be taken to assure that the classes are exhaustive and mutually exhaustive. There should be option as others, which can be opted in case no mentioned class matches the very different few answers of the respondents.

(vi) The number of categorization for a specific question/ observation at the coding stage should be maximum permissible. Since reducing the categorization at the analysis level would be easier than splitting an already classified group of responses. However, the number of categories, is limited by the number of cases and the anticipated statistical analysis that are to be used on the observations.

5. Transcription of Data: It is the next very important step which is described as the intermediary stage between data coding and data tabulation. The main aim of transcription is to minimize the shuffling process between several responses and observation. When the data collected by the instrument, is not that much large, the simple inferences that can be drawn from the responses of observations can be transferred to data sheet, which is a summary of all responses on all observations from a research instrument. Suppose a research instrument contains 50 responses from 125 observations, to prepare a simple summary of one response from all 125 observations would require shuffling of 125 pages. And it becomes quite tedious when even if no.50 full, but a few summary tables are to be prepared from a research instrument. The transcription that is transferring data to data sheets, helps the researcher in presentation of all responses and observations on properly managed and clearly understood data sheets. The transcriptions can be prepared manually or electronically. The main requisite is the preparation of data sheets where observations are the rows of data base and the responses/ variables are the columns of data sheet. As explained earlier, each question is labeled by

the variable name that too not exceeding the maximum length of eight characters. The label names are thus the links to specific questions in the research instrument. Once the labeling process has gone through for all the responses in the research instrument, the transcription of the responses is executed. The worksheets can then be used for preparing tables as further analysis of data. The original research instruments can now be kept aside. The transcription process like editing, after once entering the data, is subject to a testing to ensure error free transcription of data.

Transcription is really vital and important and can be executed as and when edited instruments are ready for processing. Once all the research instruments are transcribed, the frequency tables can be prepared straight from the work sheet. For computerized data transcription, care should be taken while assigning coding. In codes, logical coding and ordering of coding should be prepared, use of blank spaces should be avoided as different softwares have different principles and the use of special characters or symbols in coding should also be avoided.

6. Tabulation: It is yet another very important step of data presentation. It is an orderly arrangement of data in columns and rows. After transcription the summary is presented in the form of tables. Tables conserve space and time for understanding the presented variables. Tables represent the total of responses. They can be made manually by using tally method or otherwise electronically by using some statistical analysis software. In tally method, the number of each response in front of column of its row (question/ variable row) is represented with a stroke. And after every four strokes, the fifth one is drawn diagonally so as to make it easily understandable and countable. After the complete entry of responses, the total or percentage of total is presented in exact right column for rows and the last row for columns. In electronic data processing, it is much easier as one has to just enter the data and prepare data sheets and the rest of the work is done with the help of the simple commands for each operation. In summary table, the frequencies are presented which are calculated through tally method as explained earlier. While preparing tables in research, care should be taken in table presentation and its naming. When the tables are presented, each table is given a specific number, title, source, etc. In each row, clearly defined stubs (row names/ variable names) are recorded and columns, captions, responses are mentioned. Some researchers give each column a specific number. Such creditation helps in clear and accurate interpretation and for the readers, it helps in easily correlating the interpretation of the table with the apt row/ column. Abbreviations should be avoided in any table, the

data entered should be as concise as possible. Each table should be numbered in addition to the chapter number (chapter-1, Table 1.1) in which the tables are used. Or for grouped data, special consistent numberings should be used for all the incorporated tables.

Tables should be presented with appropriate interpretation so as to guide the readers as to how and what the table is telling about the represented data.

Tabulation is categorised as simple and complex tabulation. Simple tabulation is one- way tables answering questions such as the inter- relationship of two variables. Complex tables can be used to present inter- relationship of more than two to N number of variables. Complex tabulation is also called cross tabulation. Tabulation can be very well understood by the following examples:

Simple Table:

Details of internet users on the basis of age

Age (In Yrs.)	**Readers**
0-20	
20-40	
40-60	
60-80	
Above 80	
Total	

Complex Table (Bi-variate Cross Tabulation)

Details of internet users on the basis of age and gender

Age (In Yrs.)	Readers		
	Male	Female	Total
0-20			
20-40			
40-60			
60-80			
Above 80			
Total			

Complex Table (Tri-variate Cross Tabulation)

Details of internet users on the basis of age, gender and literacy

Age (In Yrs.)	Male		Female		
	Literate	Illiterate	Literate	Illiterate	Total
0-20					
20-40					
40-60					
60-80					
Above 80					
Total					

Complex Table (Multi-variate Cross Tabulation)

Details of internet users of different states on the basis of age, gender and literacy

State	Age (In Yrs.)	Male		Female		Total
		Literate	Illiterate	Literate	Illiterate	
Delhi	0-20					
	20-40					
	40-60					
	60-80					
	Above 80					
	Total					
Haryana	0-20					
	20-40					
	40-60					
	60-80					
	Above 80					
	Total					

Punjab	0-20					
	20-40					
	40-60					
	60-80					
	Above 80					
	Total					
Uttar Pradesh	0-20					
	20-40					
	40-60					
	60-80					
	Above 80					
	Total					
Rajasthan	0-20					
	20-40					
	40-60					
	60-80					
	Above 80					

9.3 CHECK YOUR PROGRESS

Note: 1) Use the space below for your answers.

2) Compare your answers with those given at the end of this lesson.

A. CHOOSE THE RIGHT OPTION.

1. Data is described as :
   (e) Codification
   (f) Statistics in raw
   (g) Organised facts
   (h) None of the above

2. Primary Sources are
   (e) original sources
   (f) sub-ordinate sources
   (g) Tertiary sources
   (h) None of the above
3. Data processing includes:
   (a) Editing
   (b) Coding
   (c) Classification and tabulation
   (d) All of them
4. Data is analysed as per the:
   (a) Objectives
   (b) Research questions
   (c) Hypothesis (if any) of the research
   (d) All of them
5. Zero coding refers to:
   (a) No response
   (b) Many responses
   (c) All the responses
   (d) None of them.

B. FILL IN THE BLANKS

1. Primary Sources are the ……sources from where the researcher collects the data directly.
2. …….. is basically respondents' responses, contents, observations, etc. as per the directed research aims and plans.
3. Data presentation relates to editing, coding, classification, …….tabulation and general explanation of the table.
4. …… is the next step in which the proper placement of the unit of analysis into a particular category is required.
5. Transcription of data is described as the stage between data coding and data tabulation.

9.4 SUMMARY

- Data is usually collected from two kinds of sources: (i) Primary sources,(ii) Secondary sources. Primary Sources are the original sources from where the researcher collects the data directly. Primary data are the first hand information gathered through different methods such as observation, interviewing, mailing, etc. Secondary sources are those sources containing data which have been collected and combined earlier or for other purpose. The secondary sources consist of easily and readily available compendia and already compiled statistical statements and reports whose data may be used in the study e.g, census reports, annual reports and financial statements of companies, statistical statements of reports of government departments. Data presentation relates to editing, coding, classification, transcription, tabulation and general explanation of the table.

9.5 KEY WORDS

Data: Statistics or information in raw or unorganised or unstructured form are called data. It is basically respondents' responses, contents, observations, etc. as per the directed research aims and plans.

Sources of Data: Data is usually collected from two kinds of sources: (i) Primary sources, (ii) Secondary sources.

Primary Sources: Primary Sources are the original sources from where the researcher collects the data directly. Primary data are the first hand information gathered through different methods such as observation, interviewing, mailing, etc.

Secondary Sources: Secondary sources are those sources containing data which have been collected and combined earlier or for other purpose. The secondary sources consist of easily and readily available compendia and already compiled statistical statements and reports whose data may be used in the study e.g, census reports, annual reports and financial statements of companies, statistical statements of reports of government departments.

Data Presentation: Data presentation relates to editing, coding, classification, transcription, tabulation and general explanation of the table.

9.6 SELF-ASSESSMENT TEST

1. What is data? Discuss the various sources of data.
2. What is primary source of data? Discuss its importance.
3. What is secondary source of data? Describe its relevance in media research.
4. Throw light on presentation of data.
5. What is editing of data? Explain.
6. Describe tabulation with suitable examples.
7. What is codification? How is it carried out? Explain.
8. Throw light on classifications of data.
9. Explain transcriptions of data.

9.7 ANSWERS TO CHECK YOUR PROGRESS

A. CHOOSE THE RIGHT OPTION.

1. (b) Statistics in raw
2. (a) original sources
3. (d) All of them
4. (d) All of them
5. (a) No response

B. FILL IN THE BLANKS:

1. Original
2. Data
3. Transcription
4. Coding
5. Intermediary

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SUBJECT: COMMUNICATION RESEARCH	
COURSE CODE: MSM-511	**AUTHOR: PROF MANOJ DAYAL**
LESSON NO.: 10	
DATA ANALYSIS TECHNIQUES	

STRUCTURE

10.0 LEARNING OBJECTIVES

The objectives of this lesson are as follows:

- To describe data analysis
- To elaborate graphic representation of data processing and analysis
- To explain the types of data analysis
- To describe data interpretation
- To throw light on popular studies of data analysis in communication and media
- To explain the role of media metrics in scientific data analysis of communication and media

10.1 INTRODUCTION

In this lesson, the students will be acquainted with data analysis, graphic representation of data processing and analysis, types of data analysis, data interpretation, prominent studies of data analysis of communication & media and media metrics in scientific data analysis of communication & media.

10.2 DATA ANALYSIS

It is primarily a procedure of understanding, diagnosing, inquiring, inspecting, investigating, cleaning, transforming, modeling and mining the available data to derive inferences and conclusions. It also aims at discovering useful information, suggesting conclusions and supporting decision making. It is a process of evaluating data using analytical and logical reasoning to test each element of the data to arrive at a conclusion. The term data analysis is synonymously used as data modeling, data visualization, data dissemination, data integration and data mining. But some experts mark a hairline difference between data analysis and data mining. Data mining is basically a specific data analysis tool which focuses on modeling and discovery of knowledge for predictive rather than completely descriptive goals. This data may at some point of time be required to convert into tabular form, or classified form, or row-column form or any other well defined form for further analysis. Ultimately it has to be processed and analysed according to the suitability of outline with a goal to solve research problems as framed in the research design.

10.2.1 GRAPHIC REPRESENTATION OF DATA PROCESSING & ANALYSIS

Any visual display of data like chart, plot, diagram or graph is described as graphic representation of data. In such representation, the data is explained with the help of symbols such as bars in a bar chart, lines in a line chart or slices in a pie chart. A chart, plot, diagram or graph represents quantitative data, functions or some kinds of qualitative structure and present various informations. Used in several academic and professional researches, graphic representation helps in quantifying, sorting, communicating and presenting data in a method that is easily understandable to heterogeneous audiences.

After tabulation, the other simple way to present data for further analysis, is the graphic representation of the summary tables or data. These graphic forms such as graphs, plots, diagrams,

charts, and pictographs reduce large masses of statistical data to a form that can be easily and immediately understood at a glance. Properly constructed graphs, plots, diagrams, pictograms and charts relieve the mind of burdensome details by portraying the facts concisely, logically and simply. The graphic devices of data presentation are useful to depict the data to general public. However, the graphic tools can never be treated as substitute for tables. They are just additional tools for the researcher to emphasize the research findings.

A graph, diagram, plot, pictogram or chart is a diagrammatical representation of a set of data in which the data is represented by symbols. A diagrammatical representation is also called a graphic representation which is also described as geometrical image of a set of data. It is basically a mathematical visualization. It helps us in visual thinking about a statistical problem. Hence, the graphic representation of data is a highly effective and more communicative method of processing, presenting, understanding, analysing and interpreting the collected data.

There are several advantages of graphic representation. In graphic representation, the data is eye-catching and eye-arresting because it is presented in more attractive and crystal clear manner. It becomes easily understandable and makes it possible to have an immediate, instant, pertinent and meaningful grasp of heavy data or even mines of data. Second, it helps a lot in comparative study of facts which becomes the base of further research. Third, measures of central tendencies like mean, median, mode and measures of dispersion like average deviation, standard deviation, quartile deviation etc. may be easily calculated, which further help in deriving correlation and regression between two or more variables. Fourth, the graphical representation helps in proper estimation, evaluation and interpretation of the characteristics of different variables. Fifth, the real value of such representation lies in its economy, effectiveness and communication power. Moreover, it helps a lot in forecasting and prognosticating as it indicates the trends, movements and fluctuations of data in the past.

The other important aspect to discuss in the present context is the graphic representation of the ungrouped data. The data in the form of raw scores is known as ungrouped data. The ungrouped data is not grouped or not classified into a frequency distribution.

In ungrouped data, the following types of graphical representations are discussed:

1. Bar Graph or Bar Chart,
2. Circle Graph or Pie Graph or Pie Chart,

3. Line Graph or Line Chart or Line Diagram
4. Pictogram.

1. **Bar Graph or Bar Chart:** In bar graph or chart, the data is represented by bars. Usually, these charts are drawn on graph paper. Hence, these bar charts are also described as bar graph. The bar graph or chart is of two types: (a) Vertical Bar Graph, (b) Horizontal Bar Graph.

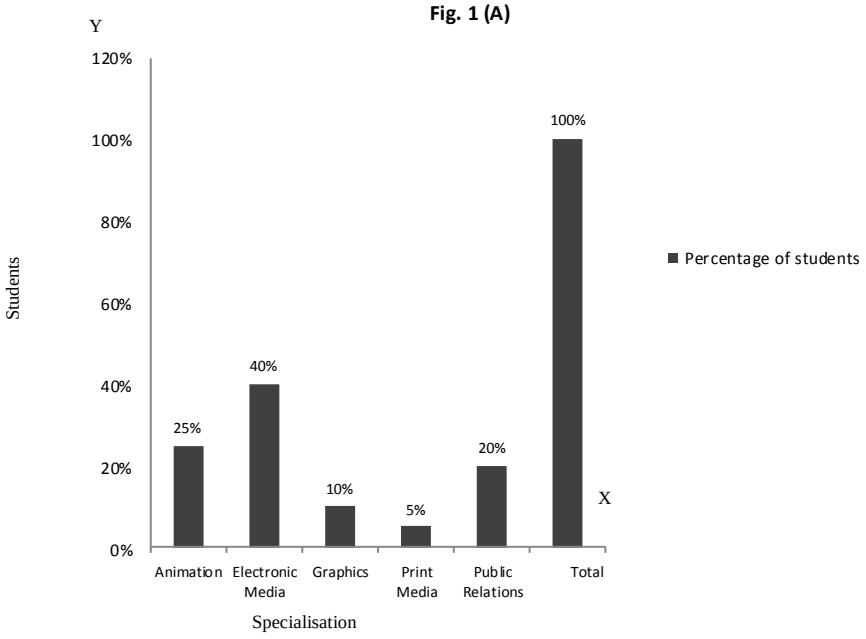
For example, 120 students of journalism and mass communication were asked to opt for different specialisations. The details of these options are followings:

Specialisation	**No. of Students**	**Percentage**
Animation	30	25%
Electronic Media	48	40%
Graphics	12	10%
Print Media	06	5%
Public Relations	24	20%
Total	120	100%

Represent the above data through Vertical Bar Graph and Horizontal Bar Graph.

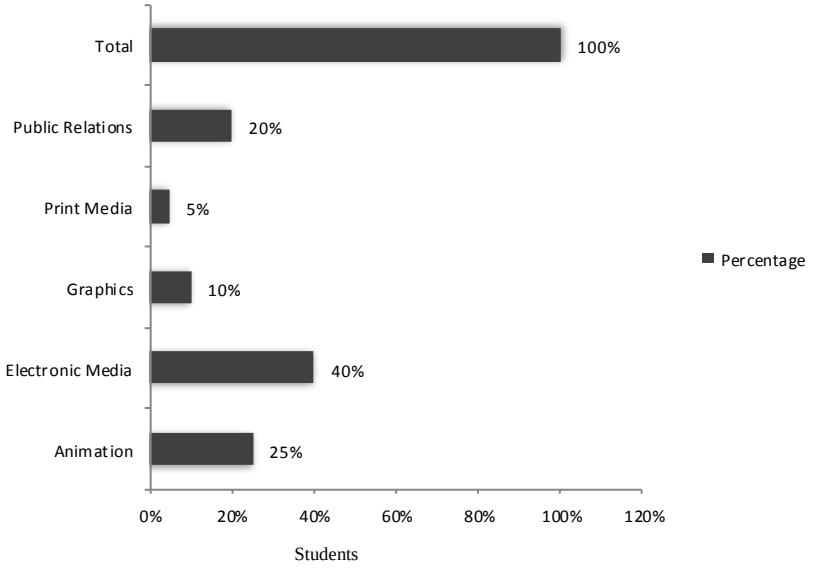
Solution: The above data through vertical bar graph and horizontal bar graph may be represented in the following manner:

Fig. 1 (A)



(Vertical Bar Graph)

Fig. 1 (B)



(Horizontal Bar Graph)

2. **Circle Graph or Pie Graph or Pie Chart:** In such a situation, the data is represented through the sections or the portions of a circle. This graph is most popularly known as pie-chart.

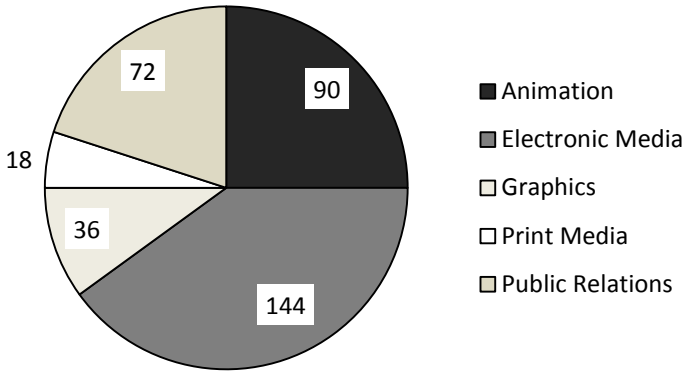
This can be very well understood by the following diagram with the help of the previous example.

The given numerical data can easily be converted into the angles of a circle as given below:

Specialisation	**No. of Students**	**Area of Circle**
Animation	30	$\frac{30}{120} \times 360 = 90°$
Electronic Media	48	$\frac{48}{120} \times 360 = 144°$
Graphics	12	$\frac{12}{120} \times 360 = 36°$
Print Media	06	$\frac{6}{120} \times 360 = 18°$
Public Relations	24	$\frac{24}{120} \times 360 = 72°$

Representation of data through pie-chart:

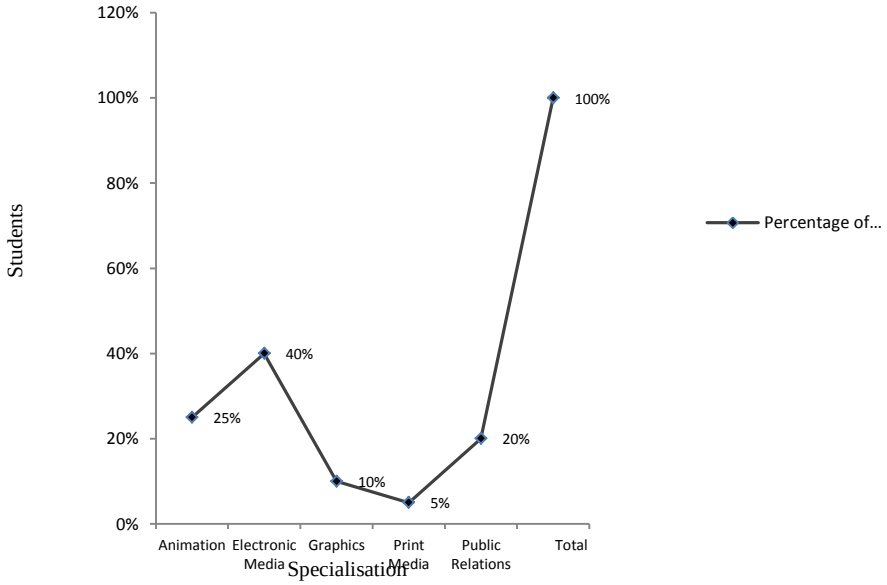
Fig.. 2



Pie-chart

3. **Line Graph or Line Chart:** This is a very common and simple quantitative line which is drawn on the graph paper by plotting the data taking one variable on the horizontal X-asix and other variable on the vertical Y-axis. This can be very well understood by the following diagram with the help of the previous example:

Fig 3



(Line Graph)

4. **Pictogram:** When the quantitative data are represented by pictures, these are described as pictogram. This can be easily understood by the following diagram:

Fig. 4

Strength of Investigative reporters in Mumbai in different Years

Year 2013/14	 350 Investigative reporters
2014/15	 400 Investigative reporters
2015/16	 450 Investigative reporters

Each picture represents the strength of 50 Investigative reporters

(Pictogram)

Yet another important aspect to discuss in the present context is the graphic representation of the grouped data. The data in the form of frequency distribution with class interval is described as grouped data. In group data, the following graphical representation is made:

1. Histogram
2. Frequency Polygon
3. Cumulative Frequency Graph
4. Ogive (Cumulative Frequency Percentage Graph)

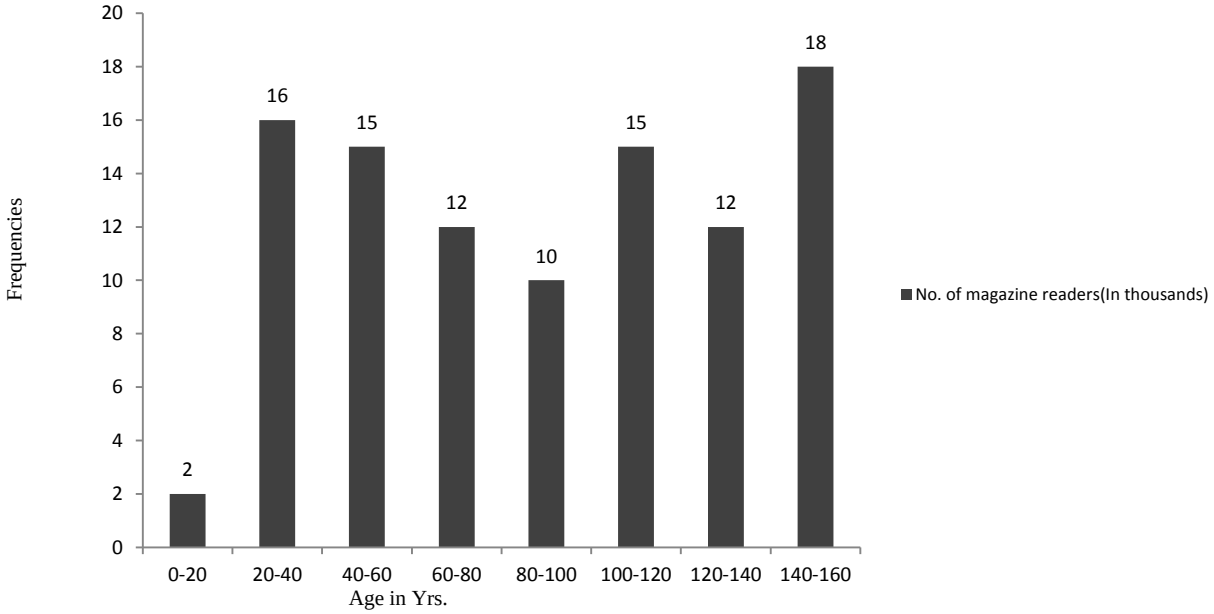
1. Histogram: Also called a column chart or a column diagram, is essentially a bar graph of classified or group frequency distribution. This can be easily understood by observing the following table of grouped frequency distribution (of age and number of newspaper readers) followed by bar graph.

Table 1

Grouped frequency distribution between age and no. of magazine readers

Age (In Yrs.) Class	Mid point	No. of magazine readers(In thousands) Frequency	Cumulative frequency	Cumulative percentage frequency
0-20	10	2	2	2%
20-40	30	16	18	18
40-60	50	15	33	33%
60-80	70	12	45	45%
80-100	90	10	55	55%
100-120	110	15	70	70%
120-140	130	12	82	82%
70-80	150	18	100	100
Total		100		

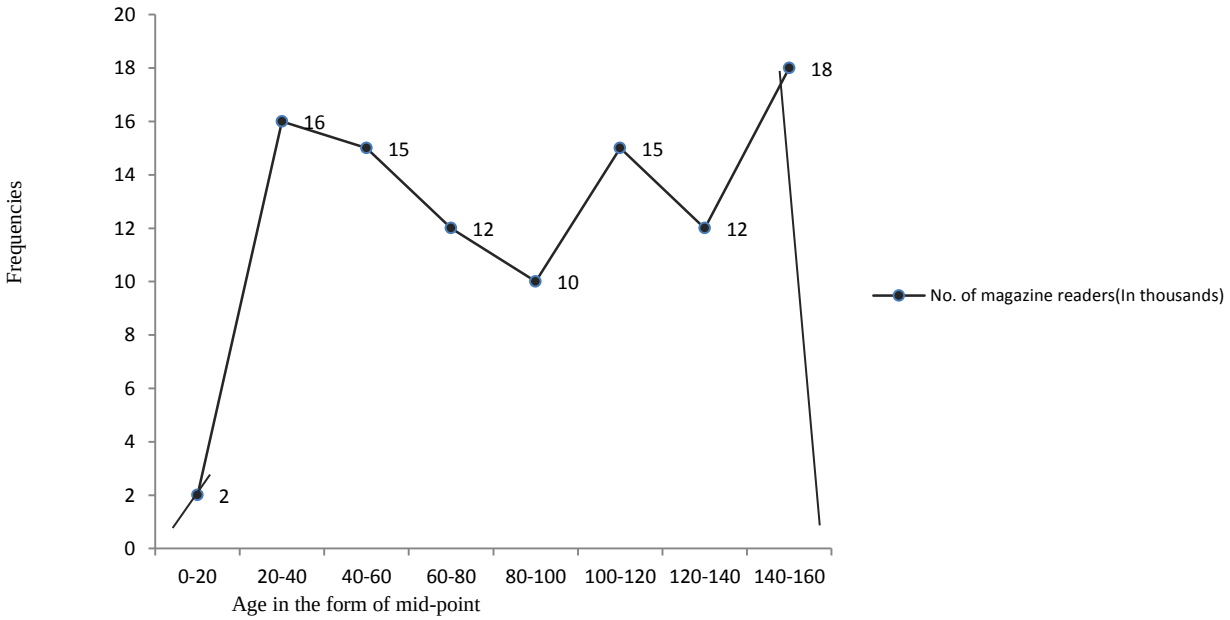
Fig. 5



(Histogram of grouped frequency distribution as given in Table 1)

2. Frequency Polygon: It is basically a graphical tool for comprehending the form and shape of the data. It is highly instrumental and useful in comparing the sets of the data and serves the same purpose as histogram. It is often used for showing cumulative frequency distribution. It is a line graph for the diagrammatical representation of a grouped or classified frequency distribution. We can easily get a frequency polygon from a histogram if the mid-points of the upper bases of the rectangles are connected by straight lines. But it is not mandatory to plot a histogram first to draw a frequency polygon. We may draw it directly from a given classified frequency distribution. It can be very well understood by the following diagram drawn with the help of statistical data in Table 1

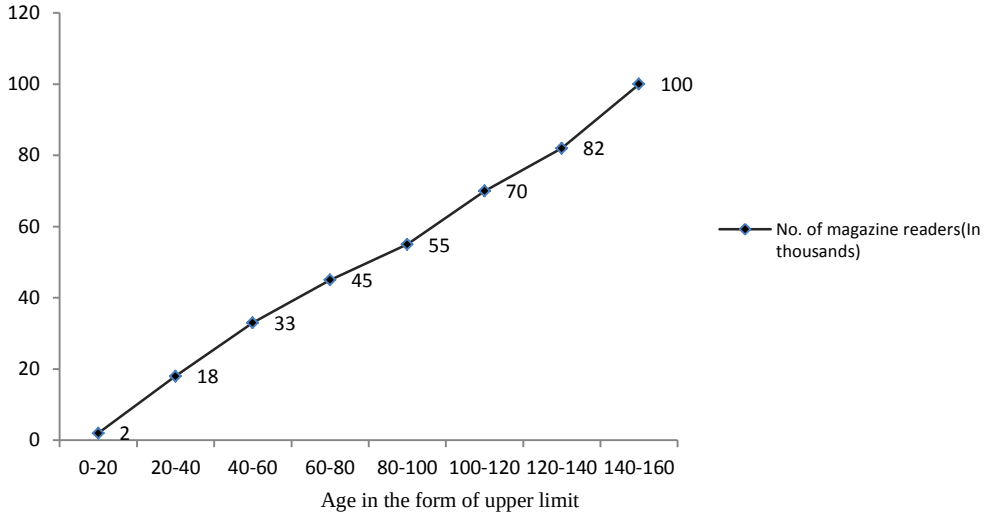
Fig. 3.6



(Frequency polygon of the grouped frequency distribution as given in Table 1)

3. Cumulative Frequency Graph: It is statistical curve displaying the cumulative frequency for a given set of data. The numerical data arranged in the form of a cumulative frequency distribution can be graphically represented through the cumulative frequency graph. it is basically a line diagram for the graphical representation by plotting actual upper limits of the class intervals on the X-asix and the respective cumulative frequencies of these class intervals on the Y-asix. This can be easily understood by the following diagram with the help of statistical data in Table 1

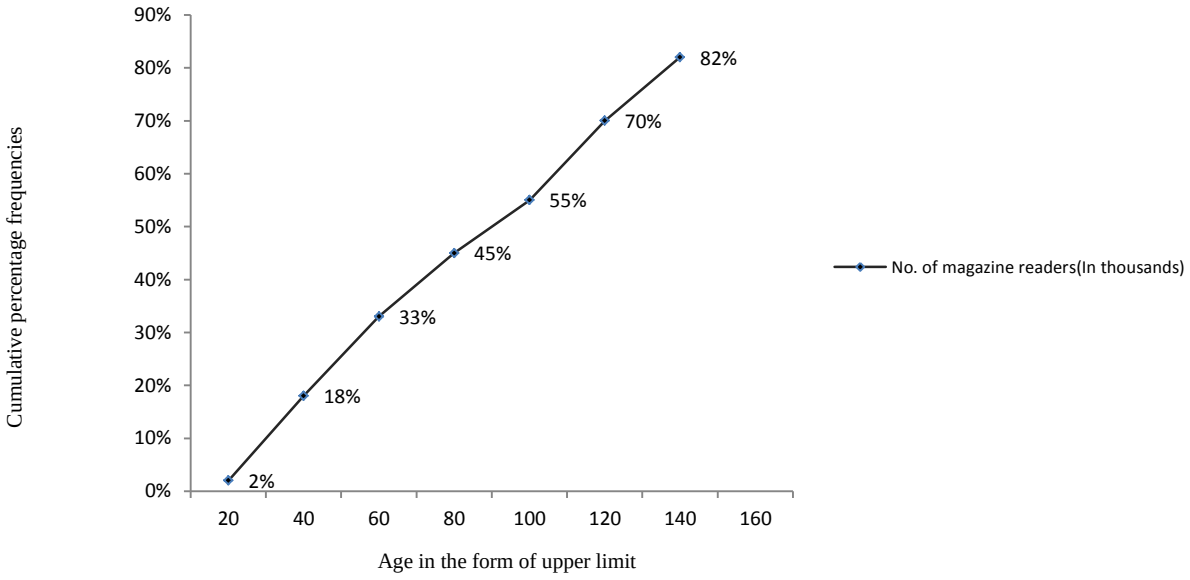
Fig. 7



(Cumulative frequency graph of the grouped frequency distribution as given in Table 1)

4. Ogive (Cumulative Frequency Percentage Graph): It is a pointed arch and a free-hand graph displaying the curve of a cumulative frequency distribution function. It can be used to determine how many data values lie above or below a particular value in a data set. It is the diagrammatical representation of a cumulative percentage frequency distribution as per the statistical data given in Table 1.It is thus a line graph drawn by plotting actual upper limit of the class on the x-axis and their respective cumulative percentage frequencies on the Y-axis. This can be easily understood by the following diagram with the help of the numerical data in Table 1

Fig. 8



(Ogive or Cumulative frequency percentage graph of the grouped frequency distribution as given in Table 1)

10.2.2 TYPES OF DATA ANALYSIS

Before we discuss the types of data analysis, it will be desirable to discuss the difference between data presentation and data analysis. There is a hairline difference between data presentation (or data processing) and data analysis.

A few researchers like Johan Galtung differentiates between data presentation or data processing and data analysis while some other like Seltiz, Jahoda et al, do not affect such a precise difference. According to them, analysis of data seemingly involves processing, i.e., operations designed to facilitate and increase amenability of data for analysis as also the operations designed to draw generalizations or to test hypothesis. They are of the opinion that analysis of data involves closely related operations which are performed with the purpose of summarizing the collected data and organizing them in such a systematic and scientific manner that they answer the research questions and hypothesis. To be more accurate and precise, it is desirable to observe the hairline difference between data presentation and data analysis so that their implications become crystal clear.

Data analysis is the process of applying statistical measures on the data retrieved after the processing of data to know the relationship pattern among different data group. As data analysis means computation of certain statistical measures to draw inferences and finding the relationship pattern between different data groups. Particularly it involves drawing parameters and testing hypotheses. In research, this analysis is of two types:

(i) Descriptive analysis

(ii) Inferential analysis

(i) Descriptive analysis: The word descriptive is synonymously used as depictive or illustrative also and hence descriptive analysis is simply a way of illustrating or depicting a data. It quantitatively and statistically summarises and displays the characteristics of a data in a meaningful way. But it does not allow us to make conclusions beyond the data we have analysed or arrive at a conclusion on the basis of any hypothesis.

That is why it is also called summary data analysis or deductive data analysis which includes the following statistical techniques:

(i) Data Processing and Analysis

(ii) Measures of central tendency

(iii) Measures of dispersion

(iv) Measures of asymmetry

(v) Measures of relationship and other measures

(vi) Multivariate analysis

(ii) Inferential data analysis: It makes inferences about populations with the help of sample of data drawn from the population. It is also called inductive data analysis or sampling data analysis and under this category the facts derived from descriptive data analysis are generalized. The inferential data analysis may be further divided into two categories.

(i) Parametric inferential data analysis

(ii) Non- parametric inferential data analysis

Parametric inferential data analysis is that which has some parameters. That is to say which has certain assumptions whereas non-parametric inferential data analysis is that which does not have any parameters meaning that non parametric inferential data analysis is assumption –free?

Followings are some of the prominent parametric data analysis:

(a) F-test,

(b) t-test,

(c) Z- test,

(d) ANOVA.

Followings are some of the prominent non-parametric inferential data analysis:

(a) Chi- Square test,

(b) Sign- test

(c) Signed test for Paired Observation

(d) Mann- Whitney U-Test

(e) Kruskal- Wallis H Test

(f) Alexander Mood's median test,

(g) Wilcoxon signed- rank test

(h) McNemar test

(i) Fisher's exact probability test,

(j) Wald- Wolfwitz run test

(Note: It is important to mention here that McNemar test, Fisher's probability test and Wald-Wifwitz test are generally not used in media and communication research).

DATA INTERPRETATION

It usually means drawing inference as per the nature, behavior, trend and characteristics of the data. This is a very useful, important and ending step in the process of research as it is the phase where the findings as per objectives and set hypotheses are highlighted. Through processing the informations gathered are given a valid form to be analysed. Through applying statistical techniques, certain measures are computed which are selected as per data's nature and measures' applicability. After this, the outputs are interpreted and inferences are drawn. The relationship patterns of different data groups are explained. This is the most important step in any research. So care should be taken. Even language error may change the actual expression of data. A few relevant and important precautions to be kept in mind are:

1. The study should state what the data says.
2. The relationship patterns and inferences must be drawn as per data behavior.
3. The researcher should be very careful about the digits and percentage.
4. The researcher should never try to exaggerate the facts.
5. Biases should be carefully avoided and the researcher should just go with the data.
6. The researcher should always avoid his/her own personal opinion.

10.2.3 PROMINENT STUDIES OF DATA ANALYSIS IN COMMUNICATION & MEDIA

As the data processing and analysis is the most important part of any social science research including mass communication, so the discussion of some popular studies of data processing and analysis becomes relevant to highlight here. According to a study by Riff et al. (2014), during a 15-year period, one fourth of the articles of mass communication published in Journalism & Mass Communication Quarterly analysed the content. Riff & Freitag (1997) points out that more than 90 % of PG dissertations of mass communication in US were focused on the content analysis. The data analysis techniques we discuss in the following sections are those used most often in the articles. Unpublished examples of the data tables and analysis sections of 239 studies in Journalism & Mass Communication Quarterly from 1986 to 1995 indicates that content analysis relies on several basic techniques and a few more advanced ones. That is a limited number of statistical tools turn out to be useful for a variety of

tasks. As in many kinds of work, knowing what tool will serve adequately for what job is essential knowledge.

Some of these analysis techniques are very simple indeed. Researchers who produced 28% of 239 content analysis studies have been able to achieve their objectives using only means, proportions or simple frequency counts. When other techniques were used, they were often in combination with means and proportions. Techniques for analysing the content data included chi-square and Cramer's V (used in 37% of studies) and Pearson's product moment correlation (used in 15%) techniques to assess differences between means or proportions of two samples were used in 17% of studies. More advanced techniques included ANOVA (8% of studies).Only 7% of the studies employed statistical techniques more sophisticated than these.

10.2.4 MEDIA METRICS IN SCIENTIFIC DATA ANALYSIS OF COMMUNICATION & MEDIA

Communication and media research is basically a scientific study of communication and media variables and sub variables. Media metrics plays a vital role in scientific data collection, scientific data processing, scientific data presentation, scientific data interpretation and scientific data analysis. It is the relevant application of statistics and mathematics in media research. It is the measurement of key media variables and sub variables. The role of statistics and mathematics in media research is to function as a foundational and basic tool in designing research, analyzing the collected data and drawing inferences and conclusions there from. Hence, media metrics is considered to be a technical device for scientific data processing and analysis. Media and communication research mostly studies the results in a large volume of raw data which must be suitably or logically reduced so that it can be easily understandable and can be used for further analysis. In this process, statistics and mathematics cannot be ignored by any researcher in case it is a scientific and systematic quantitative analysis. Then only we can adopt the process of generalization from all small groups (i.e., samples) to population. As a matter of fact, there are two useful areas of statistics- (i) Descriptive Statistics, (ii) Inferential Statistics.

Just like descriptive data analysis as already discussed, descriptive statistics relates to the development and depiction of certain indices from the raw data, while inferential statistics relates to the process of generalization and conclusion. And inferential statistics is primarily related to two types of problems:

1. Estimation of population parameters
2. Testing of statistical hypotheses

In the present context of communication and media research, descriptive statistics may be depicted as descriptive media metrics and inferential statistics may be illustrated as inferential media metrics. Hence, the most striking such statistical measures in this context are:

(i)Data Processing & Analysis(Already discussed),(ii)Measures of central tendency, (iii) Measures of dispersion, (iv) Measures of asymmetry, (v) Measures of relationship and other measures, (vi) Parametric testing of hypotheses, (vii) Non- parametric testing of hypotheses, (viii) Chi- square test, (ix) Analysis of variance, (x) Multivariate analysis techniques

Further, the most important such mathematical measures in this context are: (i) Number system,(i) Set theory, (ii) First principle of differentiation, (iii) Basics of integration,(iv)Matrix.

10.3 CHECK YOUR PROGRESS

Note: 1) Use the space below for your answers.

2) Compare your answers with those given at the end of this lesson.

A. CHOOSE THE RIGHT OPTION.

1. Statistics in raw form is called **:**
   (a) Information
   (b) Fact
   (c) Data
   (d) None of Them
2. Graphic representation of data is any visual display having :
   (a) Chart
   (b) Plot
   (c) Diagram or Graph
   (d) All of Them
3. Histogram, frequency polygon, cumulative frequency graph, ogive (cumulative frequency percentage graph) is discussed:
   (a) Group Data
   (b) Data

(c) Raw Information

(d) News

4. When the data is represented through the sections or the portions of a circle. This graph is most popularly known as……...

(a) Pie Chart

(b) Bar Chart

(c) Line Chart

(d) None Of The Above

5. When the quantitative data are represented by pictures, these are described as ……

(a) Pictogram

(b) Histogram

(c) Hexagram

(d) None Of The Above

6. Descriptive analysis of data…… summarises and displays the characteristics of a data in a meaningful way.

(a) Qualitatively

(b) Quantitatively

(c) Naturally

(d) Formally

7. Inferential analysis of data makes ……about populations with the help of sample of data drawn from the population.

(a) Inferences

(b) Conclusions

(c) Results

(d) None Of Them

8. ……..is basically a specific data analysis tool which focuses on modeling and discovery of knowledge for predictive rather than completely descriptive goals.

(a) Data Processing

(b) Data Analysis

(c) Data Interpretation

(d) Data Mining

9. Histogram is also called a ……

(a) Column Chart

(b) Line Chart

(c) Manual Chart

(d) Rectangular Chart

10.4 SUMMARY

- Data analysis is a way of understanding, diagnosing, inquiring, inspecting, investigating, cleaning, transforming, modeling and mining the available data to derive inferences and conclusions. Any visual display of data like chart, plot, diagram or graph is described as graphic representation of data. In ungrouped data, bar graph or bar chart, circle graph or pie graph or pie chart, line graph or line chart or line diagram, pictogram, etc. are discussed. In group data, histogram, frequency polygon, cumulative frequency graph, ogive (cumulative frequency percentage graph) is discussed. Data analysis is of two types: descriptive analysis and inferential analysis. Descriptive analysis is simply a way of depicting or illustrating a data. It quantitatively and statistically summarises and displays the characteristics of a data in a meaningful way. But it does not allow us to make conclusions beyond the data we have analysed or arrive at a conclusion on the basis of any hypothesis. That is why descriptive analysis is also called summary data analysis or deductive data analysis which includes the statistical techniques like data processing and analysis, measures of central tendency, measures of dispersion, measures of asymmetry, measures of relationship and other measures, multivariate analysis, etc. On the other hand, inferential data analysis makes inferences about populations with the help of sample of data drawn from the population. It is also called inductive data analysis or sampling data analysis and under this category the facts derived from descriptive data analysis are generalized. The inferential data analysis may be further divided into parametric inferential data analysis and non- parametric inferential data analysis .Parametric inferential data analysis is that which has some parameters. That is to say which has certain assumptions, whereas non-parametric inferential data analysis is that which does not have any parameters meaning that non

parametric inferential data analysis is assumption –free. . Some of the prominent parametric data analysis are F-test, t-test, Z- test, ANOVA, etc. And non –parametric inferential data analysis are chi- square test, sign- test ,signed test for paired observation Mann- Whitney U-Test, Kruskal- Wallis H Test , Alexander Mood's median test, Wilcoxon signed- rank test, McNemar test, Fisher's exact probability test, Wald- Wolfwitz run test, etc. Just like descriptive data analysis, descriptive statistics relates to the development and depiction of certain indices from the raw data, while Inferential statistics relates to the process of generalization and conclusion. In the present context of communication and media research, descriptive statistics may be illustrated as descriptive media metrics and inferential statistics may be depicted as inferential media metrics. Hence, the most striking such statistical measures in this context are all descriptive and inferential statistics and the most important such mathematical measures are number system, set theory, first principle of differentiation, basics of integration, matrix algebra, etc.

10.5 KEY WORDS

Data: Statistics or information in raw form is called data.

Data Analysis: Data analysis is a way of understanding, diagnosing, inquiring, inspecting, investigating, cleaning, transforming, modeling and mining the available data to derive inferences and conclusions.

Graphic Representation of Data: Any visual display of data like chart, plot, diagram or graph is described as graphic representation of data.

Group Data: In group data, histogram, frequency polygon, cumulative frequency graph, ogive (cumulative frequency percentage graph) is discussed.

Descriptive Analysis of Data: It is simply a way of depicting or illustrating a data. It quantitatively and statistically summarises and displays the characteristics of a data in a meaningful way.

Inferential Analysis of Data: It makes inferences about populations with the help of sample of data drawn from the population. It is also called inductive data analysis or sampling data analysis and under this category the facts derived from descriptive data analysis are generalized.

Data Mining: It is basically a specific data analysis tool which focuses on modeling and discovery of knowledge for predictive rather than completely descriptive goals.

Bar Graph or Bar Chart: In this, the data is represented by bars. Usually, these charts are drawn on graph paper. Hence, these bar charts are also described as bar graph. The bar graph or chart is of two types: (a) Vertical Bar Graph, (b) Horizontal Bar Graph.

Circle Graph or Pie Graph or Pie Chart: In such a situation, the data is represented through the sections or the portions of a circle. This graph is most popularly known as pie-chart.

Line Graph Or Line Chart: This is a very common and simple quantitative line which is drawn on the graph paper by plotting the data taking one variable on the horizontal X-asix and other variable on the vertical Y-axis.

Pictogram: When the quantitative data are represented by pictures, these are described as pictogram.

10.6 SELF-ASSESSMENT TEST

1. Distinguish between data processing and data analysis.
2. Differentiate between data presentation, data analysis and data interpretation.
3. What is data analysis? Describe the graphic representation of data processing and data analysis.
4. Describe the various types of data analysis.
5. Throw light on various types of data interpretation.
6. Explain descriptive data analysis.
7. Discuss inferential data analysis.
8. Describe prominent studies of data analysis of communication and media.
9. Explain the role of media metrics in scientific data analysis of communication and media.
10. What is media metrics? Discuss the role of descriptive media metrics in scientific data analysis of mass communication.
11. Describe the function of inferential media metrics in communication and media research.

10.7 ANSWERS TO CHECK YOUR PROGRESS

A. CHOOSE THE RIGHT OPTION.

1. (c) Data
2. (d) All of Them
3. (a) Group Data
4. (a) Pie Chart

5. (a) Pictogram
6. (b) Quantitatively
7. (a) Inferences
8. (d) Data Mining
9. (a) Column Chart

10.8 REFERENCES/SUGGESTED READINGS

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2. http://www.cdc.gov/metrics/
3. http://www.jstor.org/stable/3035554

SUBJECT: COMMUNICATION RESEARCH	
COURSE CODE: MSM-511	**AUTHOR: PROF MANOJ DAYAL**
LESSON NO.: 11	
RESEARCH REPORT WRITING	

STRUCTURE

11.0 LEARNING OBJECTIVES

The objectives of this lesson are as follows:

- To describe the concept of Research Report Writing
- To elaborate Structure & Outline of Research Report Writing
- To explain Structure & Outline of Research Report
- To describe Precautions for Research Report Writing
- To throw light on Qualities of a Good Research Report Writing

11.1 INTRODUCTION

A research report is a well-organised, analysed, systematised, articulate and orderly presentation of the research project .It is a document prepared by the researcher that contains the basic aspects of the thesis or dissertation or project. It is presented in a written form with containing the key and core aspects of the research project. It contains the relevant information of the research work carried out. It may be hand-written or typed or computerised. Hence, it is a complete written depiction of the research design whereas a research design is a complete plan and its profile. Research design is structure, outline, lay-out, blue print, framework, scheme, paradigm of operation, essential for effective, efficient, systematic and scientific research with minimum time, cost ,money, energy and resources. On the other hand, report writing is an integral part and one of the most important components of any research. Without report writing, a research is considered to be an incomplete imagination like showing the moon shining but not finding the glint of light on broken glass. In quantitative media research, an appropriate hypothesis formulation, research design, research methodology, research techniques and findings are of no use unless it is converted into an effective report, communicative to others. Thus, preparation and designing of a research report is not a child's play. It is a herculean task. It requires a great deal of knowledge, depth, experience, expertise, skill, innovation, imagination, creation and perseverance.

In this lesson, the students will be acquainted with the concept, structure & outline, importance, precautions and qualities of good report writing.

11.2 RESEARCH REPORT WRITING

A research report is the creation, documentation and elaboration of an account or statement that simply describes and narrates in detail an incident, event, situation or occurrence, generally as the result of some observation or investigation or inquiry. It is the full and final part of a research work. It is a description of the research work carried out by the researcher. It requires various steps to present a report in the form of a project or thesis or dissertation. The purpose of a research cannot be properly served unless the findings are made known to others including general audience and subject experts. Hence report writing is a part and parcel of the entire research project. Report writing in quantitative media research as a whole requires a set of skills which are much different from those called for in respect of earlier stages of research activities. Thus, this final assignment should be carried out by the

researcher with rapt attention and utmost care. The media researcher should not hesitate in seeking assistance and guidance of the experts, especially in quantitative media research. Report is therefore described as written details of the entire research. In case of media research report writing of quantitative analysis, the researcher must be very clear about the persons, the target audience for which the given report is focused. Whatever may be the target audience of research, two important points must be kept in minds of researchers:

(i) What are the general desires and expectations of its audience from the said study?

(ii) How can this research work be best presented at its optimum level?

11.2.1 STRUCTURE & OUTLINE OF RESEARCH REPORT WRITING

The structure and outline of any social science report writing should be simple, crystal clear and easily understandable. Its general structure and outline may be as follows:

(i) Research topic
(ii) Introduction
(iii) Research Problem
(iv) Significance of the study
(v) literature review
(vi) Objectives
(vii) Hypothesis
(viii) Methodology
(ix) Data collections and analysis
(x) Results/findings
(xi) Conclusions and suggestions
(xii) Limitations
(xiii) Bibliographical references
(xiv) Appendices

(i) Research topic: It is the title of the research which should be as short as possible. It should be simple, catchy, innovative, and suitable to the interest of the researcher, socially relevant, unbiased, analysable, measurable, communicative and manageable as well as researchable within time, money, energy and resources. In the light of the above, the researcher should get his topic approved. And if

at all, any of these characteristics are missing, then he should get it reapproved. Hence, the research topic must be carefully, minutely and meticulously selected at entry point or else it should be modified at submission level.

(ii) Introduction: This chapter should contain the historical background, nature, advantages, disadvantages, characteristics, qualities, relevance and importance of the topic very briefly of the topic. Though it is an essay type of writing, yet there should be no editorialisation of the facts. Further, if some others are quoted, then it should be suitably quoted and referred. Moreover, all the terms used in the topic must be defined properly and systematically. Thus, it is a highly skilful task which requires expertise, experience, skill, etc.

(iii) Research Problem: It comes, strikes, haunts and occurs in the mind of the researcher even before finalizing the topic. But, theoretically the topic is drafted and written first whether it is the cover page or inside page, despite the fact that the topic comes from the problem. Research problems are generally research questions, which gradually become the foundation of the research objectives and the research hypothesis. Research problem is presented in its detailed form in major project or thesis. Thus, the research problem writing is the second stage or step of the structure and outline of any social science research.

(iv) Significance of the study: Any topic is usually chosen when the researcher finds some social significance in it and the researcher is seriously interested in the topic by heart and soul. The researcher himself is the first unit of the society. Hence his keen interest or background or future prospect of the topic cannot be avoided. That is why "Social Significance of the Topic" is also sometimes replaced by another chapter called "Rationale of the Topic". Hence, it is important in this chapter as to why the researcher thinks that a particular topic has social significance. And he starts with his personal significance and then relates it to the social significance.

(v) Literature review: It gives solid base and strong foundation to the research despite the fact that it collects data and facts from secondary and tertiary sources and does not highlight new or original work. It is the latest and current knowledge including the substantive findings and results as well as theoretical and methodological contributions to a particular topic. When the literature is reviewed from the previous research work in the concerned area or field or topic or problem, then it should be preferably written chronologically either in ascending order or in descending order while editing and

writing the report. Sometimes, it is written alphabetically (Author's name) in report writing depending upon the significance, relevance and usefulness. In literature review, it can be the previous related work of international referred research journal of high impact factor, national refereed research journal of high impact factor, websites, books, periodicals, journals, websites, CDs of audio as well as audiovisual, article in standard magazines and standard newspapers including editorials and features. But the preference and chronology should start from international refereed research journal of high repute and high impact factor.

Literature review is started immediately after the research problem which occurs to the researcher's mind. The problem decides the research area and the literature review are initiated accordingly. It helps at different stages and from topic modification to objective framing. It helps in deleting a few already developed objectives and also helps in adding a few more important objectives. It is executed before and after objective framing sometimes leading to reframing of the objectives. It is thoroughly searched on research area, research topic and also objective-wise. Hence, it is like chicken egg situation executed at different points and often described as pre-topic and post-topic phenomena, pre- problem and post-problem phenomena, pre-objective and post-objective phenomena and also pre-hypothesis and post-hypothesis phenomena. In fact, all these areas, title, problems, review literature, objectives and hypothesis are so interlinked and interwoven that each one is pre and post operations of one another.

Thus, writing literature review is an extremely skilled art and craft depending on the researcher's expertise, maturity, experience and knowledge.

(vi) Objective: It describes as to what we expect to achieve by a research. It is the result sought by the researcher at the end of the project. It is basically the core and needle of the research. Finally,the results and conclusions it is tested whether all the objectives have been achieved or not. Objectives also give birth to a few general hypotheses and if it is a quantitative research, then the general hypotheses are gradually converted into statistical hypotheses. It is important to mention here that qualitative research is objective driven whereas quantitative research is hypothesis driven.

Objectives are usually of two types: a) Broad objectives b) Specific objectives. In broad objectives, topic or its key words are written. As far as specific objectives are concerned, these are the further break-up of the broad objectives.

(vii) Hypothesis: It is a proposed explanation for a phenomenon, a pre-statement of any thought or any theory. It is a prior assumption of the expected results. It is also the general statement about the population. It is of general nature as well as of statistical nature. When we convert the general hypothesis into statistical hypothesis, the latter is further broken into two types, i.e., null hypothesis and alternative hypothesis. When the null hypothesis, also called no relation hypothesis, is proved, the alternative hypothesis is disproved. Thus, null hypothesis and alternative hypotheses are described as mathematical opposites. Formulating an appropriate hypothesis means completing half of our research work. Not only that, hypothesis automatically deletes and minimizes the unwanted data and like a supervisor directs us towards the specific data. Thus hypothesis not only gives us direction, but also reduces our research work to a great extent. Hence, formulation of a hypothesis and then writing it in a report requires a specific research experience and expertise. It is an art and craft of skills and must be properly placed and suitably written in a research report.

(viii) Research Methodology: It is a science of methods and an integral part of research design which includes research methods, research techniques/tools/apparatus and statistical testing. Thus, the methods, tools and statistical testing are all scientifically approved devices. There are so many types of qualitative research methods, quantitative research methods and a triangulation (combination of both with research problem as a third point). Therefore, a researcher must be aware of merits and demerits of all the research methods. Then only, he can decide which method/methods is/are most suitable for his research problem. Similarly, the researcher should also be fully aware of all the research tools and statistical testing. Then only he can best judge which one/ones are most appropriate for his particular research problem.

Hence the primary job of the methodology of a research report is to inform the intended general public/audience and the experts what was done to solve the problem. Thus, research methodology should not only be selected scientifically, systematically and properly, but it should also be written effectively in a research report.

(ix) Data collections and analysis: The data are collected as per the research methods with the help of research tools. Then the data are analyzed in view of research problems, objectives and hypothesis to get results/findings.

The first part of the data collection should tell what sample or samples were used, how they were selected, and then the reason for selecting them including the sample size and sample design, should be stated. If the samples were stratified random sampling, then it should also be stated in the follow up action of the methodology. The sample size and the whole sample design be justified and should be scientifically logical. In data collection process and analysis, the details of graphs, tables, charts, diagrams, etc. are used and that must be properly stated in the research report. Hence, writing data collection and analysis in the research report is a highly artistic job and skilled task. It must give an eye to all the proper arrangements and sequences of graphs, tables, charts, diagrams, etc. with suitable and symbolic headlines.

(x) Results/findings: These are very carefully written in the research report in terms of data. These are objective-oriented results or findings in the form of available data. In quantitative research, these are hypothesis driven. Hence these are data within data. That is to say that these are the most important and useful data according to the requirements of the research problems, objectives and hypothesis. Hence, writing results or findings with the help of available data, charts, tables, diagrams, etc. is a job of experience and expertise as far as research report is concerned. More so, as the results or findings are very useful, relevant and important in the process of formation of conclusions and finally providing practical and effective suggestions or recommendations.

(xi) Conclusions and Suggestions: This is another significant, useful and challenging part of writing a research report. More so in case of quantitative research. Conclusion is a generalization of results or findings. It further edits and modifies the irrelevant and unwanted data to its minimum level. Though in a research journal, results and conclusions are clubbed together, yet in thesis or major project, these are preferably separated. The results or findings are written for both general readers and specific readers like subject experts. But the conclusions are written for general readers. So it should be written in readers' friendly manner. The language should be very simple, comprehensible and easily understandable. Hence, the actual art and craft of a research report lies in simplifying the results or findings in its simplest form to make them significant, useful and socially relevant conclusions. After that there is a role of suggestions. It is primarily dependent on the existing and emerging problems relating to the topic and then giving suggestions by the researcher on the basis of his own skill as and experiences that he has gained before, during and after the research.

Hence, stating conclusions and suggestions in a research report is a matter of extreme maturity and ability of the researcher. The researcher must be minute and meticulous while executing this art and craft in the report.

(xii) Limitations: Every research project has some limitations. A few researchers usually get confused with the research problems and limitations. Limitations are primarily related to the problems and crisis of time, money, energy resources and man-power. In every research there is generally either lack of time or lack of money or lack of energy or lack of resources or lack of man-power. The researcher in the report must highlight this to defend his research work's deficiencies and shortcomings. If he has studied only a small village and it should have been compared with outer small village, then the researcher highlights his limitations indicating that it may be executed by some other researchers in the next study. Since research is a continuous ongoing process and one researcher directly or indirectly hands over his remaining tasks to the next, next to next and so on. Hence, the limitations must be stated in the research report so that in a series, another unit and then yet another unit may be covered by the new and prosperous researchers. In a way, it gives a way to new researcher to study the topic from yet another point of view. Therefore, writing limitations in research report is yet another skilful challenge and requires experience, expertise and maturity to point out the most important shortcomings and limitations, opening vistas and scope for the remaining researchers to carry forward.

(xiii) Bibliographical references: There is no denying the fact that it is another very important part of research report writing. It gives the holistic picture and complete details of the sources of information and papers cited in standardized format. It reflects that the researcher is well-read and vastly –studied. This not only helps the readers about the various other sources, but it is also a legal requirement to cite author, the publisher, the title, etc. If the researcher has directly or indirectly taken some reference material from anywhere or somewhere and if he does not give proper biographical reference, then it is also a violation of the Copyright Act which is an offence.

Largely and broadly speaking, there are various kinds of referencing styles which are followings:

(i) Harvard style

(ii) Vancouver style

(iii) American Psychological Association(APA) style

(iv) Modern Language Association (MLA) style

(v) OSCOLA style

(vi) Chicago style

(vii) Turabian style

(xiv) Appendices: This is a type of miscellaneous forum. In appendices usually the different questionnaires, schedules, related pictures, maps, interviews, etc. are provided. When any charts or diagrams or tables which are indirectly related to the research work, may also be presented under this chapter. It is important to mention here that all the filled questionnaires/schedules should never be attached to this chapter. Only one copy of the related questionnaires/schedules should be provided in this chapter so that the general public or the experts may be able to assess the research work from inside.

Hence, even appendices writing as a part of research report is not a child's play. It requires a lot of care and attention to properly place each and everything in this chapter. Anything that could not be projected earlier due to one reason or the other may also be projected in this chapter. Thus, writing appendices in research report is really a skilful art and innovative craft with minute and meticulous observation.

11.2.3 IMPORTANCE OF RESEARCH REPORT WRITING

First of all report writing can be instrumental in acquiring a vast amount of varied knowledge in the concerned field. Hence it contributes to the knowledge of this section, branch, area and finally subject. With the help of such knowledge, so many theories, models, paradigms of communication and media can be developed.

Second, this tremendously contributes to the expansion and development of branch and subject.

Third, the findings, results, conclusions, suggestions and recommendations of the properly written research report can be published in newspapers, magazines and broadcast in radio, television and also upload on the internet due to its social significance. Hence the research which remains confined to the microscopic minority of experts and researchers can be popularised and brought to the level of common men, general public and real target audience.

Fourth, a well-organized, analysed, synthesised, systematised, articulate, orderly placed and properly written research report can also be published in research journals in pieces to reach more researchers for further addition and exploration in the field.

Fifth, a suitably drafted research report can become the basis for formulation of new hypothesis. This can activate, continue and mobilise the process of research in this section, branch, area and finally subject.

Sixth, an appropriately documented research report relates the past and present work of the said research which develops a scope for further useful comparisons and new studies.

Seventh, the research design, research methods, research techniques and statistics used are largely and broadly reflected in research report. This not only helps, but also motivates and boosts new researchers to a great deal in understanding all these, applying new methods, techniques and statistical tools for their proper applications.

Eighth, a properly designed and prepared research report is highly useful and greatly helpful to the researchers in devising new ways of exploring the research problems.

Hence, drafting a research report is not only the end and final stage of research process, but it is a functional art and craft. It is primarily a result of researcher's labour, skill, maturity, ability, experience, expertise and knowledge. Moreover, it is important and helps in vast reservoir of knowledge, expansion and development of qualitative media research. Popularising such research to general public, publication in research journals in pieces, formulation of new hypothesis, relating past work and present work, developing new methods, techniques, statistical tools for its various applications and in devising new ways of exploring and discovering research problems and questions also give a lot of importance to the research report writing.

11.2.4 PRECAUTIONS FOR RESEARCH REPORT WRITING

Research report is a means to provide findings, results, conclusions, suggestions and recommendations to so many readers of the report. Hence, there are some precautions for writing research report:

(a) A research report should contain visual, conceptual, linguistic and thematic clarity. It should be simply readable, easily understandable and clearly comprehensible.

(b) It must not be abnormally lengthy that it becomes dull and dismal and must not be so short that it loses the gist, essence and basic theme of the research.

(c) A research report should have orderly presentation, proper sequencing and interlinking between chapters and within chapters. This is extremely important to sustain readers' interest and arrest the target audience into the text.

(d) The report should have visual, conceptual, thematic and linguistic correctness. It should be free from grammatical errors and linguistic omissions. It should judiciously contain the use of quotations, footnotes, documentation and proper use of abbreviations in footnotes.

(e) A research report should not be used for more than one purpose or more than one degree or diploma and should be an original work of the researcher and the researcher is legally required to sign a declaration of the originality and exclusiveness of the work.

(f) It should judiciously describe and elaborate the policy implications with reference to the research questions and research problems. It is extremely desirable that the report makes the forecast of the probable future of the subject concerned. It must also hint the type of research which still needs to be carried out in that section, branch, area or subject. This will be extremely helpful for the new researchers to carry out further research.

(g) Appendices should be endorsed to provide details of questionnaires, schedules and technical data in the report.

(h) Bibliographical references are relevant and significant not only from knowledge point of view, but mandatory from legal point of view. It often protects the researcher from infringement of Copyright Act if it has been properly referred.

(i) Indexing is no doubt an important, relevant and integral part of a good research. So it should be minutely, meticulously and carefully drafted and documented by the researcher in the report.

11.2.5 QUALITIES OF A GOOD RESEARCH REPORT WRITING

An appropriately drafted, suitably documented and well written research report should have the following qualities:

(a) The most striking and important quality of a report is that it should have a nice visual appearance. It should be slim and trim. It should look attractive, beautiful, elegant and appealing. Its cover page must have a fascination. Its paper must be of high quality and standard and typing or printing must be neat and clean with proper line spacing and four-sided margins.

(b) A good report should have visual, conceptual, thematic and pictorial clarity.

(c) A quality research report should have crystal clear research problems and research questions. Intensive, extensive, large, wide and logical clarification of the research problems is one of the most important angles of a good research report.

(d) A proper report avoids frequent repetition of facts and its chapters should be suitably interlinked and interwoven within and between the chapters. Thus orderly placement, continuity and logical sequencing are relevant and significant aspect.

(e) In a quality research report, the findings, results conclusions, suggestions and recommendations should be full of factuality, objectivity, authenticity, validity and reliability.

(f) In a proper and judicious report, small sentences and small paragraphs are used so that it should be simply readable, easily understandable and clearly comprehensible.

(g) In a properly drafted, suitably written and well-documented report, scientific and technical words are minimized. And if at all they are used, then such word should be well supported by simple words or such words are explained in the bracket with easily understandable expression and meaning.

(h) A well-written report is one which has a large and wide readership. And that is possible only when it is highly communicative. It should be full of 7C's of communication, i.e., clarity, conciseness, continuity, correctness, credibility and completeness.

(i) In an appropriately drafted and well documented good report, there should be proper reference of title, author, page no., publisher, place, time, etc.

(j) A suitably drafted report contains tables, charts, diagrams, etc. in proper sequencing with orderly placement coupled with telegraphic headline containing only nouns.

It is important to mention here that well known social scientists Goode and Hatt suggest the following qualities in writing a research report:

1. Explicit hypothesis must be made in scientific terms.
2. The plan of research must be made in detail.
3. All the derived observations and propositions must be tabulated and presented.
4. The report must be verified for its comprehensiveness in covering all points and findings of the research.
5. The report must be finally checked to find out whether it summarises all the points and findings of the research.

Hence, a good research report is very well drafted, documented and written .It is factual, clear, easily understandable, widely and largely readable, comfortably comprehensible, free from errors and duplication, result-focused and

Conclusion- oriented, well analysed, organised, synthesised, structured, reader-friendly, purposefully communicative, timely prepared, straight- forward, law-abiding and ethical. It is not a child's play. It is a herculean task. But constant and continuous practice brings perfection to it. Thus it should be carefully designed, meticulously prepared and minutely produced.

11.3 CHECK YOUR PROGRESS

Note: 1) Use the space below for your answers.

2) Compare your answers with those given at the end of this lesson.

A. CHOOSE THE RIGHT OPTION.

1. What gives solid base and strong foundation to the research despite the fact that it collects data and facts from secondary and tertiary sources and does not highlight new or original work?
   (a) Review of Literature
   (b) Objectives
   (c) Hypothesis
   (d) Methodology
2. What is research report writing out of the followings?
   (a) Document
   (b) Style
   (c) Process
   (d) Method
3. Report writing is very important. Hence it is called
   (a) Important Part of Research
   (b) Integral Part of Research
   (c) Ignorable Part of Research
   (d) None of Them

B. FILL IN THE BLANKS.

1. The importance of a research report is that it can be instrumental in acquiring a vast amount of ……..in the concerned field.
2. Objectives are usually of two types: a) Broad and b)…….
3. A research report is a document prepared by the researcher that contains the basic aspects of the thesis or……or dissertation.
4. A research report is a well-organised, analysed, systematised, articulate and orderly ……..of the research project.
5. Research problem comes, strikes, haunts and occurs in the mind of the researcher even before finalizing the……

11.4 SUMMARY

- A research report is a document prepared by the researcher that contains the basic aspects of the thesis or dissertation or project. It is presented in a written form containing the key and core aspects of the research project. It requires various steps and innumerable skills to present a report in the form of a project or thesis or dissertation. Its structure should be simple, reader-friendly, easily understandable, timely prepared and result-oriented. Its general outline includes: (i) Research topic (ii) Introduction (iii) Research problem (iv) Rationale of the topic (v) Review of literature (vi) Objectives (vii) Hypothesis (viii) Methodology (ix) Data collection and analysis (x) Results/findings (xi) Conclusions (xii) Limitations (xii) Bibliography (xiv) Appendices. The importance of a research report is that it can be instrumental in acquiring a vast amount of knowledge in the concerned field. Hence it contributes to the knowledge of this section, branch, area and finally subject. With the help of such knowledge, so many theories, models, paradigms of communication and media can be developed. Hence, drafting a research report is not only the end and final stage of research process, but it is a functional art and craft. It is primarily a result of researcher's labour, skill, maturity, ability, experience and knowledge. Moreover, it is important and helps in vast reservoir of knowledge, expansion and development of qualitative media research. Popularising such research to general public, publication in research journals in pieces, formulation of new hypothesis, relating past work and present work, developing new

methods, techniques, statistical tools for its various applications and in devising new ways of exploring and discovering research problems and questions also give a lot of importance to the research report writing. The precautions for writing good research report demands that it should be factual, clear, easily understandable, free from errors and duplication, finding-focused, conclusion-oriented, well-analysed, organised, synthesised, reader-friendly, purposefully communicative, timely prepared, straightforward, law-abiding and ethical. Hence, It should be very well drafted, documented and written. It is not a child's play. It is a herculean task and should be carefully designed, meticulously prepared, minutely produced and suitably engineered.

11.5 KEYWORDS

Research Report: It is a document prepared by the researcher that contains the basic aspects of the thesis or dissertation or project.

Structure & Outline of Research Report Writing: The structure and outline of any social science report writing should be simple, crystal clear and easily understandable. Its general structure and outline may be as follows: Research topic, Introduction, Research Problem, Significance of the study, literature review, Objectives, Hypothesis, Methodology, Data collections and analysis, Results/findings, Conclusions and suggestions, Limitations, Bibliographical references, Appendices.

Importance of a Research Report: The importance of a research report is that it can be instrumental in acquiring a vast amount of knowledge in the concerned field.

Precautions For Writing Good Research Report: The precautions for writing good research report demands that it should be factual, clear, easily understandable, free from errors and duplication,finding-focused, conclusion-oriented, well-analysed, organised, synthesised, reader-friendly, purposefully communicative, timely prepared, straightforward, law-abiding and ethical.

Objectives of Research Report Writing: It describes as to what we expect to achieve by a research. It is the result sought by the researcher at the end of the project. It is basically the core and needle of the research. Finally, the results and conclusions it is tested whether all the objectives have been achieved or not. Objectives also give birth to a few general hypotheses and if it is a quantitative research, then the general hypotheses are gradually converted into statistical hypotheses. It is important to mention here that qualitative research is objective driven whereas quantitative research is hypothesis driven.

Objectives are usually of two types: a) Broad objectives b) Specific objectives. In broad objectives, topic or its key words are written. As far as specific objectives are concerned, these are the further break-up of the broad objectives.

11.6 SELF-ASSESSMENT TEST

1. What do you mean by research report writing? Describe its structure and outline.
2. Describe the importance of research report writing.
3. Discuss the qualities of a good research report.
4. Highlight the precautions for research report writing.
5. Throw light on different steps in research report writing.
6. Distinguish between research topic and research problem.
7. Describe the qualities of a good research report as prescribed by Goode and Hatt.
8. Differentiate between research problem and limitations of a research.
9. Describe the precautionary measures for report writing of a quantitative study.
10. What should a researcher keep in mind while writing the introduction of a quantitative research topic?
11. Differentiate between general hypothesis and statistical hypothesis.
12. Convert the general hypothesis of your choice into statistical hypothesis.
13. Describe the importance of literature review in a communication and media research.
14. Write short notes on the followings :
    a) Data processing
    b) Data presentation
    c) Data analysis
    d) Data interpretation
    e) Bibliographical references
    f) Rationale of the topic
15. Differentiate between research report, research design, research methodology, and research method and research tool.
16. Why is it desirable to insert a copy of questionnaire/schedules into 'Appendices'?

17. Why should the research report be well-written, properly documented, suitably drafted and meticulously designed blueprint?

11.7 ANSWERS TO CHECK YOUR PROGRESS

A. CHOOSE THE RIGHT OPTION.

1. (a) Review of Literature
2. (a) Document
3. (b) Integral Part of Research

B. FILL IN THE BLANKS.

1. Knowledge
2. Specific
3. Project
4. Presentation
5. Topic

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SUBJECT: COMMUNICATION RESEARCH	
COURSE CODE: MSM-511	**AUTHOR: PROF MANOJ DAYAL**
LESSON NO.: 12	
STATISTICAL METHODS IN MEDIA RESEARCH-I	

STRUCTURE

12.0 LEARNING OBJECTIVES

The objectives of this lesson are as follows:

- To describe Measures of Central Tendency in Media Research
- To elaborate Mean comprehensively
- To analyse Mode in details
- To explain Media largely and widely
- To enlist the formulae of Mean, Median and Mode.

12.1 INTRODUCTION

Measures of central tendency are considered to be the statistical averages which are continuously growing indispensable in the emerging research areas of mass communication. As per the basic concept, the word "Average" is commonly used in media research and in our day-to- day activities. But it has been differently defined in statistics.

According to Clark, "An average is an attempt to find one single figure to describe whole of figures".

Leabo defines "Average" as "The average is sometimes described as a number which is typical of the whole group".

A.E. Waugh defines it as "An average is a single value selected from a group of values to represent them in some way – a value which is supposed to stand for whole group, of which it is a part, as typical of all the values in the group".

According to Ya-Lun-Chou "An average is a typical value in the sense that it is sometimes employed to represent all the individual value in a series of a variable".

Croxton and Cowden defines average as "An average value on a single value within the range of the data that is used to represent all of the values in the series. Since the average is somewhere within the range of the data, It is also called measures of central tendency.

Thus, the main objectives of average is to get single value that describes the characteristics of the entire group, and to facilitate comparison. Since the comparative and evaluative measurement concept of unexplored variables of communication and media are more in demand these days due to the growing professionalism in this area, so getting a single value of the mines of media data and then using such data in various comparisons is becoming the crying need of the hour.

Types of average: There are three types of average

i) Mean, ii) Median, iii) Mode

12.2 STATISTICAL METHODS IN MEDIA RESEARCH

Statistical Methods in Media Research are:

1. Measures of Central Tendency
2. Mean

3. Median
4. Mode
5. Important Formulae

12.2.1 MEASURES OF CENTRAL TENDENCY

Measures of central tendency indicates the point about which items have a tendency to cluster. This is generally accepted as the most representative figure for the whole bunch of data. It gets a single value that describes the characteristics of entire mass of scattered and wide data. Taking such example of media research, suppose there are 35 lakhs media persons in India and each media person has some income. But we say that per capita income per media person per annum is Rs. 10 lakhs. It reflects the entire picture of income of media persons of the whole country with a single value. Hence, measures of central tendency in media research are generally the computation of mean, media and mode in the field of print media, electronic media, advertising, corporate communication & public relations, web media, development communication & social marketing, social media and various other media.

12.2.2 MEAN

In communication research or social research only arithmetic mean is use ful and applicable, while geometric mean or harmonic mean are not required at any point of research. But arithmetic mean is the most largely and widely used measures of representing the whole of media or communication data by one value. Its value is obtained by adding together all the items and by dividing this total by number of items. In media research, arithmetic mean is so popular and relevant that when we talk of mean, we generally mean "Arithmetic Mean"

1. Mean of Simple Distribution (or Ungrouped or Unclassified Distribution):

Formula, $\overline{X} = \frac{\sum X}{N}$ where (i) $\overline{X}$ (called X bar)is mean

(ii) X is scores

(iii) N is number of score

(iv) $\sum$is summation of ……

Σ is a letter of Greek alphabets also called sigma

e.g. In a media awareness test, 10 students secured the following marks:

10, 18, 16, 15, 19, 15, 14, 25, 16, 18. Find the mean of the said data

No. of students	**Scores (X)**
1	10
2	18
3	16
4	15
5	19
6	15
7	14
8	25
9	16
10	18
_____	_____
N = 10	Σx=166

$$\overline{X} = \frac{\sum X}{N} = \frac{166}{10} = 16.6$$

Hence, the average score is 16.6 marks.

2 Mean of Unclassified Data with Frequency Distribution:

Formula,

$$\overline{X} = \frac{\sum fX}{N}$$

Where $\overline{X} =$ mean, X is scores, N is number of scores. fx= Frequency multiplied by X value.

e.g. Calculate the arithmetic mean of the unclassified data with the following frequency distribution of five print journalists and their no. of investigative stories:

X(Print Journalists)	1	2	3	4	5
F(Investigative stories)	2	9	9	7	3

Variable (x)	**Frequency (f)**	**fx**
1	2	2
2	9	18
3	9	27
4	7	28
5	3	15
	$N = \sum f = 30$	$\sum fX = 90$

$\therefore \overline{X} = \frac{\sum fX}{N} = \frac{90}{30} = 3$

Hence the arithmetic mean of investigative stories of five journalists is 3.

3 Mean of Classified Data with Frequency Distribution:

Formula,

$\therefore \overline{X} = \frac{\sum fX}{N}$

Find the mean of the following frequency distribution of media persons and their exclusives:

Class(Media persons)	0-8	8-16	16-24	24-32	32-40	40-48
Frequency(No. of exclusives)	10	20	14	16	18	22

Class	Frequency (f)	Mid value of class (X)	Fx
0-8	10	$\frac{0+8}{2} = 4$	40
8-16	20	$\frac{8+16}{2} = 12$	240
16-24	14	$\frac{16+24}{2} = 20$	280
24-32	16	$\frac{24+32}{2} = 28$	448
32-40	18		648
40-48	22		968

		$\frac{32+40}{2}=36$ $\frac{40+48}{2}=44$	
	$N=\sum f=100$		$\sum fX=2624$

$\therefore \overline{X}=\frac{\sum fX}{N}=\frac{2624}{100}=26.24$

Hence, the mean of the media persons and their successful exclusives is 26.

4. Mean by Short-cut method:

i) Simple Distribution

ii) Frequency distribution

Formula,

i) Simple Distribution $\overline{X}=A+\frac{\sum d}{N}$

(whereA is Assumed Mean and d is Deviation of scores from Assumed Mean)

For assuming (A), any single value can be selected from X values.

ii) Frequency Distribution $\overline{X}=A+\frac{\sum fd}{N}$

e.g. (i) In a media creativity test, 10 students secured the following mark:

10,18,16,15,19,15,14,24,25,16,18.Find the mean of this simple distribution by short-cut method:

Solution: Let us take the assumed mean =19

x	d= X-A
10	10-19=-9
18	18-19=-1
16	16-19=-3
15	15-19=-4
19	19-19=0
15	15-19=-4
14	14-19=-5
25	25-19=6
16	16-19=-3
18	18-19=-1

N=10 $\sum d = -24$

$\overline{X} = A + \frac{\sum d}{N} = 19 + \frac{-24}{10} = 19 - 2.4 = 16.6$

Hence mean value is 16.

e.g. (i) Find the mean of the following frequency distribution (unclassified data) by short-cut method of 5 advertisers about the no. of ad campaigning organized by them:

Advertisers(x)	1	2	3	4	5
No. of Ad Campaigning (f)	2	9	9	7	3

Let the assumed mean be 3

X	F	Deviation of score from assumed mean d=(x-A)	fd
1	2	1-3= -2	-4
2	9	2-3= -1	-9
3	9	3-3= 0	0
4	7	4-3= 1	7
5	3	5-3= 2	6
	$\overline{N = \sum f = 30}$		$\overline{\sum fd = 0}$

$\therefore \overline{X} = A + \frac{\sum fd}{N} = 3 + \frac{0}{3} = 3 + 0 = 3$

Thus, the mean of 5 advertisers about the no. of ad campaigns organized by them is 3.

(Note: If we take the middle no. from the series as Assumed Mean, then the calculation becomes much easier).

e.g. (2) Calculate the mean of the following frequency distribution (classified data) by short cut method about the no. of threats received by 100 journalists per year

Class(Journalists)	0-8	8-16	16-24	24-32	32-40	40-48
Frequency(No. of threats)	10	20	14	16	18	22

Let us consider the mid value of (16-24), i.e. 20 as Assumed Mean

Class	f	Mid	Deviation of x from	fd	fd_1 (d_1 = d/h)

		Value	assumed mean d=(X-A)	-160	-20
0-8	10	$\frac{0+8}{2}$	4-20= -16	-160	-20
8-16	20	$=4$	12-20= -8	0	0
16-24	14	$\frac{8+16}{2}$	20-20= 0	128	16
24-32	16	$=12$		288	36
32-40	18	$\frac{16+24}{2}$	28-20= 8	528	66
40-48	22	$=20$	36-20= 16		
	$\overline{N=\sum f=100}$	$\frac{24+32}{2}$	44-20=24	$\overline{\sum fd=624}$	$\overline{\Sigma fd_1=78}$
		$=28$			
		$\frac{32+40}{2}$			
		$=36$			
		$\frac{40+48}{2}$			
		$=44$			

$$\therefore \overline{X} = A + \frac{\sum fd}{N} = 20 + \frac{624}{100} = 20 + 6.24 = 26.24$$

Thus, the no. of threats received by 100 journalists per year is 26.

5. Mean by Step Deviation Method

Mean by step deviation method can be derived only in case of classified distribution.

Formula,

$$\overline{X} = A + \frac{h\sum fd_1}{N} \qquad \text{where } d_1 = \frac{d}{h} \text{ and h is the height of class}$$

(Note: Instead of length of the class, height of the class is preferred because it is always the same whether the class is overlapping (continuous) or non-overlapping (discrete). In height, we have to just subtract the lower limit of any class from the lower limit of the nearest higher class. Or we have to just

subtract the higher limit of any class from the higher limit of the nearest higher class. In case of use of height, there is no need to add +1 in non-overlapping (discrete) class unlike length of the class)

e.g., calculate the mean of the following frequency distribution (classified data) by step deviation method about the no. of threats received by 100 journalists per year

Calculate the mean of the following frequency distribution by Step Deviation method:

Class(Journalists)	0-8	8-16	16-24	24-32	32-40	40-48
Frequency(No. of threats)	10	20	14	16	18	22

Let us consider the Mid Value of (16-24), i.e.,20 as Assumed Mean.

Class	f	Mid Value(X)	Deviation from Assumed Mean,i.e., d=(X-20)	d_1=d/h where h=8	fd_1
0-8	10	$\frac{0+8}{2}=4$	4-20=-16	-2	-20
8-16	20	$\frac{8+16}{2}$ =12	2-20=-8	-1	-20
16-24	14	$\frac{16+24}{2}=20$	20-20=0	0	O
24-32	16	$\frac{24+32}{2}=28$	28-20=8	1	16
32-40	18	$\frac{32+40}{2}=36$	36-20=16	2	36
40-48	22	$\frac{40+48}{2}=44$	44-20=24	3	66
	N=100				$\sum fd_1 = 78$

$$\overline{X} = A + \frac{h\sum fd_1}{N}$$

$$= 20 + \frac{8 \times 78}{100} = 20 + \frac{624}{100}$$

$$= 20 + 6.24 = 26.24 \text{ Ans.}$$

12.2.3 MEDIAN

Median is the middle value in the entire distribution of data or scores. It refers to the central position of the data or the score. When all the observations are arranged in order of their size, the median is the value of that item, which has equal number of observations on either sides. In other words, median is the central value of the distribution or the value that divides the distribution into two equal parts. Hence, for the computation of median, it is the first condition that items be arranged in ascending or descending order. That is why it is also called the positional average or average of position, as it occupies a definite place in the given set of observation.

J. Wert, C. Neidt and J. Ahmmann has aptly defined median as "The Median is that point in the distribution above which and below which 50 percent of class lie".

1 Median of Simple Distribution (or Ungrouped or Unclassified Distribution):

Formula,

$$M = \left(\frac{N+1}{2}\right) \text{th term}$$

Where M is Median and N is the no. of scores. When N is an odd number, then deriving median is an extremely simple process.

e.g., Find the Median of 5, 8, 6, 11, and 9 of a Advertising campaigning by different advertising agencies.

First, the scores are arranged in ascending or descending order as follows: 5, 6, 8, 9, 11.

According to the formula,

Median=$\left(\frac{N+1}{2}\right)$ th term

Here N=5=5+1/2=6/2=3rd term

$$\therefore \text{Median} = 8$$

Thus, the median of ad campaigning by different corporate organizations is 8.

When the Median is an odd no., then also the same formula $\left(\frac{N+1}{2}\right)$ th term may be applied, but there will be one more step in calculation as it gives 0.5 value, like 2.5, etc. then we will find, the mean of 2nd and 3rd term.

e.g., Find the median of the following number of executive council meetings organized by different universities in a district: 5, 8, 9, 12, 11, 6

First, the data is arranged in ascending or descending order as follows:

5, 6, 8, 9, 11, 12

According to the formula

$$\text{Median} = \left(\frac{N+1}{2}\right) \text{th term}$$

$$\text{here } N = 5 = \frac{6+1}{2} = \frac{7}{2} = 3.5_{\text{th}} \text{ term}$$

Here, 3rd term is 8 and fourth term is 9, so the value of 3.5th term will be the mean of 8 and 9 i.e $\frac{8+9}{2}$ = 8.5

$$\therefore \text{Median} = 8.5$$

Thus, the median of the executive council meetings organized by different universities in the district is 8.5

2. Median of Frequency Distribution:

i) Unclassified

ii) Classified

i) Median of unclassified frequency distribution: first of all, the value of $\frac{N}{2}$ will be derived.

Here Median will be the value of the variable having cf $\geq \frac{N}{2}$.

(Note: when N/2 is not equal to any cumulative frequency, then cf which is just greater than N/2 is taken)

e.g., Find the median of the following unclassified frequency distribution of marks secured by PG Diploma students of Journalism:

Marks(X)	11	12	13	14	15	16	17	18
No. of	5	7	11	9	8	7	3	5

students								

Solution:

X	f	cf
11	5	5
12	7	12
13	11	23
14 ←	9	32
15	8	40
16	7	47
17	3	50
18	5	55
	$\overline{N = 55}$	

N/2 =55/2=27.5

(cf is calculated by just adding previous frequency/frequencies. Like 5+7=12, 12+11=23, 23+9=32….. and so on.)

Here cf just greater than 27.5 is 32 and the value of the variable corresponding to 32 is 14.

∴ M =14.

Thus, the Median of marks of PG Diploma in Journalism is 14.

ii) Median of the Classified Frequency Distribution:

Formula,

$$M = l + \left(\frac{\frac{N}{2} - cf_b}{f_m}\right) \times h$$

where
$l = lower\ limit\ of\ Median\ class$
$(if\ total\ frequency\ be\ N, then\ class\ w$
$cf \geq N\ is$
$called\ median\ class)$
cf_b: $cumulative\ frequency\ just$
$below\ Median\ class$
f_m: $frequency\ of\ Median\ class$
h: $height\ of\ the\ class$

It is important to mention here that the lower limit of the median class is the same as given in the class in overlapping or continuous class. But 0.5 less in non-overlapping or discrete class.

(Note: Instead of length of the class, height of the class is preferred because it is always the same whether the class is overlapping (continuous) or non-overlapping (discrete).In height, we have to just subtract the lower limit of any class from the lower limit of the nearest higher class. Or we have to just subtract the higher limit of any class from the higher limit of the nearest higher class. In case of use of height, there is no need to add +1 in non-overlapping (discrete) class unlike length of the class)

e.g. 1 Find the Median of the following class distribution of no. of investigative stories covered by journalists of different age groups:

Age group of journalists	30-40	40-50	50-60	60-70	70-80
No. of investigative stories	50	54	85	45	30

Class	Frequency	cf
30-40	50	50
40-50	54	104
$\boxed{50-60}$ ←	85	189
60-70	45	234
70-80	30	264
	$\overline{N = 264}$	

$$h = 50 - 40 = 10$$

$$\therefore \frac{N}{2} = \frac{264}{2} = 132$$

Here, cf 189 is just greater than N/2, i.e; 132. Hence the corresponding class, i.e., (50-60) is the median class and 104 is Cf_b i.e., cumulative frequency just below median class. Further **h** is 70-60=10, 60-50=10, 50-40=10 or 40-30=10 i.e. subtraction of the lower limit of any class from the lower limit of the nearest higher class as shown above in the class column.

As per formula

$$M = l + \left(\frac{\frac{N}{2} - cf_b}{f_m}\right) \times h$$

$$= 50 + \left(\frac{132 - 104}{85}\right) \times 10$$

$$= 50 + \left(\frac{280}{85}\right) = 53.29$$

Thus, the median of no. of investigative stories covered by journalists of the said age group is 53.

e.g 2. Find the Median of following classified distribution of scores obtained by the students of new media:

Scores	65-69	60-64	55-59	50-54	45-49	40-44	35-39	30-34	25-29	20-24
No. of new media students	1	3	6	8	10	7	7	5	2	1

Solution:

Scores	Frequency	cf
20-24	1	1
25-29	2	3
30-34	5	8
35-39	7	15
40-44	7	22
45 – 49	10	32
50-54	8	40
55-59	6	46
60-64	3	49
65-69	1	50
	$\sum f = N = 50 \ \therefore \frac{N}{2} = \frac{50}{2} = 25$	

Here cf 32 is just greater than N/2, i.e, 25. Hence the corresponding class, i.e., (45-49) is the median class and 22 is Cf_b , i.e., cumulative frequency just below median class. Further h is 25-20=5, i.e, subtraction of the lower limit of any class from the lower limit of the nearest higher class as shown above in the class column. Since class is non-overlapping, so the lower limit of the median class (45-49) is 44.5. It is important to mention here that lower limit in non-overlapping class is always 0.5 less than the one given in the distribution.

$$\text{Now } M = l + \left(\frac{\frac{N}{2} - cf_b}{f_m}\right) \times h$$

$$= 44.5 + \left(\frac{25 - 22}{10}\right) \times 5$$

$$= 44.5 + \frac{15}{10}$$

$$= 44.5 + 1.5 = 46$$

Hence, the median of distribution of scores obtained by new media students is 46.

e.g. 3. Find the median of the following distribution:

Marks Obtained	No. of students of MMC students
Less than 10	25
Less than 20	40
Less than 30	60
Less than 40	75
Less than 50	95
Less than 60	125
Less than 70	190
Less than 80	240

First of all, the frequency table will be prepared in the following manner:

Class	Cumulative Frequency	Frequency
0-10	25	25
10-20	40	40-25=15
20-30	60	60-40=20

30-40	75	75-60=15
40-50	95	95-75=20
$\boxed{50-60}$ ←	125 ↻	125-95=30 →
60-70	190	190-125=65
70-80	240	240-190=50

N=240

Here c.f 125 is just greater than N/2, i.e, 120. Hence, the corresponding class, i.e, cumulative frequency just below median class. Further, **h** is 10-0=10, i.e., subtraction, of the lower limit of any class from the lower limit of the nearest higher class as shown above in the class column.

$$\text{Now } M = l + \left(\frac{\frac{N}{2} - cf_b}{f_m}\right) \times h$$

$$= 50 + \left(\frac{120 - 95}{30}\right) \times 10$$

$$= 50 + \frac{25}{3} = 50 + 8.33$$

$$= 58.33$$

12.2.4 MODE

Mode is the score of the gretest frequency. It indicates that point in the distribution which occurs most frequently. According to J.P. Guilford & B. Fructer, "The mode is defined as the point on the scale of measurement with maximum frequency in a distribution".

Croxton and Cowden define it as: "The mode of a distribution is the value at the point around which the items tend to be most heavily concentrated. It may be regarded of the most typical of a series of values".

1. Mode of a Simple Distribution:

It is the value in a series of observations which has the highest or greatest or maximum frequency.

e.g. Find the value of mode in the following data: 3, 5, 6, 6, 7, 6, 8.

In this Simple Distribution of data, mode is '6' as it has the highest frequency '3'.

2. Mode of Frequency Distribution:

i) Mode of unclassified Frequency Distribution

ii) Mode of Classified Frequency Distribution.

i) Mode of Unclassified Frequency Distribution: Here, again it is the value of the highest frequency.

E.g. Find the mode of the following Unclassified frequency distribution of scores secured by MA students of Public Relations:

Scores(X)	11	12	13	14	15	16	17	18
No. of students	5	7	11	9	8	7	3	5

Here Mode is '13' as it has the highest frequency, i.e, 11.

ii) Mode of Classified Frequency Distribution: Mode of a classified data is normally the mid-point of the class interval of the highest frequency. But for more accuracy and precision, the following formula is used:

$$M_0 = l + \left(\frac{f_a}{f_a + f_b}\right) \times h$$

Where M_o is Mode,

l is lower limit of modal class (class of highest frequency). It is the same in overlapping or continuous class and 0.5 less in non-overlapping or discreet class.

f_a is frequency of pre-modal class

f_b is frequency of post-modal class

h is height of the class(height is the subtraction of the lower limit of any class from the lower limit of any class from the lower limit of the nearest higher class.

12.2.5 IMPORTANT FORMULAE

1. Mean of Simple Distribution

$$\overline{X} = \frac{\sum X}{N} \quad \text{where} \overline{X} = \text{Mean.}$$

$$X = \text{scores}$$

$$N = \text{No. of scores .}$$

Hence mean, i.e., X bar is called sigma or summation X bi N)

2. Mean of Frequency Distribution (Unclassified & classified):

$$\overline{X} = \frac{\sum fX}{N} \quad \text{where f is frequency}$$

$N = \sum f$. Hence mean, i.e., X bar is called summation $= \sum fX$ bi N)

3. Short-cut Method:

(a) Simple Distribution:

$$\overline{X} = A + \frac{\sum d}{N} \quad (\text{where } A = \text{Assumed Mean},$$

$$d = \text{Deviation from Mean, i. e, } (X - \overline{X})$$

(b) Frequency Distribution: (unclassified and classified)

$$\overline{X} = A + \frac{\sum fd}{N}$$

4. Step-Deviation Method: (classified only)

$$\overline{X} = A + \frac{h\sum fd_1}{N} \quad (\text{where } h = \text{Height of class}$$

$$d_1 = \frac{d}{h})$$

5. Median in Simple Distribution: $\left(\frac{N+1}{2}\right)$ th term (Easy when N is odd)

$\left(\frac{N+1}{2}\right)$ th term (More steps when N is even as it gives 0.5 value like 2.5 etc.Then we will find the Mean of 2nd &3rd Term)

6. Median in Unclassified Frequency Distribution:

Here Median will be the Value of Variable having cf≥ N/2

7. Median in Classified Frequency Distribution:

$$M = l + \left(\frac{\frac{N}{2} - cf_b}{f_m}\right) \times h$$

$$\left(\begin{array}{c} \text{If total frequecy be N, then the class whose} \\ cf \geq \frac{N}{2} \text{ is called the Median class.} \\ l = \text{lower limit of the Median class} \\ (\text{Note: l is 0.5 less in case of non overlapping}) \\ cf_b: \text{cummulative frequency below Median class} \\ f_m: \text{frequency of Median class} \\ h = \text{Height of Median class} \end{array}\right)$$

8. Mode in Simple Distribution or Unclassified Frequency Distribution:

M_0= Variable having highest frequency

9. Mode in Classified Frequency Distribution:

$$M_o = l + \left(\frac{f_a}{f_a + f_b}\right) \times h$$

$$\left(\begin{array}{c} \text{The class of highest frequency is Modal class} \\ l = \text{lower limit of Modal class} \\ (\text{Note l is 0.5 less in case if non} - \text{overlapping class}) \\ f_a = \text{frequency of pre} - \text{modal class} \\ f_b = \text{frequency of post} - \text{modal class} \\ h = \text{height of Modal class} \end{array}\right)$$

10. Mode with the help of Median and Mean:

$M_{0=}$ 3Median - 2Mean

12.3 CHECK YOUR PROGRESS

Note: 1) Use the space below for your answers.

2) Compare your answers with those given at the end of this lesson.

A. CHOOSE THE RIGHT OPTION.

1. Who defines average as "an attempt to find one single figure to describe whole of figures."?
   (a) Clark
   (b) Leabo
   (c) Waugh
   (d) Ya-Lun-Chou
2. What are the three types of average?
   (a) Mean deviation, Standard deviation, Quartile deviation
   (b) Mean, Median, Mode
   (c) ANOVA, Chi-Square, T-value
   (d) None of them
3. What is average of position?

(a) Mean

(b) Median

(c) Mode

(d) None of the above

4. What is the highest frequency of scores?

(a) Mean

(b) Median

(c) Mode

(d) None of the above

5. What is Central Tendency?

(a) Single value

(b) Double value

(c) Triple value

(d) None of the above

B. FILL IN THE BLANKS.

1. Measures of central tendency in media research which is described as …….averages.
2. Average of position is described as ……..
3. The highest frequency in the entire scores is mentioned as……
4. Mean is described as ……..average.
5. …… Mean is treated as Mean in media research.

12.4 SUMMARY

- Measures of central tendency in social research, specially communication research which is described as statistical averages, gets a single value of largely and widely scattered data of mass media which describes the characteristics of the entire data. There are three types of averages—mean, median and mode. In media research when we talk of mean, we generally mean arithmetic mean. Median is the average of position, which refers to the middle value in the distribution. Hence median is the central value in the distribution or the value that divides the distribution into two equal parts. Mode is the score of the highest frequency. Choosing a measure of central tendency in media research out of the mean, media and mode, mean is the most widely and

largely used descriptive statistics in media research or descriptive media metrics because so many statistical methods relating to media are based on means. So if we use something other than mean, we would need a lot of extra knowledge on the application of inferential statistics of mass communication or inferential media metrics.

12.5 KEYWORDS

Central Tendency: A single value which represents the large and widely scattered data, either in the form of a mathematical average or positional average or concentration of the highest frequency, mean, median and mode.

Mean: It is the mathematical average of the given data**.**

Median: It is the positional average of the given data.

Mode: It is the score having the greatest value.

12.6 SELF-ASSESSMENT TEST

1. Write the formulae for calculating median?
2. Write the formulae for calculating mode?
3. Find the arithmetic mean of following scores secured by the students of bachelors of mass communication in reporting: 50, 40, 30, 45, 25, 42, 44, 38, 48, and 36.
4. Ten working journalists of a regional daily have the following monthly income in rupees: 14780, 15760, 26690, 27750, 24840, 24920, 16100, 17810, 27050, 26950. Find out the arithmetic mean of their income.
5. 50 students of Master of Mass Communication secured the following marks in the paper of editing. Find their mean, median and mode: 32, 30, 45,75, 35, 33, 51, 61, 44, 33, 45, 48, 56, 71, 70, 73, 80, 34, 46, 44, 48, 33, 31, 46, 61, 63, 64, 68, 69, 76, 77, 79, 71, 75, 55, 56, 34, 36, 38, 40, 32, 49, 51, 58, 55, 31, 62, 66, 45, 62.
6. The following are the monthly incomes in rupees of 12 journalist families. Calculate their arithmetic mean: 28000, 18000, 9600, 10400, 7500, 8000, 9400, 10000, 7500, 60000, 20000.
7. Calculate the arithmetic mean of the following frequency distribution by long method, short-cut method and step-deviation method:

Class	65-69	60-64	55-59	50-54	45-49	40-44	35-39	30-34	25-29	20-24
Frequency	1	3	6	8	10	7	7	5	2	1

8. Calculate the arithmetic mean of the following frequency distribution by long method, short-cut method and step-deviation method:

Class	11-13	13-15	15-17	17-19	19-21	21-23	23-25
Frequency	3	4	5	6	5	4	3

9. Calculate the arithmetic mean of the following frequency distribution by long method, short-cut method and step-deviation method:

Class	0-9	10-19	20-29	30-39	40-49	50-59	60-69	70-79
Frequency	15	20	25	24	12	31	71	52

10. In the following frequency distribution, find the unknown frequency if the arithmetic mean of the distribution is 67.45

Class	60-62	63-65	66-68	69-71	72-74
Frequency	15	54	----	81	24

Answers:

(3) A.M=39.8 **(4)** A.M=Rs.22,265 **(5)** $\overline{X} = 53, M = 52, M_0 = 50$, **(6)** A.M = Rs 16,516.66 **(7)** A.M = 45.4 **(8)** AM = 18 **(9)** A.M = 49.9 **(10)** unknown frequency=126

12.7 ANSWERS TO CHECK YOUR PROGRESS

A. CHOOSE THE RIGHT OPTION.

1. (a) Clark
2. (b) Mean, Median, Mode
3. (b) Median
4. (c) Mode

5. (a) Single value

B. KEYS OF FILL IN THE BLANKS.

1. Statistical
2. Median
3. Mode
4. Mathematical
5. Arithmetic

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SUBJECT: COMMUNICATION RESEARCH	
COURSE CODE: MSM-511	**AUTHOR: PROF MANOJ DAYAL**
LESSON NO.: 13	
STATISTICAL METHODS IN MEDIA RESEARCH-II	

STRUCTURE

13.0 LEARNING OBJECTIVES

The objectives of this lesson are as follows:

- To describe the meaning and concept of measures of dispersion in media studies
- To elaborate methods of dispersion
- To analyse mean deviation
- To explain meaning and concept of standard deviation
- To describe variance
- To explain range, inter-quartile range & quartile deviation

- To enlist the formulae

13.1 INTRODUCTION

In the previous chapter we have discussed measures of central tendency in which mean, media and mode were comprehensively discussed. In this chapter, we will describe and analyse the measures of dispersion. In media research or communication research, the word dispersion is described as variability or scatter or spread. It refers to the degree or extent of stretched or squeezed of the available data. Measures of dispersion in media research are generally the mean deviation, coefficient of mean deviation, standard deviation, variance, range, semi-range or inter-quartile range in the field of print media, electronic media, advertising, corporate communication & public relations, web media, development communication & social marketing, social media and various other media. Thus measures of dispersion in media research or communication research generally measure as to how spread out a set of media or communication data is.

13.2 MEANING & CONCEPT OF MEASURES OF DISPERSION IN MEDIA STUDIES

The measures of central tendency give a single value of largely and widely spreaded data. But the average cannot adequately describe a set of observations, unless all the observations are the same. In two or more distributions, the central value may be the same, but yet there may be huge disparities in the formation of the distribution. Measures of dispersion are instrumental in finding out this important characteristic of a distribution in media studies due to variability and fluctuation in the various areas of mass communication. Different experts have defined measures of dispersion differently:

According to Simpson and Kafka, "The measurement of the scatteredness of the mass of figures in a series about an average is called measure of variation or dispersion."

A.L. Bowley defines it as, "Dispersion is the measure of the variation of the items."

Spigel Opines, "The degree to which numerical data tend to spread about an average value is called the variation or the dispersion of the data."

Hence, it is very obvious that dispersion (also described as scatter, spread or variation) is the amount of variability in a set of scores and it measures the extent to which the items vary from some

central value. Since measures of dispersion give an average of the differences of various items from one average, they are also called averages of the second order.

For example, let there be two small groups of students of new media and traditional media scores in a test are such as the following:

Scores of New Media Students	37,41,36,17,20,19,18,3,5,4
Scores of Traditional Students	18, 21, 22, 18,21,23,17,20,22,18

Mean of New Media students' scores=37+41+36+17+20+19+18+3+5+4=200/10=20

Mean of Traditional Media students' scores= 18+21+22+18=21+23+17+20+22+18=200/10=20

Hence, the value of mean in both the above situation is 20 and hence, so far as the mean goes, there is no difference in the performance of the two groups. Now, a valid question arises, can we take both sets of scores as identical? No doubt, there is a lot of difference between the performances of the two groups. Whereas the scores of students of mass communication are found to range from 3 to 41, the scores of Advertising range from 18 to 23. The first group is composed of students who have wide individual differences. It consists of either very intelligent students or very dull students. The second group of students of advertising, on the other hand, is composed of average students. Students in this later group are less variable than those in the former. Thus, there is a great need of paying attention to the variability or dispersion of scores in the sets of scores or series if we want to describe or compare them. Thus, we may conclude that there is a tendency for data to be dispersed, scattered or to show variability around the average consequently, the variability or dispersion may also be defined as the tendency of the measures of the attributes of a group to deviate from the average or central value. Variability, thus, refers to the spread of scores from their central tendency.

13.2.1 METHODS OF DISPERSION

The degree of spreading, scattering, or dispersion, i.e, variability is measured by different methods. Of them, the following are popular:

(i) Mean deviation

(ii) Standard deviation

(iii) Variance

(iv) Range

(v) Interquartile range & quartile deviation.

13.2.2 MEAN DEVIATION

Mean deviation or average deviation is an integral part of measures of dispersion. Mean deviation of a distribution is the arithmetic mean of the absolute deviations of the values of the variable from a measure of their either mean. The mean deviation is also known as average deviation and is generally denoted by A.D or M.D or δ (del). It is the average difference between the items in a distribution and the median or mean or mode of that series. It is the mean of the deviations of all the separate scores in the series taken from their mean (occasionally from their median or mode) (Garnett, 1971 p-48). It is the simplest measure of variability that takes into account the fluctuation or variation of all the items in a series. Theoretically, there is an advantage of taking the deviations from median merely because the sum of deviations of items from median is minimum when signs are ignored. But in practice the mean is more frequently used in computing the value of average deviation and this is the reason why it is more commonly called mean deviation. This is also called first moment dispersion. For mean deviation, we write δ, for mean deviation from mean, we write $\delta_{\bar{x}}$ for mean deviation from median, we write δ_M and from mean deviation from mode, we write δ_{M_0}

1. **Mean Deviation of Simple Distribution or Unclassified or Ungrouped Distribution:**

Formula:

$$\delta(\text{M. D. or A. D.}) = \frac{\Sigma|d|}{N} \qquad \begin{pmatrix} \text{where } \delta = \text{Mean Deviation} \\ d = (X - \bar{X}) \\ |d| = \text{Mod} \\ X \text{ is score, N is no. of scores} \\ \bar{X} = \text{Mean of score} \end{pmatrix}$$

e.g.(i) Find the mean deviation of the following data of media test : 12,9,8,7,4

X	$d = (X - \bar{X})$	$\lvert d \rvert$
12	$12 - 8 = 4$	4
9	$9 - 8 = 1$	1
8	$8 - 8 = 0$	0
7	$7 - 8 = -1$	1

4 $\overline{\sum X = 40, N = 5}$	$4 - 8 = -4$	4 $\overline{\sum \lvert d \rvert = 10}$

$$\therefore \ \overline{X} = \frac{\sum X}{N} = \frac{40}{5} = 8 \qquad \therefore \delta = \frac{\sum |d|}{N} = \frac{10}{5} = 2$$

2. Mean Deviation of Frequency Distribution:

(a) Unclassified frequency distribution

(b)Classified frequency distribution

Formula:

$\delta = \frac{\sum |fd|}{N}$ where f is the frequency of scores

e.g. (i) Calculate the mean deviation of the following data of reporters filling stories per day:

No. of reporters(X)	2	3	4	5	6	7
No. of stories per day(f)	5	4	7	6	3	2

X	f	fx	$d = (X - \overline{X})$	$\lvert d \rvert$	$\lvert fd \rvert$
2	5	10	$2 - 4.15 = -2.15$	2.15	10.75
3	4	12	$3 - 4.15 = -1.15$	1.15	4.60
4	7	28	$4 - 4.15 = -.15$	0.15	1.05
5	6	30	$5 - 4.15 = .085$	0.85	5.10
6	3	18	$6 - 4.15 = 1.85$	1.85	5.55
7	2	14	$7 - 4.15 = 2.85$	2.85	5.70
	$\overline{N = 27}$	$\overline{\sum fx = 112}$			$\overline{\sum \lvert fd \rvert = 32.75}$

$\therefore \overline{X} = \frac{\sum fx}{N} = \frac{112}{27} = 4.15$ $\therefore \delta = \frac{\sum |fd|}{N} = \frac{32.75}{27} = 1.21$

Hence, mean deviation is 1.21.

3. Advantages and Disadvantages of Mean Deviation:

Advantages:

(i) Simplicity in calculation: The formula for computing Mean Deviation is simple. Hence it is very useful for communication issues and media analysis.

(ii) Freedom of choice of mean: M.D. can be computed from any of the averages like Mean, Median or Mode. Thus it is highly applicable in media research

(iii) Importance of every term: The value of M.D. is dependent on each and every term. Hence, it is very relevant in media metrics.

(iv) Distribution structure: The evaluation of M.D. gives us an idea about how the terms are situated in the series of distribution. This type of distribution structure is very relevant in media analysis.

Disadvantages:

(i) Avoidance of negative sign: Since the formula of mean deviation carries only absolute value, the negative sign is ignored, neglected or avoided.It tremendously affects a suitable media analysis.

(ii) Lack of certainty: Since it is calculated from any of the measures of central tendency, it lacks certainty. That is why, it is sometimes avoided in the analysis of media issues. But mean deviation from the median is the least and considered to be the best in macro and micro media analysis.

Therefore, mean deviation is highly practically relevant and useful in media research because of its simplicity in computation. It is particularly useful and effective in reports presented to such group or group of public of communication studies which is not aware of statistical methods. Mean deviation is highly useful in media and communication studies for small samples with no elaborate analysis required. It is important to mention that the National Bureau of Economic Research has meticulously observed that the mean deviation is the most practical measures of dispersion especially in social sciences including communication studies.

4. Co-efficient of Mean Deviation: It is basically the ratio of the mean deviation and the central value from which the deviation is measured.

Thus,

(i) Co-efficient of mean deviation from mean $=\frac{\delta_{\bar{X}}}{\bar{X}}$

(ii) Co-efficient of mean deviation from median $=\frac{\delta_{M}}{M}$

(iii) Co-efficient of mean deviation from mode $=\frac{\delta_{M_0}}{M_0}$

13.2.3 MEANING AND CONCEPT OF STANDARD DEVIATION

The meaning and concept of standard deviation was first given by Karl Pearson in 1894. It is also called root mean square deviation or second moment dispersion (unlike mean deviation as first moment dispersion). No doubt, it is the most relevant, important and useful measure of study of dispersion. It is the most commonly used measure of dispersion in media research. It satisfies most of the properties laid down for an ideal measure of dispersion in communication and media studies. In social sciences including communication studies, standard deviation is denoted by the small Greek letter σ(sigma). The greater the standard deviation, the greater will be the magnitude of the deviations of the values from their mean. Similarly, a small standard deviation means a high degree of uniformity of the observation as well as homogeneity of a series. Hence, if there are two or more comparable series with the smallest standard deviation that has the most representative mean. Thus, it is largely and widely used in judging the representativeness of the mean.

Standard deviation is quite different from mean deviation. Negative signs are avoided while computing mean deviation whereas standard deviation is calculated without ignoring any algebraic sign. Further, mean deviation can be calculated either from median, or mean or mode whereas standard deviation is always calculated from the arithmetic mean as the sum of the squares of the deviation of items from arithmetic mean is the least. Since it is root mean square deviation, it is the square root of the mean of the squared deviation from the arithmetic mean.

1. Standard Deviation of Simple Distribution or Unclassified or Ungrouped Distribution:

Formula,

$\sigma = \sqrt{\frac{\Sigma d^2}{N}}$ Where σ (Sigma) = Standard deviation

d=X-$\overline{X}$

X= Scores

$\overline{X}$ =Mean of scores, N= No. of scores

e.g., Calculate the standard deviation of the following data: 12, 9, 8, 7, 4

X	$d = (X - \overline{X})$	d^2
12	$12 - 8 = 4$	16
9	$9 - 8 = 1$	1
8	$8 - 8 = 0$	0
7	$7 - 8 = -1$	1
4	$4 - 8 = -4$	16
$\sum X = 40$		$\sum d^2 = 34$

$$\therefore \overline{X} = \frac{\sum X}{N} = \frac{40}{5} = 8$$

$$\therefore \sigma = \sqrt{\frac{\sum d^2}{N}} = \sqrt{\frac{34}{5}} = \sqrt{6.8} = 2.60$$

Thus, the standard deviation is 2.60.

2. Standard Deviation of the Frequency Distribution:

Formula: $\sigma = \sqrt{\frac{\sum fd^2}{N}}$

(i) Unclassified or ungrouped frequency distribution:

e.g. Compute the Standard deviation of the following frequency distribution of a editors writing stories per month:

No. of editors(X)	0	1	2	3	4	5	6	7
No. of stories filed per month(f)	14	21	25	43	51	40	39	12

X	f	fx	$d = (X - \bar{X})$	d^2	fd^2
0	14	0	$0 - 3.76 = -3.76$	14.14	197.96
1	1	21	$1 - 3.76 = -2.76$	7.62	160.02
2	5	50	$2 - 3.76 = -1.76$	3.10	77.50
3	43	129	$3 - 3.76 = -0.76$	0.58	24.94
4	1	204	$4 - 3.76 = 0.24$	0.06	3.06
5	40	200	$5 - 3.76 = 1.24$	1.54	61.60
6	39	234	$6 - 3.76 = 2.24$	5.02	195.78
7	2	84	$7 - 3.76 = 3.24$	10.50	126.00
	$\overline{N = 245}$	$\overline{\sum fx = 922}$			$\overline{\sum fd^2 = 846.86}$

$$\therefore \bar{X} = \frac{\sum fx}{N} = \frac{922}{245} = 3.76 \qquad \therefore \sigma = \sqrt{\frac{\sum fd^2}{N}} = \sqrt{\frac{846.86}{245}} = \sqrt{3.456} = 1.86$$

Thus, Standard deviation of the above said frequency distribution of a newspaper correspondents filing news stories per month is 1.86.

(ii) Classified frequency distribution:

e.g., Calculate the standard deviation of the following data of news channel reporters of different age group filing per day:

Age of reporters(Class)	45-49	40-44	35-39	30-34	25-29	20-24	15-19	10-14
No of filing stories per day(Frequency)	1	2	2	6	5	2	1	1

Class	f	Mid	fx	$d = (X - \bar{X})$	d^2	fd^2
45-49	1	Value(X)	47	$47 - 30.25 = 16.75$	280.56	280.56
40-44	2	47	84	$42 - 30.25 = 11.75$	138.06	276.12
35-39	2	42	74	$37 - 30.25 = 6.75$	45.56	91.12
30-34	6	37	192	$32 - 30.25 = 1.75$	3.06	18.36
25-29	5	32	135	$27 - 30.25 = -3.25$	10.56	52.80
20-24	2	27	44	$22 - 30.25 = -8.25$	68.06	136.12
15-19	1	22	17	$17 - 30.25 = -13.25$	175.56	175.56
10-14	1	17	12	$12 - 30.25 = -18.25$	333.06	333.06
	$\overline{N = 20}$	12	$\overline{\sum fx = 605}$			$\overline{\sum fd^2 = 1363.7}$

$$\therefore \bar{X} = \frac{\sum fx}{N} = \frac{605}{20} = 30.25 \qquad \therefore \sigma = \sqrt{\frac{\sum fd^2}{N}} = \sqrt{\frac{1363.7}{20}} = \sqrt{68.185} = 8.25$$

Thus, the standard deviation of the above said data of reporters of different age group filing stories per day is 8.25.

3. Standard Deviation by Short-cut Method (or, Assumed Mean Method):

(i) In simple distribution:

$$\sigma = \sqrt{\frac{\sum d^2}{N} - \left(\frac{\sum d}{N}\right)^2}$$

e.g. Find the standard deviation of the following data : 10, 14, 7, 9, 5, 5,4,2

X	$d = (X - A)$	d^2
10	$10 - 7 = 3$	9
14	$14 - 7 = 7$	49
7	$7 - 7 = 0$	0
9	$9 - 7 = 2$	4
5	$5 - 7 = -2$	4
5	$5 - 7 = -2$	4
4	$4 - 7 = -3$	9

2 $\overline{N = 8}$	$2 - 7 = -5$ $\overline{\sum d = 0}$	25 $\overline{\sum d^2 = 104}$

Let the assumed mean A be 7.

$$\therefore \sigma = \sqrt{\frac{\sum d^2}{N} - \left(\frac{\sum d}{N}\right)^2}$$

$$= \sqrt{\frac{104}{8} - \left(\frac{0}{8}\right)^2}$$

$$= \sqrt{\frac{104}{8}}$$

$$= \sqrt{13} \qquad = 3.605$$

(ii) In frequency Distribution:

$$\therefore \sigma = \sqrt{\frac{\sum fd^2}{N} - \left(\frac{\sum fd}{N}\right)^2}$$

d=Deviation from assumed mean

=X-A

e.g. (i) Find the Standard deviation of the following data:

X	2	4	6	7	8	9
f	3	2	5	3	2	1

X	f	$d = (X - A)$	d^2	fd	fd^2
2	3	$2 - 7 = -5$	25	-15	75
4	2	$4 - 7 = -3$	9	-6	18
6	5	$6 - 7 = -1$	1	-5	5
7	3	$7 - 7 = 0$	0	0	0
8	2	$8 - 7 = 1$	1	2	2
9	1	$9 - 7 = 2$	4	2	4
	$\overline{N = 16}$			$\overline{\sum fd = -22}$	$\overline{\sum fd^2 = 104}$

Let the assumed mean A be 7.

$$\therefore \sigma = \sqrt{\frac{\sum fd^2}{N} - \left(\frac{\sum fd}{N}\right)^2}$$

$= \sqrt{\frac{104}{16} - \left(\frac{-22}{16}\right)^2}$ $= \sqrt{6.5 - 1.89}$ $= \sqrt{4.61}$ $= 2.15$

Hence, the Standard deviation of the above said data is 2.15.

e.g. (ii) Find the Standard deviation of the following data:

Class	0-4	5-9	10-14	15-19	20-24
Frequency	2	5	7	13	21

Class	f	Mid-value	$d = (X - A)$	d^2	fd	fd^2
0-4	3	(X)	$2 - 12 = -10$	100	-20	200
5-9	5	2	$7 - 12 = -5$	25	-25	125
10-14	7	7	$12 - 12 = 0$	0	0	0
15-19	13	1	$17 - 12 = 5$	25	65	325
20-24	21	17	$22 - 12 = 10$	100	210	100
	$N = 48$	22			$\sum fd = 23$	$\sum fd^2 = 2750$

Lat the assumed mean A be 12.

$$\therefore \sigma = \sqrt{\frac{\sum fd^2}{N} - \left(\frac{\sum fd}{N}\right)^2}$$

$= \sqrt{\frac{2750}{48} - \left(\frac{230}{48}\right)^2}$ $= \sqrt{57.29 + (4.8)^2}$ $= \sqrt{57.29 - 23.04}$ $= \sqrt{34.25}$ $= 5.85$

4 Standard Deviation by Step Deviation Method (only in case of Classified Distribution):

$$\sigma = h \times \sqrt{\frac{\sum fd_1{}^2}{N} - \left(\frac{\sum fd_1}{N}\right)^2}$$

Where = height of class , $d_1 = \frac{d}{h}$, d=X-A

Note: 1. Standard deviation in step deviation method takes place only in case of classified distribution.

2. Instead of length of the class, height of the class is preferred because it is always the same whether the class is overlapping (continuous) or non-overlapping(discrete). In height, we have to just subtract the lower limit of any class from the lower limit of the nearest higher class. Or we have to just subtract the higher limit of any class from the higher limit of the nearest higher class. In case of use of height, there is no need to add +1 in non-overlapping (discrete) class unlike length of the class.

e.g. Calculate the standard deviation of the following data by Step Deviation Method :

Class	10-20	20-30	30-40	40-50	50-60	60-70	70-80
Frequency	6	8	15	7	3	0	1

Solution:

Class	f	Mid-value (X)	$d = (X - A)$	d_1=d/10	fd_1	fd_1^2
10-20	6	15	$15 - 45 = -30$	-3	-18	54
20-30	8	25	$25 - 45 = -20$	-2	-16	32
30-40	15	35	$35 - 45 = -10$	-1	-15	15
40-50	7	45	$45 - 45 = 0$	0	0	0
50-60	3	55	$55 - 45 = 10$	1	3	3
60-70	0	65	$65 - 45 = 20$	2	0	2
70-80	1	75	$75 - 45 = 30$	3	3	9
	$\overline{N = 40}$				$\overline{\sum fd_1 = -43}$	$\overline{\sum fd_1^2 = 113}$

Let the assumed mean A be 45

$$\therefore \sigma = h \times \sqrt{\frac{\sum fd_1^2}{N} - \left(\frac{\sum fd_1}{N}\right)^2}$$

$= 10 \times \sqrt{\frac{113}{40} - \left(\frac{-43}{40}\right)^2}$ $=10 \times \sqrt{2.825 - 1.156}$ $=10 \times \sqrt{1.1669}$ $= 10 \times 1.292 =$ 12.92.

Hence, the standard deviation is 12.92.5

5. Standard Deviation by Non-Deviation Method:

This method is used when the deviation cannot be calculated or computed. That is why it is called non-deviation method.

Formula, $\sigma = \sqrt{\frac{\sum X^2}{N} - \left(\frac{\sum X}{N}\right)^2}$

Where X=Scores, N= No. of scores

Formula,

$\sigma = \sqrt{\frac{\sum X^2}{N} - \left(\frac{\sum X}{N}\right)^2}$ Where X= Scores, N = No. of Scores

e.g. Find the Standard deviation by non-deviation method of the following marks obtained by the following media students in a major test: 15,14,10,16,20,30,35,18,29,20.

Scores (X)	X^2
15	225
14	196
10	00
16	256
20	400
30	900
35	1225
18	324
29	841
20	400
$\overline{\sum X = 207}$	$\overline{\sum X^2 = 4867}$
N=10	

$\therefore \sigma = \sqrt{\frac{\sum X^2}{N} - \left(\frac{\sum X}{N}\right)^2} = \sqrt{\frac{4867}{10} - \left(\frac{207}{10}\right)^2} = \sqrt{486.7 - (20.7)^2} = \sqrt{486.7 - 428.5} = \sqrt{58.2}$

=7.628

6. Advantages & Disadvantages of Standard Deviation:

Advantages:

(i) Mathematically useful: Since both positive and negative signs are taken into consideration, so it is mathematically more correct, accurate and useful. As a result, media researchers often rely on this method for measuring dispersion

(ii) Dependence on every item: It is more reliable as it depends on all the terms. Hence this method can be more dependable for data analysis of media issues.

(iii) Effect of sampling is minimum: If the sample slightly changes, it will have the least effect on its computation. That is why its reliability is very high in communication and media studies.

(iv) Certainty: There is no ambiguity in its measurement. Due to its certainty attribute, it is emerging as one of the most dependable methods of measuring dispersion of media variables.

(v) Useful for more critical studies: As it is mathematically more convincing, it is more useful for critical analysis. That is why is considered to be a standard device of dispersion in mass communication research.

Disadvantages:

(i) Lengthy calculation: It is difficult to compute as compared to other measures. It is longer and lengthier. In media research, earlier it was sometimes avoided due to this demerit. But now with the rapid growth if information technology, lengthy computation is no more a problem. Since media researchers are generally more than average in the use of communication and information technology, so this method is often adhered to.

(ii) Effect of extreme value: it is normally more influenced and affected by extreme values. Yet one of the most preferred device in media and communication analysis as it is automatically nullified in the process of squaring the data.

7. Differences between Mean Deviation and Standard Deviation:

Both these measures are based on all the items of a variable but they differ a lot in the following measures:

(i) Mean deviation does not take into consideration the algebraic signs (plus or minus) in its calculation which is unreasonable and illogical.

(ii) Mean deviation can be calculated from median, mode or mean and its value differs in these cases (unless the distribution is normal). The standard deviation is always calculated from arithmetic mean.

(iii) The mathematical properties possessed by standard deviation are much greater than these possessed by Mean deviation.

8. Co-efficient of Standard Deviation and Co-efficient of Variation: It is important to mention here that the standard deviation is an absolute measure of dispersion and is expressed in terms of the units of the variable. For the purpose of comparative studies, a relative measure of dispersion is computed. It is co-efficient of standard deviation which is equal to standard deviation divided by mean.

Thus,

$$\text{co} - \text{effcient of SD} = \frac{\sigma}{\bar{X}}$$

This value will be often in fraction and as such not ideal for any comparison and hence co-efficient of variation is calculated by multiplying the co-efficient of standard deviation by 100.

Thus,

$$\text{co} - \text{effcient of Variation or C.V.} = \frac{\sigma}{\bar{X}} \times 100.$$

This measure for the first time was evolved by Karl Pearson and is very useful for studying dispersion in more than one series.

A series in which co-efficient of variation is higher would have greater dispersion than the one in which it is lower. Similarly, when C.V. is high, the series is less consistent or less variable. This measure is largely, widely and most commonly used for a comparative study of the variability or consistence of two or more series.

e.g. (i) Find the mean deviation, standard deviation, co-efficient of standard deviation and co-efficient of variation of the following data: 5,6,9,12,13:

X	$d = (X - \bar{X})$	$\lvert d \rvert$	$\lvert d^2 \rvert$
5	$5 - 9 = -4$	4	16
6	$6 - 9 = -3$	3	9
9	$9 - 9 = 0$	0	0
12	$12 - 9 = 3$	3	9
13	$13 - 9 = 4$	4	16
$\overline{\sum X = 45}$		$\overline{\sum d = 14}$	$\overline{\sum \lvert d^2 \rvert = 50}$
N=5			

$\therefore \bar{X} = \frac{45}{5} = 9$

$\therefore \delta = \frac{|d|}{N}$ $= \frac{14}{5}$ $= 2.8$

$\sigma = \sqrt{\frac{\sum d^2}{N}}$ $= \sqrt{\frac{50}{5}}$ $= \sqrt{10}$ $= 3.162$

$\text{co} - \text{effcient of SD} = \frac{\sigma}{\bar{X}}$ $= \frac{3.162}{9}$ $= 0.351$

$\text{co} - \text{effcient of Variation or C. V.} = \frac{\sigma}{\bar{X}} \times 100.$

$= \frac{3.162}{9} \times 100$ $= 35.13$

13.2.4 VARIANCE

Variance is very important and relevant statistical tool in the field of media research and communication research. The term 'variance' is used to describe the square of standard deviation . This term was first used by R.A. Fisher in 1913. The relevance and importance of the term 'variance' lies in the fact that it is capable of a very exhaustive type of quantitative analysis. The concept of variance is very significant in advanced media research work where it is possible to split the total into several parts, each attributable to one of the factors causing variation in their original series. When we deal with a phenomenon affected by a number of variables in communication and media studies, the analysis of variance helps us in isolating the effects of various factors. Thus, variance is the sum of squared deviations of scored taken from mean and divided by their number (N).

Symbolically, Variance= $\sum \frac{(X-\bar{X})^2}{N} = \sigma^2$

Thus, $\sigma = \sqrt{\text{Variance}}$

In a frequency distribution, where assumed mean is taken and step-deviations are calculated:

$$\text{Variance} = \left[\frac{\sum fd_1{}^2}{N} - \left(\frac{\sum fd_1}{N}\right)^2\right] \times h^2$$

Where $d = \frac{X-A}{H}$ and $h = \text{height of class}$

e.g. (i) 5 students of advertising scored the following marks in their dissertations: 20, 22, 25, 18, and 30. What is the variance and standard deviation?

X	$d = (X - \bar{X})$	$\lvert d^2 \rvert$
20	$20 - 23 = -3$	9
22	$22 - 23 = -1$	1
25	$25 - 23 = 2$	4
18	$18 - 23 = -5$	25
30	$30 - 23 = 7$	49
$\overline{\sum X = 115}$		$\overline{\sum \lvert d^2 \rvert = 88}$
N=5		

$$\therefore \bar{X} = \frac{\sum X}{N} = \frac{115}{5} = 23$$

$$\therefore \text{Variance} = \frac{\sum d^2}{N} = \frac{88}{5} = 17.6$$

$\sigma = \sqrt{17.6} = 4.2$

e.g. (ii) Compute the variance of the following marks obtained by 80 students of Communication as shown in the following table:

Marks Obtained	10-14	14-18	18-22	22-26	26-30	30-34	34-38	38-42	42-46	46-50	50-54	54-58

No. of Students	2	4	4	8	12	16	10	8	4	6	2	4

Marks	f	Mid Value (X)	$d' = (X - A)/h$	$\|fd1\|$	$\|fd1^2\|$
$10 - 14$	2	12	-5		50
$14 - 18$	4	16	-4	-10	64
$18 - 22$	4	0	-3	-16	36
$22 - 26$	8	4	-2	-12	32
$26 - 30$	12	8	-1	-16	12
$30 - 34$	16	32	0	-12	0
$34 - 38$	10	36	1	0	10
$38 - 42$	8	40	2	10	32
$42 - 46$	4	44	3	16	36
$46 - 50$	6	48	4	12	96
$50 - 54$	2	52	5	24	50
$54 - 58$	4	56	6	10	144
	$\overline{N =}$			24	$\overline{\sum\|fd'^2\| = 562}$
				$\overline{\sum fd' = 30}$	

$$\therefore \text{Variance} = \left[\frac{\sum fd'^2}{N} - \left(\frac{\sum fd'}{N}\right)^2\right] \times h^2$$

$$= \left[\frac{562}{80} - \left(\frac{30}{80}\right)^2\right] \times 4^2$$

$$= 6.884 \times 16 = 110.144$$

13.2.5 RANGE, INTER-QUARTILE RANGE & QUARTILE DEVIATION

The relevance and importance of Range cannot be denied in media research. Range is the simplest possible measure of dispersion. It is calculated by subtracting the lowest score in the series from the highest. But it takes only extreme values into account and remains silent about the variation of different items.

Symbolically, Range $(R) = L - S$ where L is the largest value and S is the smallest value in a series.

If range is divided by the sum of the extreme items, the resulting figure is called, "Ratio of range" or "Co-efficient of range".

Symbolically,

Co-efficient of Range or Ratio of Range= $\frac{L-S}{L+S}$

e.g. (i) The range of the data 2,4,6,8,50 is 50-2=48

e.g. (ii) Calculate the Range and Co-efficient of Range of the following data:

Class	11-13	13-15	15-17	17-19
Frequency	3	4	5	26

$R = L - S$

$= 19 - 11 = 8$

$\text{Co} - \text{efficient of Range} = \frac{L-S}{L+S}$

$\frac{19-11}{19+11} = \frac{8}{30} = 0.266$

(Note: In the calculation of Range, only the values of the variables are taken into account and the frequencies are totally ignored).

1. Advantages and Disadvantages of Range: A good measure of dispersion should be easily computed, rigidly defined and readily understood. Moreover, it should be capable of further mathematical treatment and should not be much affected by fluctuations of the sampling.

Advantages:

(i) Range is easily calculated, readily understood and hence the simplest and the easiest method of studying dispersion. While carrying on economic journalism research, range is useful in the study of fluctuations in share prices, money, rates, exchange rates, gold prices etc.

(ii) It takes the least time to compute the value of range. Thus, if we are interested to get a quick rather than a very accurate picture of variability, we may calculate range. Hence, in the applied research of communication and media analysis this is often used as it is quickly computable.

Disadvantages:

(i) It is not based on all the observations of the series. It has nothing to do with each and every item of the distribution as far as quality control is concerned. Since, it is subject to fluctuations of

considerable magnitude from sample to sample, so we may say it is largely affected by fluctuations of sampling.

(ii) It is impossible to use it in case of open ended distributions. In such distributions, the lower limit of the lowest class and the upper limit of the highest class are quite unknown.

Despite several demerits of range of fluctuations of considerable magnitude from sample to sample ,yet it is very useful in financial and commercial journalism research, specially in the study of fluctuations in share prices, money, rates, exchange rates, gold prices etc. It is very relevant in overall mass communication research, in weather forecasts and overall in our everyday life. For example, if the salary of the highest earning journalist and the lowest earning journalist remain unchanged and if the salaries of all other journalists are changed, range will remain unaffected. The range of a symmetrical and an asymmetrical distribution can be identical. Two such distributions can never have the same dispersion. Thus it is relevant and useful in media research.

2. **Inter-quartile Range & Quartile Deviation**: Inter-quartile range is also a measure of dispersion. It has an advantage over range because it is not affected by the values of the extreme items. For this purpose, a measure called Inter-quartile range has been developed. This type of range includes the middle 50 per cent of the distribution, i.e. , one quarter of the observations at the lower end, another quarter of the distribution are excluded in calculating the Inter-quartile range. Thus, Inter-quartile range represents the difference between the third quartile and the first quartile.

Symbolically

$$\text{Inter} - \text{quartile Range} = Q_3 - Q_1$$

When the value of inter-quartile range is divided by 2, it becomes Semi-Inter-quartile Range or Quartile Deviation.

Thus, Semi-Inter-quartile Range

Or Quartile Deviation $= \frac{Q_3 - Q_1}{2}$

Where Q_3 and Q_1 stands for the upper and lower quartiles respectively.

In a symmetrical distribution, median lies half-way on the scale from Q_1 to Q_3, i.e., median-Q_1=Q_3-median and as such the difference can be taken as a measure of dispersion. The median $\pm$Q. D. covers exactly 50 per cent of the observations. But mass media, generally, such data is not available as we have more possibility of the asymmetrical distribution. In an asymmetrical distribution, Q_1 and Q_3 are not

equidistant from the median. Thus, an asymmetrical distribution includes only approximately 50 per cent of the observations.

If Quartile Deviation is very less, it indicates high uniformity or small variation of the central 50 per cent items and a high quartile deviation means that the variation among the central item is large.

Thus, Quartile Deviation is described as an absolute measure of the dispersion. When it is divided by the average value of the two quartiles, a relative measure of the dispersion is obtained. It is called "Co-efficient of Quartile Deviation".

Symbolically,

$$\text{Co} - \text{efficient of a Quartile Deviation} = \frac{\frac{Q_3 - Q_1}{2}}{\frac{Q_3 + Q_1}{2}} = \frac{Q_3 - Q_1}{Q_3 + Q_1}$$

(Note: it is important to mention here that Co-efficient of Quartile Deviation may be used to compare the degree of variations in different distribution.)

e.g. Find the Quartile Deviation and its Co-efficient from the following data relating to the monthly income of seven freelance journalists.

Monthly Income (Rs.): 5000, 7000, 8000, 6000, 6500, 4000, 9000.

Here, the incomes are arranged in ascending order, i.e. , 4000, 5000, 6000, 6500, 7000, 8000, 9000.

$$Q_1 = \text{the value of } \left(\frac{N+1}{4}\right)^{\text{th}} \text{ or } \left(\frac{7+1}{4}\right)^{\text{th}} \text{ or 2nd item} = 5000$$

$$Q_3 = \text{the value of } 3\left(\frac{N+1}{4}\right)^{\text{th}} \text{ or } 3\left(\frac{7+1}{4}\right)^{\text{th}} \text{ or 6th item} = 8000$$

$$\therefore \text{Quartile Deviation} = \frac{Q_3 - Q_1}{2} = \frac{8000 - 5000}{2} = \frac{3000}{2} = 1500$$

$$\text{And, Co} - \text{Efficient of Quartile Deviation} = \frac{Q_3 - Q_1}{Q_3 + Q_1} = \frac{8000 - 5000}{8000 + 5000} = \frac{3000}{13000} = 0.23$$

e.g. (ii) Calculate the value of Quartile Deviation and its Co-efficient from the data of 7 students of digital media.

Roll No.	1	2	3	4	5	6	7
Marks	20	28	40	12	30	15	50

Marks arranged in ascending order:

12, 15, 20, 28, 30, 40, 50

$$Q_1 = \left(\frac{N+1}{4}\right)\text{th term} = \frac{7+1}{4} = 2\text{nd item} = 15$$

$$Q_3 = 3\left(\frac{N+1}{4}\right)\text{th term} = 3\left(\frac{7+1}{4}\right) = 6\text{th item} = 40$$

$$\therefore \text{Quartile Deviation} = \frac{Q_3 - Q_1}{2} = \frac{40-15}{2} = \frac{25}{2} = 12.5$$

$$\text{And, Co} - \text{Efficient of Quartile Deviation} = \frac{Q_3 - Q_1}{Q_3 + Q_1} = \frac{40-15}{40+15} = \frac{25}{55} = 0.455$$

3. Advantages and Disadvantages of Quartile Deviation:

Advantages:

1. It is simply calculable and easily understandable.
2. As a measure of dispersion, it is superior to range in certain aspects
3. It is relevant, significant and useful in studying dispersion in open and series.
4. It is also relevant, significant and useful in erratic or badly skewed distributions, where the other measures of dispersion would be warped by extreme values. The Quartile Deviation is not affected by the presence of extreme values.

Disadvantages:

1. Quartile Deviation is not based on all the observations and it ignores 50% items, i.e., the first 25% and the last 25%.
2. It is not capable of further algebraic manipulation and mathematical treatment.
3. It is in a way a positional average.

4. Its value is very much affected by sampling fluctuations. A change in the value of one item, may affect its value considerably.

Thus, due to considerable variation in the value of various items, it is not a suitable measure of dispersion. As its value does not depend upon every item of the series, it cannot be considered as a favorable method of measuring dispersion. Because of such limitations, it is not often useful for statistical inference. But communication and media researchers do use the term standard deviation and variance in measurements or differences between research units on what is being measured. And the knowledge of others measures are important for proper understanding of standard deviation and variance.

13.2.6 IMPORTANT FORMULAE

Mean Deviation of Simple Distribution or Unclassified or Ungrouped Distribution:

$$\delta\ (\text{M. D. or A. D.}) = \frac{\Sigma|d|}{N} \text{where } \delta\ (\text{del}) = \text{Mean Deviation}$$

|d|= (X- $\overline{X}$) positive value

N= No. of scores

X= Scores

$\overline{X}$= Mean of Scores

(When Mean Deviation is taken from mean, it is also written as $\delta_{\overline{X}}$)

Mean Deviation of Frequency Distribution:

$$\delta \text{ or } \delta_{\overline{X}} = \frac{\sum|d|}{N} \text{ where f} = \text{freuency of scores}$$

Co-efficient of Mean Deviation from Mean = $\frac{\delta_{\overline{X}}}{\overline{X}}$ where $\delta_{\overline{X}} = \text{Mean Deviation from the mean}, \overline{X} =$ Mean

Co-efficient of Mean Deviation from Median = $\frac{\delta_M}{M}$ where $\delta_M = \text{Mean Deviation from Median}, M =$ Median

Co-efficient of Mean Deviation from Mode = $\frac{\delta_{M_0}}{M_0}$ where $\delta_{M_0} = \text{Mean Deviation from Mode}, M_0 =$ Mode

Standard Deviation of Simple Distribution or Unclassified or Ungrouped Distribution:

$$\sigma = \sqrt{\frac{\sum d^2}{N}} \text{ where } \sigma(\text{sigma}) = \text{Standard Deviation}$$

$$d = X - \overline{X}, X = \text{Scores}, \overline{X} = \text{Mean of Scores}, N = \text{No. of Scores}$$

Standard Deviation of Frequency Distribution:

$\sigma = \sqrt{\frac{\sum fd^2}{N}}$ where f = frequency of scores

Standard Deviation by Short-cut method (or, Assumed Mean Method):

(a) In Simple Distribution:

$$\sigma = \sqrt{\frac{\sum d^2}{N} - \left(\frac{\sum d}{N}\right)^2}$$ where d=X-A, X=Scores, A= Assumed Mean

(b) In Frequency Distribution:

$$\sigma = \sqrt{\frac{\sum fd^2}{N} - \left(\frac{\sum fd}{N}\right)^2}$$ where f= frequency, d=X-A

Standard Deviation by Step Deviation Method (only in case of Classified Distribution):

$$\sigma = h \times \sqrt{\frac{\sum fd_1{}^2}{N} - \left(\frac{\sum fd_1}{N}\right)^2}$$ where $d_1 = \frac{d}{h}$, h = height of class

Standard Deviation by Non-deviation Method:

$$\sigma = \sqrt{\frac{\sum X^2}{N} - \left(\frac{\sum X}{N}\right)^2}$$ where X = Scores, N = No. of Scores

Co-efficient of SD = $\frac{\sigma}{\overline{X}}$

Co-efficient of Variation or C.V. = $\frac{\sigma}{\overline{X}} \times 100$

Combined Standard Deviation of two groups (σ_{12}):

$$\sigma_{12} = \sqrt{\frac{N_1 \sigma_1{}^2 + N_2 \sigma_2{}^2 + N_1 d_1{}^2 + N_2 d_2{}^2}{N_1 + N_2}}$$

Where σ_{12} = Combined Standard Deviation

σ_1 = Standard Deviation of First Group

σ_2 = Standard Deviation of Second Group

$d_1 = \overline{X}_1 - \overline{X}_{12}, d_2 = \overline{X}_2 - \overline{X}_{12}$

N_1 = No. of scores of first group, N_2 = No. of scores of second group

Combined Standard Deviation of three groups (σ_{123}):

$$\sigma_{123} = \sqrt{\frac{N_1\,\sigma_1{}^2 + N_2\,\sigma_2{}^2 + N_3\,\sigma_3{}^2 + N_1\,d_1{}^2 + N_2\,d_2{}^2 + N_3\,d_3{}^2}{N_1 + N_2 + N_3}}$$

Where $d_1 = \overline{X}_1 - \overline{X}_{123}, d_2 = \overline{X}_2 - \overline{X}_{123}$

$\overline{X}_{123} =$ Mean of combined three groups

$\sigma_3 =$ Standard Deviation of third Group

$N_3 =$ No. of scores for third group

Combined Mean of two groups ($\overline{X}_{12}$)

$$\overline{X}_{12} = \frac{N_1\overline{X}_1 + N_2\overline{X}_2}{N_1 + N_2}$$

Where $N_1 =$ No. of Scores of group I

$N_2 =$ No. of Scores of group II

$\overline{X}_1 =$ Mean of group I

$\overline{X}_2 =$ Mean of group II

Combined Mean of three groups ($\overline{X}_{123}$)

$$\overline{X}_{123} = \frac{N_1\overline{X}_1 + N_2\overline{X}_2 + N_3\overline{X}_3}{N_1 + N_2 + N_3}$$

Where $N_3 =$ No. of scpres of group III

$\overline{X}_3 =$ Mean of group III

Variance =σ^2

1. Range: $R = L - S$, where R= Range, L= largest value in a score, S= Smallest value in a score

2. Co-efficient of Range or Ration of Range = $\frac{L-S}{L+S}$

3. Inter-quartile Range= $Q_3 - Q_1$, where $Q_3 = 3\left(\frac{N+1}{4}\right)$ th term, $Q_1 = \left(\frac{N+1}{4}\right)$ th term

4. Semi-inter-quartile Range or Quartile Deviation = $\frac{Q_3-Q_1}{2}$

5. Co-efficient of a Quartile Deviation =$\frac{Q_3-Q_1}{Q_3+Q_1}$

13.3 CHECK YOUR PROGRESS

Note: 1) Use the space below for your answers.

2) Compare your answers with those given at the end of this lesson.

A. CHOOSE THE RIGHT OPTION.

1. What is inter-quatile range?
   (a) It represents the difference between the third and the first quartile
   (b) It represents the difference between the second and the first quartile
   (c) It represents the difference between the fourth and the first quartile
   (d) None of them

2. The main disadvantage of mean deviation is that
   (a) Avoidance of positive sign
   (b) Avoidance of negative sign
   (c) Accepting both positive and negative
   (d) None of the above.

3. Mean deviation is the least from
   (a) Mean
   (b) Mode
   (c) Median
   (d) None of them

4. Standard deviation is also called
   (a) Root mean square deviation
   (b) Deviation with standard error
   (c) Deviation from mode
   (d) None of them

5. Second moment dispersion is also called:
   (a) Mean deviation
   (b) Standard deviation
   (c) Skewness
   (d) None of the above

B. FILL IN THE BLANKS:

1. Mean deviation is also called ……..…deviation.
2. The concept of standard deviation was given by……..…..…..
3. Standard deviation is also called either root mean square deviation or ……...
4. Variance is the ……. Of standard deviation.
5. The concept of variance was given by……. in 1913.

13.4 SUMMARY

- Measures of dispersion is so important to be discussed in the suitable analysis of media research. Dispersion, which is often described as scatter, spread or variation is the amount of variability in a set of scores and it measures the extent to which the item vary from some central value. There are five methods of dispersion: (i) Mean Deviation, (ii) Standard Deviation, (iii) Variance, (iv) Range, (v) Inter-quartile Range & Quartile Deviation. Mean deviation is the average difference between the items in a distribution and the median or mean or mode of that series. Standard deviation is always calculated from the arithmetic mean as the sum of squares of deviation of items from arithmetic mean is the least. Variance is described as the square of standard deviation. Range is calculated by subtracting the lowest score in the series from the highest. Inter-quartile range represents the difference between the third and the first quartile. Most of such measures may not be practically so pertinent, but standard deviation and variance are highly relevant pertinently applicable. Communication and media researchers do use the term standard deviation and variance in measurements or differences between research units on what is being measured.

13.5 KEYWORDS

Dispersion: It is often described as scatter, spread or variation. It is the amount of variability in a set of scores and it measures the extent to which the item vary from some central value.

Mean Deviation: It is the average difference between the items in a distribution and the median or mean or mode of that series.

Standard Deviation: It is always calculated from the arithmetic mean as the sum of squares of deviation of items from arithmetic mean is the least.

Variance: It is described as the square of standard deviation.

Range: is calculated by subtracting the lowest score in the series from the highest.

13.6 SELF-ASSESSMENT TEST

1. Explain the various methods of dispersion comprehensively.
2. Describe the meaning and concept of measures of dispersion.
3. What is Mean Deviation? Discuss the merits, demerits and usefulness of Mean Deviation.
4. What is Standard Deviation? Discuss the merits, demerits and usefulness of Standard Deviation.
5. Describe the significance of Standard Deviation in mass communication research.
6. Discuss the role of Mean Deviation in media and communication research.
7. Throw light on co-efficient of Mean Deviation, Co-efficient of Standard Deviation and Co-efficient of Quartile Deviation.
8. Differentiate between Mean Deviation and Standard Deviation.
9. What is Variance? Discuss the significance of Variance in media research.
10. Discuss the role of Range, Interquartile Range and Semi-inter-quartile Range in media and communication research.
11. Describe the merits and demerits of Quartile Deviation.
12. Discuss the significance of Standard Deviation in communication research.
13. Throw light on Combined Standard Deviation.

13.7 ANSWERS TO CHECK YOUR PROGRESS

A. CHOOSE THE RIGHT OPTION.

1. (a) It represents the difference between the third and the first quartile.
2. (b) Avoidance of negative sign
3. (c) Median
4. (a) Root mean square deviation
5. (b) Standard deviation

B. FILL IN THE BLANKS.

1. Average
2. Karl Pearson

3. Second Moment Dispersion
4. Square
5. R. A. Fisher

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SUBJECT: COMMUNICATION RESEARCH	
COURSE CODE: MSM-511	**AUTHOR: PROF MANOJ DAYAL**
LESSON NO.: 14	
CHI-SQUARE TEST	

STRUCTURE

14.0LEARNING OBJECTIVES

The objectives of this lesson are as follows:

- To describe the meaning and concept of Chi Square Test in Media Research
- To elaborate applications of Chi Square Test
- To analyse additive property of Chi Square
- To explain misuse and precaution of Chi Square Test
- To describe illustration of various applications of Chi Square Test

14.1 INTRODUCTION

Chi Square Test is often used in media or communication research. It is one of the easiest, simplest, and most popular non-parametric tests. It has a vital role in statistical analysis and statistical inference. But these tests in communication and media studies are still not as reliable as parametric tests. If both parametric and non-parametric tests can be applied under any situation, then parametric tests are considered to be more suitable, powerful and effective. Chi-square is slightly parametric also. Hence, it is described as mixed though it is primarily a non-

14.2 MEANING AND CONCEPT OF CHI SQUARE TEST IN MEDIA RESEARCH

Chi Square which is widely and largely used in media research is denoted by the Greek letter χ^2 which was first applied by British statistician *Karl Pearson* in the year 1900. It is given by the following formula:

$$\chi^2 = \sum \frac{(f_0 - f_e)^2}{f_e}$$

Where f_0 is observed frequencies and f_e is expected frequencies.

This formula is applied by the following steps :

i First of all expected frequency is generally calculated by simply averaging all the observed frequencies. In a situation of multiple expected frequencies, the expected frequency is calculated by the following formula :

$$f_e = \frac{RT \times CT}{N}$$

Where RT is Row Total ,CT is Column Total and N is grand total number of observations.

ii. Then we will take the difference between observed frequencies (f_0) and expected frequencies (f_e), i.e. (f_o-f_e).

iii. After that we will find out (f_o-f_e)^2 and divide each value of (f_o-f_e)^2 by f_e, i.e., to find out the sum of all the values of $\frac{(f_0 - f_e)^2}{f_e}$.

iv. After totaling all the values of $\frac{(f_0 - f_e)^2}{f_e}$, we will get the value of χ^2In other words,

$$\chi^2 = \frac{(f_o - f_e)^2}{f_e}$$

v. Then we will compare the calculated value of χ^2 with the table value (or, critical value) for the given degrees of freedom and at the desired level of significance.

vi. If the calculated value of χ^2 is more than the table value, then the difference between observed frequencies and expected frequencies is significant. Similarly if the calculated value of χ^2 is less than the table value, then the difference between the observed frequencies and expected frequencies is not significant and it may have arisen due to sampling fluctuations.

1 Degrees of Freedom: During the comparison between the calculated value and the table value of χ^2we are supposed to find out the degrees of freedom. Here the degrees of freedom (d_f or v) is calculated by the following formula:

$d_f = (c-1)\,(r-1)$

Where *c* is the number of columns and *r* is the number of rows.

In addition, if we fit a binomial distribution, the number of degrees of freedom is one less than the number of classes. If we fit a Poisson distribution, the degrees of freedom are 2 less than the number of classes, and if we fit a normal curve, the number of degrees of freedom is small by 3 than the number of classes.

The critical or table values of $\chi^2$are available only up to 30 degrees of freedom. Beyond that, the distribution of $\sqrt{2\chi^2}$ approximates the normal distribution. For d_f beyond 30, the approximation is acceptably close. The mean of the distribution $\sqrt{2X^2}$ is $\sqrt{2d_{f-1}}$ and $s = 1$. Thus, the application of the test is simple. Deviation $\sqrt{2X^2}$ from $\sqrt{2d_{f-1}}$ may be interpreted as a normal deviate with unit SD. Thus, z = $\sqrt{2X^2}$ = $\sqrt{2d_{f-1}}$ Here z is like 't' value for larger sample.

2 Constant of χ^2Distribution : The constants of X^2 distribution with d_f degrees of freedom are

i. Mean = $2d_f$, Mode = $d_f - 2$, Variance = $2d_f$

ii. Moments = $m_0 = 0, m_2 = 2d_f, m_3 = 8d_f$ and $m_4 = 48d_f + 12d_f^2$

iii. $b_1 = \frac{m_3^2}{m_2^2} = \frac{64df^2}{8df^2} = \frac{8}{df}$ \ $g_1 = \sqrt{8/df}$

iv. $b_2 = \frac{m_4}{m_2^2} = \frac{48df + 12df^2}{4df^2} = 3 + \frac{12}{df}$

$\therefore g_2 = b_2 - 3 = \frac{12}{df}$

3. Alternative Method of X^2 : When the data are arranged into 2 × 2 consistency table as shown below :

A	B	A + B
C	D	C + D
(A + C)	(B + D)	N

Then

$$\chi^2 = \frac{N(AD - BC)^2}{(A + B)(C + D)(A + C)(B + D)}$$

When in a four cells of 2 × 2 consistancy table, any one of the frequency is less than 5, then yate's correction is applied and the value of C^2 is determined by the following formula :

$$\chi^2 = \frac{(|AD - BC| - N/2)^2}{(A + B)(C + D)(A + C)(B + D)}$$

X^2 can also be calculated by the following formula :

$$\chi^2 = \sum \frac{f_O^2}{f_e} - N$$

This formula is helpful if there are fractions in the deviations and the use of earlier direct formula becomes tedious

14.2.1 APPLICATIONS OF CHI SQUARE TEST

Applications of χ^2 Test : This test is widely used and a very popular and prevalent method in mass communication today as it is applicable under a variety of conditions and situations. Since it is assumption -free

non-parametric tests, so it can be easily applied to several problems of communication and media studies. Most important applications of χ^2 are as follows.

i. Test of Independence

ii. Test of Goodness of Fit

iii. Test of Homogeneity

iv. Test of population variance.

1. As a Test of Independence: With the application of $\mathcal{X}^2$**,** we can easily test whether two or more attributes like the benefits of new media in education and readers' opinion about the same are independent of each other or they are associated or related. We normally take the null hypothesis that "there is no association (or relation) in attributes" or in other words, "the two attributes are independent." If the calculated value of $\mathcal{X}^2$is more than the table value at a particular level of significance, then we say that the difference is significant at that level and the null hypothesis is rejected. That is to say that there is some association (or relation) between the attributes or in other words the two attributes are not independent. Similarly, if the calculated value of $\mathcal{X}^2$ is less than the table value at a particular level of significance, then we say that the difference is not significant at that level and the null hypothesis is accepted. That is to say that there is no association (or relation) between the attributes or in other words the two attributes are independent.

2. As a Test of Goodness of Fit: It is also known as a test of concordance which enables us to understand how well the assured theoretical distribution fits to the observed data. If some probability distribution (theoretical distribution) is fitted to the given data, we can understand how well this distribution fits with the observed data. When the calculated value of $\mathcal{X}^2$is less than the critical value (or tabulated value) at a particular level of significance i.e., null hypothesis is accepted and the fit is considered to be good one which means the difference between the observed and expected frequencies (or hypothesized value) is due to sampling fluctuations. But if the calculated value of $\mathcal{X}^2$is greater than its critical value, the fit is not considered to be a good one. Thus, this test also helps in judging whether the distribution is continuous or discrete.

3. As a Test of Homogeneity: It is basically an extension of test of independence. Test of homogeneity tries to understand whether two or more independent random samples are drawn from the same universe or from different universe. It is important to mention here that in both tests of independence and tests of homogeneity, we are related to cross-classified data. Hence, both tests are performed similarly. Test of independence is related to the problem of whether one attribute is independent of

other or not? But the test of homogeneity is related to the problem whether different samples come from same universe. Moreover, test of independence involves a single sample taken from one universe. But test of homogeneity involves two or more independent samples one from each of the probable universe under the study.

4. As a Test of Population Variance : This type of test is applied to find out whether the *variance* in the population could be a specified numeric value. This has a vital role in scientific accuracy of media analysis .Hence, the value of $\mathcal{X}^2$can be derived by the following formula :

$$= \frac{NS^2}{s^2} = \frac{\sum(X-\overline{X})^2}{s^2}$$

Where N is the size of the sample,

S is the standard deviation of the sample,

s is the standard deviation of the universe.

Hence the degree of freedom is taken as (N-1). Thus, by comparing the calculated value and the critical value at about d_f and at a particular level of significance, the null hypothesis may be accepted or rejected.

It is important to mention here that this test is applicable only when the universe is normal.

14.2.2 ADDITIVE PROPERTY OF CHI SQUARE

χ^2 as an unique characteristics of addition which is very useful in the field of communication and media. When a number of sample studies are conducted in the same field of communication and media, then the results can be combined together for achieving an accurate idea about the actual position. It must be noted that during addition of the values of $\mathcal{X}^2$, two important aspects must be taken care of :

i. The pooled result in a single inclusive test is proper if the samples are independent.

ii. If the values of $\mathcal{X}^2$are to be combined together, Yate's corrections should be avoided because the addition theorem is applicable only for uncorrelated constituent elements

14.2.3 MISUSE AND PRECAUTION OF CHI SQUARE TEST

This test is the most widely, largely and frequently used technique. But at the same time, this test is also described as the most widely, largely and frequently misused procedure in the field of communication

and media studies because of underexposure of this statistical device. It is very easy to learn its formula and computation, but very difficult to apply this test in a scientific, reasonable and judicious manner.

Its most common misuse in mass communication is the violation of independence between measures. This assumption of independence should not be confused and misunderstood as a test of independence. Regarding the misuse of χ^2test in the field of behavioural communication and media studies has been suitably manifested in the *Journal of Experimental Psychology* as follows:

i. It is often applied even when the frequencies are very small. This is nothing but misuse of this test. Normally no frequency should be less than 10. If the frequency is less than 5 then either it should be with the adjacent frequency or yate's corrections should be used.

ii. Frequency of non-occurrence is often neglected. But it should never be omitted.

iii. $\chi^2$is often used even if the original data is not available. This can be described as a misuse. For example, when we have only proportions, percentages or rates, this test of χ^2should not be applied.

iv. Often the repeated measurements are made on the same units. This should be strictly avoided. For example, if the frequencies are given in percentage, then it does not reflect the size of N. If it is mentioned that out of 20 journalists, 8 are taken or out of 100 advertisers, 40 are taken, then the percentage is 40%. But this cannot be treated as size of N. Such percentages must be multiplied by N/100 for computations.

v. Another misuse of this test is that there are often failures to equalize the sum of observed frequencies and the sum of expected frequencies. This should be taken care and precautions should be there to equalize the same.

vi. Many a time the expected values are not calculated on a rational basis.

vii. Often the hypothesis is not properly set up. It can destroy the entire calculations and even the final results. So precautions needed here too.

viii. Similarly the calculations of degree of freedom are often mistaken. This is very important and conclusive aspect. So it should not be avoided.

ix. Often there are confusions between critical value and calculated value. This is again a serious matter. The calculated value is derived and the table value is available. The table value is also

called the tabulated value or the critical value. The table must be seen a particular level which is generally at 0.05 level or at 0.01 level of significance.

x. Further, the misuse of indeterminate theoretical frequencies, incorrect or questionable categorizing, incorrect calculations, and use of non-frequency data should be avoided.

It is highly surprising that the rate of growth of misuse of $\mathcal{X}^2$test is increasing faster than that the rate of growth of its use. Joseph Stegar in his pioneering work *"Readings in Statistics'* and further Lewis and Burke in their joint research paper have strictly precautioned, *"One cannot simply use a statistic because one knows how to calculate it. One must understand the rationale behind its development and its limitations on its applications imposed by its assumptions underlying it."* Hence, precautions must be taken carefully and meticulously to avoid the various misuses of $\mathcal{X}^2$as discussed above.

14.2.4 ILLUSTRATION OF VARIOUS APPLICATIONS OF CHI SQUARE TEST

Illustration of Various Applications of $\mathcal{X}^2$ Test: In media metrics, all the uses, misuses, precautions and suitability of the various applications will be further exemplified and simplified by the following problem-solving illustrations.

e.g. (i) In a classroom of 60 students of mass communication, 40 said 'yes' to a proposal, 10 said 'no' to the proposal and 10 remained neutral about the proposal. Find whether the opinion of the students is significant?

Solution: Let us take the hypothesis that the opinion of the students is not significant. Now, let us put the question into the following table:

	Yes	*No*	*Neutral*	*Total*
f_0	40	10	10	N=60
f_e	20	20	10	
f_o-f_e	20	-10	-10	
$(f_o-f_e)^2$	400	100	100	
$(f_o-f_e)^2/f_e$	20	5	5	

$\therefore \mathcal{X}^2 = \sum \frac{(f_0-f_e)^2}{f_e}$ = 20 + 5 + 5 = 30

d_f = (r – 1) (c – 1) = (2 – 1) (3 – 1) = 2

The table value of $\chi^2$with d_f = 2 at 0.01 level is 9.21 and at 0.05 level is 5.99. Since the calculated value with d_f 2 at both the levels is much more than the table value, so the difference is very significant. Hence the null hypothesis is rejected. Thus, the opinion of the students is significant.

e.g. (ii) In a journalism institute, 45 students were asked to express their attitude, in which 25, 12 and 8 students expressed their attitudes as *liked, disliked and neutral* respectively. Is this difference of attitude significant?

Solution: Let us take the hypothesis that the difference of attitude of students is not significant. Now, putting the questions in the following table :

	Liked	*Disliked*	*Neutral*	*Total*
f_0	25	12	8	N=45
f_e	15	15	15	
f_o-f_e	10	-3	-7	
$(f_o-f_e)^2$	100	9	49	
$(f_o-f_e)^2/f_e$	6.67	0.60	3.26	

$$\therefore \chi^2 = \sum \frac{(f_0-f_e)^2}{f_e} = 6.67 + 0.60 + 3.26 = 10.52$$

d_f = (r – 1) (c – 1) = (2 – 1) (3 – 1) = 2

The table value of $\chi^2$with d_f = 2 at 0.01 level is 9.21 and at 0.05 level is 5.99. Since the calculated value with d_f 2 at both the levels is much more than the table value, so the difference is significant. Hence the null hypothesis is rejected. Thus, the difference of attitudes of students is significant.

e.g. (iii) In a media school, 90 students were asked to give their preference for specialization, in which *electronic media, print media* and *advertising* preferences were given by 28, 35 and 27 students respectively. Is this difference of preference significant?

Solution: Let us take the hypothesis that there is no significant difference of preference of specialization among the students.

Now, let us put the question into the following table:

	Electronic Media	*Print Media*	*Advertising*	*Total*
f_0	28	35	27	N=90
f_e	30	30	30	
f_o-f_e	-2	5	-3	
$(f_o-f_e)^2$	4	25	9	
$(f_o-f_e)^2/f_e$	0.133	0.833	0.30	

$$\therefore \chi^2 = \sum \frac{(f_0-f_e)^2}{f_e} = 0.133 + 0.833 + 0.30 = 1.266$$

d_f = (r – 1) (c – 1) = (2– 1) (3 – 1) = 2

The table value of $\chi^2$with d_f = 2 at 0.01 level and 0.05 level is 9.21 and 5.99 respectively. Since the calculated value is less than the table value with d_f 2 at both the levels, so the difference is not significant. Hence the null hypothesis is accepted. Thus, the difference of preference of specialization among students is not significant.

e.g. (iv) In a media centre, 180 media persons were asked to express their attitude towards national service scheme, in which 54 media persons *liked* it, 70 *disliked* it, while 56 remained *neutral*. Is this difference of attitude significant?

Solution: Let us take the hypothesis that the difference of attitude of media persons is not significant. Now putting the problem in a tabular form :

	Liked	*Disliked*	*Neutral*	*Total*
f_0	54	70	56	N=180
f_e	60	60	30	
f_o-f_e	-6	10	-4	
$(f_o-f_e)^2$	36	100	16	
$(f_o-f_e)^2/f_e$	0.6	1.66	0.27	

$$\therefore \chi^2 = \sum \frac{(f_0-f_e)^2}{f_e} = 0.6 + 1.66 + 0.27 = 2.53$$

d_f = (r – 1) (c – 1) = (2 – 1) (3 – 1) = 2

The table value of $\mathcal{X}^2$with d_f 2 at 0.01 level is 9.21 and at 0.05 level is 5.99. Since the calculated value at both the levels is less than table value, so the difference is not significant. Hence the null hypothesis is accepted. Thus,the difference of attitude is not significant.

e.g. (v) On 50 viewers of television advertisement, the colour preference was experimented in which 14 viewers *preferred red*, 8 *preferred blue*, 12 *preferred* yellow, 9 *preferred green* and 7 *preferred orange*. Find whether this difference of colour preference is significant?

Solution : Let us take the hypothesis that there is no difference of colour preference among viewers.

Tabular form :

	Red	*Blue*	*Yellow*	*Green*	*Orange*	*Total*
f_0	14	8	12	9	7	N=50
f_e	10	10	10	10	10	
f_o-f_e	4	-2	2	-1	-3	
$(f_o-f_e)^2$	16	4	4	1	9	
$(f_o-f_e)^2/f_e$	1.6	0.4	0.4	0.1	0.9	

$$\therefore \mathcal{X}^2 = \sum \frac{(f_0-f_e)^2}{f_e} = 1.6 + 0.4 + 0.4 + 0.1 + 0.9 = 3.4$$

$d_f = (r - 1)\,(c - 1) = (2 - 1)\,(5 - 1) = 4$

At d_f 4, the table value of $\mathcal{X}^2$at 0.05 level and at 0.01 level is 9.48 and at 0.01 level is 13.27. Since the calculated value of χ^2 is less than the table value at both the levels, so the difference is not significant. Hence, the null hypothesis is accepted. Thus, there is no difference of colour preference among viewers of television advertisements.

e.g. (vi) Whether new media is helpful in education or not? 100 users of *new media* were asked to give their views in which 24 *strongly agreed*, 17 *agreed*, 18 remained *neutral*, 23 *disagreed* and 18 *strongly disagreed.* Is this difference of views significant?

Solution: Let us take the hypothesis that there is no significant difference of views of users of *new media*:

Now, converting the problem into a table:

	Strongly agreed	*Agreed*	*Neutral*	*Disagreed*	*Strongly disagreed*	*Total*
f_0	24	17	18	23	18	N=100
f_e	20	20	20	20	20	
f_o-f_e	4	-3	-2	3	-2	
$(f_o-f_e)^2$	16	9	4	9	4	
$(f_o-f_e)^2/f_e$	0.8	0.45	0.2	0.45	0.2	

$\therefore \mathcal{X}^2 = \sum \frac{(f_0-f_e)^2}{f_e}$ =0.8 + 0.45 + 0.2+0.45+ 0.2 = 2.10

d_f = (r – 1) (c – 1) = (2 – 1) (5 – 1) = 4

At d_f 4, the table value of $\mathcal{X}^2$ at 0.05 level is 9.48 and at 0.01 is 13.27. Since the calculated value of $\mathcal{X}^2$ at both the levels is less than the table value, so the difference is not significant. Hence, the null hypothesis is accepted. Thus, there is no significant difference of among users of new media as far as education is concerned.

e.g. (vii) when the opinions of 100 students of mass communication about a political party were collected, 30 students *strongly supported*, 25 *supported*, 10 remained *neutral*, 17 *opposed* and 18 *strongly opposed*. Find whether the difference of opinion is significant*?*

Solution: Let us take the hypothesis that the difference of opinion of students is not significant. Now putting the question in a tabular form:

	Strongly supported	*Supported*	*Neutral*	*Opposed*	*Strongly opposed*	*Total*
f_0	30	25	10	17	18	N=100
f_e	20	20	20	20	20	
f_o-f_e	10	5	-10	-3	-2	
$(f_o-f_e)^2$	100	25	100	9	4	
$(f_o-f_e)^2/f_e$	5	1.25	5	0.45	0.2	

$\therefore \chi^2 = \sum \frac{(f_0 - f_e)^2}{f_e}$ 5 + 1.25 + 5+0.45+ 0.2 = 11.90

d_f = (r – 1) (c – 1) = (2 – 1) (5 – 1) = 4

At d_f 4, the table value of χ^2 at 0.05 level and 0.01 level is 9.48 and 13.27 respectively. The calculated value of χ^2 at 0.05 level is more than the table value and 0.01 level is less than the table value, so the difference is significant at 0.05 level and not significant at 0.01 level. Hence the null hypothesis is rejected at 0.05 level and is accepted at 0.01 level. Thus, the difference of opinion of students at 0.05 level is significant and at 0.01 level is not significant.

e.g. (viii) The number of attacks on journalists per month in a certain town was as follows:12,8,20,2,14,10,15,6,9,4. Use chi-square test to determine if these frequencies are in agreement with the belief that attacks on journalist in that town were the same during 10- month period.

Solution: Let us take the hypothesis that attacks on journalists were the same during the period we should expect:

$$\frac{12 + 8 + 20 + 2 + 14 + 10 + 15 + 6 + 9 + 4}{10}$$

=10 attacks per month

Applying χ^2 test,

f_0	12	8	20	2	14	10	15	6	9	4
f_e	10	10	10	10	10	10	10	10	10	10
f_o-f_e	2	-2	10	-8	4	0	5	-4	-1	-6
$(f_o-f_e)^2$	4	4	100	64	16	0	25	16	1	36
$(f_o-f_e)^2/f_e$	0.40	0.40	10	6.4	1.6	0	2.5	1.6	0.1	3.6

$\chi^2 = \sum \frac{(f_0 - f_e)^2}{f_e}$= 26.60

df = (n – 1) = (10 – 1) = 9

At d_f = 9 $\chi^2_{0.05} = 16.92$

Since the calculated value of $\mathcal{X}^2$ is more than the table value, so the difference is significant. Hence, the null hypothesis is rejected. Thus, the frequencies are not in agreement with the belief that the no. of attacks were the same as during the last 10 months period.

e.g. (ix) From a sample of 50 female journalists, 60% female were *highly educated,* whereas 40% were *moderately educated*. Compare the distribute of females from the point of view of equal distribution.

Solution: Let us take the hypothesis that there is no significant difference between observed frequencies and expected frequencies of *highly educated* and *moderately educated* female journalists in the sample. Now, let us convert the question into a table:

	Highly Educated	*Moderately Educated*
f_0	60%	40%
f_e	50%	50%
f_o-f_e	10%	10%
$(f_o-f_e)^2$	100	100
$(f_o-f_e)^2/f_e$	2	2

$$\mathcal{X}^2 = \sum \frac{(f_0-f_e)^2}{f_e} = 2 + 2 = 4$$

Now, we are supposed to multiply the percentage value of χ^2 by N/100 to convert it into numeric value.

Hence,

$$\chi^2 = 4 \times \frac{N}{100}$$

$$= 4 \times \frac{50}{100}$$

$$= 2$$

$$d_f = (r - 1)(c - 1) = (2 - 1)(2 - 1) = 1$$

At d_f 1, the table value of $\mathcal{X}^2$ at 0.05 level is 3.84 and at 0.01 level is 6.63. Since the calculated value of $\mathcal{X}^2$ is less than the table value at both the levels, so the difference is insignificant. Hence, the null hypothesis is accepted. Thus, there is no significant difference between the observed frequencies of

highly *educated* and *moderately educated* female journalists in the sample. That means there is equal distribution of highly *educated* and *moderately educated* female journalists in the sample.

e.g. (x) In an issue, out of 50 Hindu, 10 said '*Yes'*, 25 said '*No*' and 15 remained '*undecided',* while out of 45 Muslim, 20 said '*yes*', 20 said *'no'* and 5 remained *'undecided'* and out of 55 Christian, 30 said *'yes'*, 15 said *'no'* and 10 remained *'undecided'*. Find out whether the difference of opinion among Hindu, Muslim and Christian are significant?

Solution : Let us take the hypothesis that there is no significant difference of opinion among Hindu, Muslim and Christian regarding the issue. Now, converting the problem into a tabular form :

Religion	*Yes*	*No*	*Undecided*	*Total*
Hindu	f_{o_1} = 10 f_{e_1} = 20	f_{o_2} = 25 f_{e_2}=20	f_{o_3} = 15 f_{e_3}= 10	N_1 = 50
Muslim	f_{o_4} = 20 f_{e_4} = 18	f_{o_5} = 20 f_{e_5}= 18	f_{o_6} = 5 f_{e_6} = 9	N_2 = 45
Christian	f_{o_7} = 30 f_{e_7} = 22	f_{o_8} = 15 f_{e_8}= 22	f_{o_9} = 10 f_{e_9} = 11	N_3 = 55
Total	60	60	30	N= N_1+N_2+N_3 =50+45+55=150

Calculation of $f_e = \frac{RT \times CT}{N}$

$$f_{e_1} = \frac{60 \times 50}{150} = 20$$

$$f_{e_2} = \frac{60 \times 50}{150} = 20$$

$$f_{e_3} = \frac{30 \times 50}{150} = 10$$

$$f_{e_4} = \frac{60 \times 45}{150} = 18$$

$$f_{e_5} = \frac{60 \times 45}{150} = 18$$

$$f_{e_6} = \frac{30\times45}{150} = 9$$

$$f_{e_7} = \frac{60\times55}{150} = 22$$

$$f_{e_8} = \frac{60\times55}{150} = 22$$

$$f_{e_9} = \frac{30\times55}{150} = 11$$

Now calculation of $\mathcal{X}^2$:

f_0	10	25	15	20	20	5	30	15	10
f_e	20	20	10	18	18	9	22	22	11
f_o-f_e	-10	5	5	2	2	-4	8	7	-1
$(f_o-f_e)^2$	100	25	25	4	4	16	64	49	1
$(f_o-f_e)^2/f_e$	5	1.25	2.5	0.22	0.22	1.77	2.91	2.33	0.03

$\mathcal{X}^2 = \sum\frac{(f_0-f_e)^2}{f_e}$ =5 + 1.25 + 2.5+0.22+ 0.22+1.77+2.91+2.33 = 16.23

d_f = (r – 1) (c – 1) = (3 – 1) (3 – 1) = 4

At d_f 4, the table value of $\mathcal{X}^2$ at 0.05 level and 0.01 level is 9.48 and 13.27 respectively. The calculated value of $\mathcal{X}^2$ at both the levels is more than the table value. So the difference is significant at both the levels. Hence the null hypothesis is rejected. Thus, there is significant difference of opinion among Hindu, Muslim and Christian regarding the issue.

e.g. (xi) An innovative training to 250 working journalists suffering from the habit of yellow journalism, was imparted. From the data given below, state whether the *innovative training* is superior to the *conventional training*?

No. of working journalists.

Training		*Favourable*	*Not favourable*	Total
Innovative		140	30	170
Conventional		60	20	80
Total		200	50	250

Solution: Let us take the hypothesis that there is no significant difference between *innovative training* and *conventional training*.

Applying the formula for calculating f_e :-

$$f_e = \frac{RT \times CT}{N}$$

$$f_e = \frac{200 \times 170}{250} = 34$$

$$f_{e_2} = \frac{50 \times 170}{250} = 34$$

$$f_{e_3} = \frac{200 \times 80}{250} = 64$$

$$f_{e_4} = \frac{50 \times 80}{250} = 16$$

Now, calculation of $\mathcal{X}^2$:

f_0	140	30	60	20
f_e	136	34	34	16
f_o-f_e	4	4	4	4
$(f_o-f_e)^2$	16	16	16	16
$(f_o-f_e)^2/f_e$	0.118	0.250	0.471	1

$$\mathcal{X}^2 = \sum \frac{(f_0 - f_e)^2}{f_e} = 0.118+0.250+0.47+1 = 1.839$$

$$d_f = (r - 1)\,(c - 1) = (2 - 1)\,(2 - 1) = 1 \times 1 = 1$$

At d_f 1, the table value of $\mathcal{X}^2$ at 0.05 level is 3.84. Since the calculated value is less than the table value, so the difference is insignificant. Hence, the null hypothesis is accepted. Thus, there is no significant difference between *innovative training* and *conventional training.*

e.g.(xii) A certain *spiritual feature writing* is claimed to be effective in eliminating the negative attitude. In an experiment on 500 readers with negative attitude, half of them were asked to read the *spiritual feature* and half of them were asked to read the *spiritual news*. The readers' reactions after such treatment are recorded in the following table :

	Helped	Harmed	No effect	Total
Spiritual feature	150	30	70	250
Spiritual news	130	40	80	250

Total	280	70	150	500

On the basis of the data, can it be concluded that there is a significant difference in the effect of the *spiritual feature* and *spiritual news?*

Solution: Let us take the null hypothesis that there is no significant difference in the effect of the *spiritual feature* and *spiritual news.*

Applying the formula for calculating f_e:

$$f_e = \frac{RT \times CT}{N}$$

$$f_{e_1} = \frac{280 \times 250}{500} = 140$$

$$f_{e_2} = \frac{70 \times 250}{500} = 35$$

$$f_{e_3} = \frac{150 \times 250}{500} = 75$$

$$f_{e_4} = \frac{280 \times 250}{500} = 140$$

$$f_{e_5} = \frac{70 \times 250}{500} = 35$$

$$f_{e_6} = \frac{150 \times 250}{500} = 75$$

Now calculating χ^2

f_0	150	30	70	130	40	80
f_e	140	35	75	140	35	75
f_o-f_e	10	5	5	10	5	5
$(f_o-f_e)^2$	100	25	25	100	25	25
$(f_o-f_e)^2/f_e$	0.714	0.714	0.333	0.714	0.714	0.333

$\chi^2 = \sum \frac{(f_0-f_e)^2}{f_e}$ =0.714+0.714+0.333+0.714+0.714+0.333 = 3.522

d_f = (r – 1) (c – 1)= (2 – 1) (3 – 1) = 2

At d_f 2, the table value of χ^2 at 0.05 level is 5.99. Since the calculated value is less than the table value, so the difference is not significant. Hence, the null hypothesis is accepted. Thus, there is no significant difference between the effect of the *spiritual feature* and the *spiritual news.*

e.g.(xiii) A film producer is bringing out a new film. In order to map out his advertising campaign, he wants to determine whether the film will appeal most to particular age group or whether it will appeal equally to all the of groups. The producer takes a random sample from persons attending preview of the new film and gets the following data:

Age Groups

	Under 20	*20-39*	*40-59*	*60 & above*	*Total*
Liked	146	78	48	28	300
Disliked	54	22	42	22	140
Neutral	20	10	10	20	60
Total	220	110	100	70	500

What inference will you draw from this results?

Solution : Let us take the hypothesis that the film equally appeals to all age-groups. Applying the formula for calculating f_e:

$$f_e = \frac{RT \times CT}{N}$$

$$f_{e_1} = \frac{220 \times 300}{500} = 132$$

$$f_{e_2} = \frac{110 \times 300}{500} = 66$$

$$f_{e_3} = \frac{100 \times 300}{500} = 60$$

$$f_{e_4} = \frac{70 \times 300}{500} = 42$$

$$f_{e_5} = \frac{220 \times 140}{500} = 61.6$$

$$f_{e_6} = \frac{110 \times 140}{500} = 30.8$$

$$f_{e_7} = \frac{100 \times 140}{500} = 28$$

$$f_{e_8} = \frac{70 \times 140}{500} = 19.6$$

$$f_{e_9} = \frac{220 \times 60}{500} = 26.4$$

$$f_{e_{10}} = \frac{110 \times 60}{500} = 13.2$$

$f_{e_{11}} = \frac{100\times60}{500} = 12$

$f_{e_{12}} = \frac{70\times60}{500} = 8.4$

Now, calculating the value of $\mathcal{X}^2$:

f_0	146	78	48	28	54	22	42	22	20	10	10	20
f_e	132	66	60	42	61.6	30.8	28	19.6	26.4	13.2	12	8.4
f_o-f_e	14	12	-12	-14	-7.6	-8.8	14	2.4	-6.4	-3.2	-2	11.6
$(f_o-f_e)^2$	196	144	144	196	57.76	77.44	196	5.76	40.96	10.24	4	134.56
$(f_o-f_e)^2/f_e$	1.485	2.182	2.4	4.6	0.93	2.51	7	0.29	1.55	0.77	2	16.01

$\mathcal{X}^2 = \sum\frac{(f_0-f_e)^2}{f_e}$ =1.485+ 2.182+ 2.4+ 4.6+ 0.93+ 2.51+ 7+ 0.29+ 1.55+ 0.77+ 2+ 16.01= 40.16

$d_f = (r-1)(c-1) = (3-1)(4-1) = 6$

For $d_f = 6$, $\chi^2_{0.05} = 12.59$

Since the calculated value is more than the table value at 0.05 level, so the difference is significant. Hence, the null hypothesis is rejected. Thus, the film does not equally appeal to all age-groups.

e.g. (xiv) An *ad agency* gives us the following information about age groups and the liking for particular model of car, which it plans to advertise:

Age Groups

	Below 20	*20-39*	*40-59*	*60 & above*	*Total*
Liked	140	80	40	20	280
Disliked	60	50	30	80	220
Total	200	130	70	100	500

On the basis of this data, can it be concluded that the model appeal is independent of the age group.

Solution: Let us take the hypothesis that the model appeal is independent of the age group.

Applying the formula for calculating:

$$f_e = \frac{RT \times CT}{N}$$

$$f_{e_1} = \frac{200 \times 280}{500} = 112$$

$$f_{e_2} = \frac{130 \times 280}{500} = 72.8$$

$$f_{e_3} = \frac{70 \times 280}{500} = 39.2$$

$$f_{e_4} = \frac{50 \times 170}{250} = 56$$

$$f_{e_5} = \frac{200 \times 220}{500} = 88$$

$$f_{e_6} = \frac{130 \times 220}{500} = 57.2$$

$$f_{e_7} = \frac{70 \times 220}{500} = 30.8$$

$$f_{e_8} = \frac{100 \times 220}{500} = 44$$

Now, calculating the value of $\mathcal{X}^2$:

f_0	140	80	40	20	60	50	30	80
f_e	112	72.8	39.2	56	88	57.2	30.8	44
f_o-f_e	28	7.2	0.8	-36	-28	-7.2	-0.8	36
$(f_o$-$f_e)^2$	784	51.84	0.64	1296	784	51.84	0.64	1296
$(f_o$-$f_e)^2/f_e$	7	0.712	0.016	23.143	8.910	0.906	0.021	29.454

$$\mathcal{X}^2 = \sum \frac{(f_0 - f_e)^2}{f_e}$$

=7+0.712+0.016+23.143+8.910+0.906+0.021+29.454 = 70162

df = (r – 1) (c – 1) = (2 – 1)(4 – 1)=3

For d_f = 3, $\chi^2_{0.05} = 7.815$

Since the calculated value is much more than the table value, so the difference is significant. Hence, the null hypothesis is rejected. Thus, the model appeal is not independent of the age group.

e.g. (xv) The following results were obtained when two sets of media persons were subjected to two different trainings X and Y, to enhance their writing skills. Training X was imparted to 400 media persons and 80 were found to have improved their writing skills. Training Y was imparted to 400 media

persons and 20 were found to have improved their writing skills. Is the training Y superior to training X?

Solution: Let us take the null hypothesis that there is no significant difference in the two types of training X and Y. The given results can be put into a table in the following manner:

Training	*Improved*	*Not improved*	*Total*
X	80	320	400
Y	20	380	400
Total	100	700	800

Calculating the value of f_e:

$$f_e = \frac{RT \times CT}{N}$$

$$f_{e_1} = \frac{400 \times 100}{800} = 50$$

$$fe_2 = 400 - 50 = 350$$

$$fe_2 = 400 - 50 = 350$$

$$fe_4 = 700 - 350 = 350$$

Now, calculating the value of $\mathcal{X}^2$:

f_0	80	320	20	380
f_e	50	350	50	350
$f_o - f_e$	30	30	30	30
$(f_o - f_e)^2$	900	900	900	900
$(f_o - f_e)^2/f_e$	18	2.571	18	2.571

$\mathcal{X}^2 = \sum \frac{(f_0 - f_e)^2}{f_e}$ = 18+2.571 + 18+ 2.571 = 41.142

d_f = (r – 1) (c – 1) = (2 – 1)(2 – 1) = 1

At d_f = 1, $\chi^2_{0.05} = 3.84$

Since the calculated value of χ^2 is much higher than the table value, so the difference is significant. Hence, the null hypothesis is rejected. Thus, there is significant difference between two types of training X and Y.

e.g.(xvi) Three samples were taken consisting of 120 reporters, 150 sub editors and 130 advertisers. Each person chosen is asked to select one of the three categories that best represents his feeling toward a certain national policy. The three categories are in favour of policy (A), against policy (B), and indifferent toward the policy (C). The results of the interview are given below:

Occupation	*A*	*B*	*C*	*Total*
Reporters	80	30	10	120
Sub editors	70	40	40	150
Advertisers	50	50	30	130
Total	200	120	80	400

On the basis of this data, can it be concluded that the views of Reporters, Sub editors and Advertisers are homogenous in so far as National Policy under discussion is concerned.

Solution: Let us take the hypothesis that the three classifications are homogenous as far as the opinion of three different groups of people about National Policy under consideration is concerned.

Calculating the value of f_e:

$$f_e = \frac{RT \times CT}{N}$$

$$f_{e_1} = \frac{200 \times 120}{400} = 60$$

$$f_{e_2} = \frac{120 \times 120}{400} \quad fe_2 = \frac{120' \ 120}{400} = 36$$

$$fe_3 = 120 - (60 + 36) = 24$$

$$f_{e_4} = \frac{200 \times 150}{400} = 75$$

$$f_{e_5} = \frac{120 \times 150}{400} = 45$$

$$fe_6 = 150 - (75 + 45) = 30$$

$$fe_7 = 200 - (60 + 75) = 65$$

$fe_8 = 120 - (36 + 45) = 39$

$fe_9 = 80 - (24 + 30) = 26$

f_0	80	30	10	70	40	40	50	50	30
f_e	60	36	24	75	45	30	65	39	26
$f_o - f_e$	20	-6	-14	-5	-5	10	-15	11	4
$(f_o - f_e)^2$	400	36	196	25	25	100	225	121	16
$(f_o - f_e)^2/f_e$	6.667	1	8.167	0.3333	0.556	0.333	3.462	3.103	0.615

$\chi^2 = \sum \frac{(f_o - f_e)^2}{f_e}$ = 6.667 + 1 + 8.167 + 0.333 + 0.556 + 0.333 + 3.462 + 3.103 + 0.615 = 27.236

d_f = (r – 1) (c – 1) = (3 – 1)(3 – 1) = 2×2 = 4

For d_f = 4, $\chi^2_{0.05} = 9.488$

Since the calculated value is much more than the table value, so the difference is significant. Hence, the null hypothesis is rejected. Thus, the three classifications are not homogenous as far as the opinion of three different groups of people(Reporters, Sub-editors and *Advertisers*) about National Policy under consideration is concerned.

e.g. (xvii) From the following data of advertisers, find out whether there is any relationship between gender and preference of colour:

Colour	*Males*	*Females*	*Total*
Red	10	40	50
White	70	30	100
Green	30	20	50
Total	110	90	200

Solution: Let us take the hypothesis that there is no relationship between gender and preference of colour.

Now, calculating the value of f_e :

$$f_e = \frac{RT \times CT}{N}$$

$f_{e_1} = \frac{110\times50}{200} = 27.5$

$fe_2 = 50 - 27.5 = 22.5$

$f_{e_3} = \frac{110\times100}{200} = 55$

$f_{e_4} = 100-55 = 45$

$fe_5 = 110 - (fe_1 + fe_3) = 110 - (27.5 + 55) = 27.5$

$fe_6 = 50 - 27.5 = 22.5$

f_0	10	40	70	30	30	20
f_e	27.5	22.5	55	45	27.5	22.5
f_o-f_e	-17.5	17.5	15	-15	2.5	-2.5
$(f_o-f_e)^2$	306.25	306.25	225	225	6.25	6.25
$(f_o-f_e)^2/f_e$	11.14	13.61	4.09	5	0.23	0.28

$\chi^2 = \sum\frac{(f_o-f_e)^2}{f_e}$ = 11.14 + 13.61 + 4.09 +5 + 0.23 + 0.28 = 34.35

d_f = (r – 1) (c – 1)= (3 – 1)(2 – 1) = 2

At d_f 2, $\chi^2_{0.05} = 5.99$

Since the calculated value is much more than the table value, so the difference is significant. Hence, the hypothesis is rejected. Thus, there is relationship between gender and preference of colour.

e.g. (xviii) A manufacturer of TV set was trying to find out what variable influenced the purchase of a TV set. Level of income was suggested as possible variable influencing the purchases of TV sets. A sample of 500 households was selected and the information obtained was classified as shown below :

	Have TV set	*Don't have TV set*
Low income group	0	250
Middle income group	50	100
High income group	130	370

Is there evidence from the above data of a relation between ownership of TV sets and level of income?

Solution : Let us take the hypothesis that ownership of TV sets is independent of level of income.

Now calculating the f_e:

$$f_e = \frac{RT \times CT}{N}$$

$$f_{e_1} = \frac{130 \times 250}{500} = 65$$

$$fe_2 = 250 - 65 = 185$$

$$f_{e_3} = \frac{130 \times 150}{500} = 39$$

$$fe_4 = 150 - 39 = 111$$

$$f_{e_5} = 130 - (65 + 39) = 26$$

$$fe_6 = 370 - (111 + 185) = 74$$

f_0	0	250	50	100	80	20
f_e	65	185	39	111	26	74
(f_o-f_e)	-65	65	11	-11	54	-54
$(f_o-f_e)^2$	4225	4225	121	121	2916	2916
$(f_o-f_e)^2/f_e$	65	22.838	3.103	1.090	112.154	39.405

$$\chi^2 = \sum \frac{(f_0 - f_e)^2}{f_e} = 65 + 22.838 + 3.103 + 1.090 + 112.154 + 39.405 = 243.59$$

$d_f = (r - 1)(c - 1) = (2 - 1)(3 - 1) = 2$

At $d_{f\,2}$, $\chi^2_{0.05} = 7.82$

Since the calculated value of χ^2 is much more than the table value, so the difference is significant. Hence, the hypothesis is rejected. Thus, there is relationship of TV set is not independent of income.

e.g. (xix) A survey among women journalists was conducted to study the family life. The data is given below:

Family Life	*Happy*	*Not Happy*	*Total*
Highly Educated	70	30	100

Moderately Educated	60	40	100
Total	130	70	200

Test whether there is any association between family life and revel of education.

Solution: Let us take the hypothesis that there is no association between the family life and level of education.

Now, calculating f_e

$$f_e = \frac{RT \times CT}{N}$$

$$f_{e_1} = \frac{130 \times 100}{200} = 65$$

$$f_{e_2} = 100 - 65 = 35$$

$$f_{e_3} = \frac{130 \times 100}{200} = 65$$

$$fe_4 = 100 - 65 = 35$$

f_0	70	30	60	40
f_e	65	35	65	35
(f_o-f_e)	5	-5	-5	5
$(f_o-f_e)^2$	25	25	25	25
$(f_o-f_e)^2/f_e$	0.385	0.714	0.385	0.714

$$\chi^2 = \sum \frac{(f_0 - f_e)^2}{f_e} = 0.385 + 0.714 + 0.385 + 0.714 = 2.198$$

$d_f = (r - 1)(c - 1) = (2 - 1)(2 - 1) = 1$

At $d_{f\,1}$, $\chi^2_{0.05} = 3.84$

Since the calculated value of C^2 is less than the table value, so the difference is not significant. Hence, the null hypothesis is accepted. Thus, there is no association between the family life and level of education.

e.g.(xx) A controlled experiment to test the effectiveness of a communication model was conducted. Under this experiment 300 media students were treated with this new communication model and 200 were not treated with this model. The results of the experiment are given below

Details	*Favourably effected*	*Unfavourably effected*	*No effect*	*Total*
Treated with new communication model	200	40	60	300
Not treated with the new communication model	120	30	50	200
Total	320	70	110	500

Use χ^2 and comment on the effectiveness of the new communication model.

Solution : Let us assume that there is no effectiveness of the new communication model on media students.

Now calculating the value of f_e:

$$f_e = \frac{RT \times CT}{N}$$

$$f_{e_1} = \frac{320 \times 300}{500} = 192$$

$$f_{e_2} = \frac{70 \times 300}{500} = 42$$

$$f_{e_3} = 300 - (192 + 42) = 66$$

$$fe_4 = 320 - 192 = 128$$

$$fe_5 = 70 - 42 = 28$$

$$fe_6 = 110 - 66 = 44$$

Now,

f_0	200	40	60	120	30	50
f_e	192	42	66	128	28	44
f_o-f_e	8	-2	-6	-8	2	6
$(f_o-f_e)^2$	64	4	36	64	4	36
$(f_o-f_e)^2/f_e$	0.333	0.095	0.545	0.5	0.143	0.818

$$c^2 = \sum \frac{(f_0 - f_e)^2}{f_e} = 0.333 + 0.095 + 0.545 + 0.5 + 0.143 + 0.818 = 2.434$$

$df = (n-1)(c-1) = (2-1)(3-1) = 2$

for df_2, $\chi^2_{0.05} = 5.49$

Since the calculated value of χ^2 is less than the table value, so the difference is not significant. Hence, the null hypothesis is accepted. Thus, there is no significant difference in the media students treated with the new communication and those not treated.

e.g. (xxi) Out of 150 students, 56 out of 80 girls described a decision as *right* and 24 as *wrong* while 34 out of 70 boys described it as *right* and 36 as *wrong.* Find out whether there is significant difference between the decision of *right* and *wrong*.

Solution : Let us take the hypothesis that there is no significant difference between the decision of right and wrong. Now let us put the problem into a tabular form :

	Right	*Wrong*	
Girls	(A) *56*	(B) 24	A+B 80
Boys	(C) 34	(D) 36	C+D *70*
	A+C = 90	B + D = 60	N = 150

Since the data are in 2 × 2 consistency table,

So

$$\chi^2 = \frac{N(AD - BC)^2}{(A+B)(C+D)(A+C)(B+D)}$$

$$= \frac{150(56 \times 36 - 24 \times 34)^2}{(80)(70)(90)(60)}$$

$$= \frac{150(2016 - 816)^2}{30240000}$$

$$= \frac{150(1200)^2}{30240000}$$

$$= \frac{150 \times 1440000}{30240000}$$

$$= \frac{150 \times 144}{3024} = 7.14$$

$$\chi^2 = 7.14$$

d_f = (r – 1) (c – 1)= (2 – 1) (2 – 1) = 1

The table value of χ^2 with d_f 1 at 0.05 level is 3.84 and at 0.01 level is 6.63. Since the calculated value of χ^2 is more than the table value at both the levels, so the difference is significant. Hence, the null hypothesis is rejected. Thus, there is a significant difference between the decision of *right* and *wrong.*

e.g. (xxii) 30 Students (18 from public schools and 12 from govt. schools) participated in a debate: on the topic, "Media is creating more tension than awareness." Some of them spoke in *favour* while some spoke *against* the motion. The data are as follows:

	Favour	*Against*	Total
Public Schools	12	6	18
Govt. Schools	2	10	12

Find whether the difference between *favour* and *against* is significant?

Solution: Let us take the hypothesis that there is no significant difference between favour and against.

When 2 × 2 contingency table, if any one of the frequency is less than 5, then yate's correction is applied and the value of χ^2 is determined by the following formula:

$$\chi^2 = \frac{N\left(|AD - BC| - \frac{N}{2}\right)^2}{(A+B)(C+D)(A+C)(B+D)}$$

Now, converting the question into the tabular form :

	Favour	Against	
Public Schools	12(A)	6(B)	A+B = 18
Govt. Schools	2(C)	10(D)	C+D = 12
	A+C = 14	B+D = 16	N = 30

$$\chi^2 = \frac{N\left(|AD - BC| - \frac{N}{2}\right)^2}{(A+B)(C+D)(A+C)(B+D)}$$

$$\frac{30\left(|12 \times 10 - 6 \times 2| - \frac{30}{2}\right)^2}{18 \times 12 \times 14 \times 16}$$

$$= \frac{30 \times 93 \times 93}{18 \times 12 \times 14 \times 16} = 5.36$$

d_f = (r – 1) (c – 1)= (2 – 1) (2 – 1) = 1×1=1

At d_f 1, the table value of χ^2 at 0.05 level is 3.84 and at 0.01 level is 6.63. Since the calculated value of χ^2 is more than the table value at 0.05 level and is less than the table value at 0.01 level, so the difference at 0.05 level is significant and the difference is not significant at 0.01 level. Hence, the null hypothesis is rejected at 0.05 level and is accepted at 0.01 level. Thus, there is significant difference between *favour* and *against* at 0.05 level, while there is no significant difference between *favour* and *against* at 0.01 level.

e.g. (xxiii) The number of mistakes per newspaper in a sample of 330 newspapers was found as follows :

No. of Mistakes	0	1	2	3	4
No. of Newspapers	214	92	20	3	1

Fit a Poisson distribution to the data and test for goodness of fit.

Solution : Let us take the hypothesis that there is no significant difference between observed frequencies and expected frequencies by fitting Poisson distribution.

The expected frequencies can be calculated by the following the formula of Theoretical Distribution as f_{e1} = 212.75, f_{e2} = 93.4, f_{e3} = 20.5, f_{e4} = 3, f_{e5} = 0.35.

Now calculating χ^2

f_0	214	92	20	3	1
f_e	212.75	93.4	20.5	3	0.35
f_o-f_e	1.25	-1.4	-0.5	0	-0.65
$(f_o-f_e)^2$	1.56	1.96	0.0625	0	0.4225
$(f_o-f_e)^2/f_e$	0.0073	0.0210	0.0031	0	1.20

$$\chi^2 = \sum \frac{(f_0-f_e)^2}{f_e} = 1.2314$$

$$d_f = 3 - 2 = 1 \text{ , } \chi^2_{0.05} = 3.84$$

Since the calculated value of χ^2 in less than the table value, so the difference is significant. Hence, the null hypothesis in accepted. Thus, the fit is good.

14.3 CHECK YOUR PROGRESS

Note: 1) Use the space below for your answers.

2) Compare your answers with those given at the end of this lesson.

A. CHOOSE THE RIGHT OPTION.

1. Who introduced Chi-square test?
   (a) Karl Pearson
   (b) R. A. Fisher
   (c) David Ricardo
   (d) None of them
2. When was Chi-square introduced?
   (a) 1970
   (b) 1980
   (c) 1990
   (d) 2000
3. Chi-square is a type of statistics which may be described as :

(a) Descriptive

(b) Inferential

(c) Calculative

(d) None of them

4. Chi-square deals with a test which may be described as :

(a) Parametric

(b) Non-parametric

(c) Neither parametric nor non-parametric

(d) None of them

5. The most important application of Chi-Square is :

(a) Test of parameter

(b) Test of non-parameter

(c) Test of independence

(d) None of them

B. FILL IN THE BLANKS:

1. Chi-Square is denoted by ……
2. Chi-Square is the most…… non-parametric test.
3. The most common misuse of Chi-Square is the violation of ……. between measures.
4. Chi-Square is game of observed and …….frequencies.
5. Non-parametric tests are not as reliable as …….tests.

14.4 SUMMARY

- Though parametric tests are more reliable, suitable, powerful and effective than the non-parametric tests, yet chi-square test is considered to be the most popular and widely used non-parametric tests for statistical analysis and statistical inference. Applied by *British* Statistician *Karl Pearson* in 1990 and denoted by Greek Letter C^2, is given by the following formula:

$$\chi^2 = \sum \frac{(f_0 - f_e)^2}{f_e}$$

- In a situation of multiple expected frequencies, the expected frequency is calculated by the following formula: $f_e = \frac{RT \times CT}{N}$
- The *Degree of Freedom* is denoted by *df* or v is given by the formula: *df* (or v) = (n−1) (r−1). When data are arranged into 2×2 consistency table, then

$$\chi^2 = \frac{N(AD - BC)^2}{(A + B)(C + D)(A + C)(B + D)}$$

- When in a four cells of 2 × 2 consistency table, any one of the frequency is less than 5, then yate's correction is applied and the value of C^2 is determined by the following formula: $\chi^2 = \frac{(|AD-BC|-N/2)^2}{(A+B)(C+D)(A+C)(B+D)}$
- Most important applications of χ^2 are : *Test of Independence, (ii) Test of Goodness of Fit, (iii) Test of Homogeneity, (iv) Test of Population Variance*. As a *Test of Independence* one can test whether two or more attributes are independent of each other or they are associated or related. As a *Test of Goodness of fit*, one can test how well the assumed theoretical distribution is fitted to the given data. *Test of homogeneity*, an extension of test of independence, involves two or more independent samples, one from each of the probable universe under the study. *Test of population variance* is applied whether the variance in the population could be specified numeric value. The rate of growth of misuse of C^2 is increasing faster than the rate of growth of its use.

14.5 KEYWORDS

Chi-Square: It is a specific type of cross-tabulation between observed frequencies and expected frequencies which is followed by a certain formula.

Test of Independence: As a Test of Independence one can test whether two or more attributes are independent of each other or they are associated or related.

Test of Goodness of Fit: As a Test of Goodness of fit, one can test how well the assumed theoretical distribution is fitted to the given data.

Test of Homogeneity: This test is an extension of test of independence which involves two or more independent samples, one from each of the probable universe under the study.

Test of Population Variance: *It* is applied whether the variance in the population could be specified numeric value.

14.6 SELF-ASSESSMENT TEST

1. What is χ^2 test ? Under what conditions is it applicable? Why is C^2 test called test of goodness of fit?
2. Describe the χ^2 test of significance and state the several uses to which it can be put?
3. What is χ^2 test of goodness of fit? What precautions are necessary.
4. What are the basic conditions for the application of χ^2– test ?
5. χ^2 test is a test of independence, homogeneity and goodness of fit. Discuss briefly.
6. Why is χ^2test so popular despite being a non-parametric test?
7. Describe the meaning and concept of χ^2. Explain the conditions for using χ^2 test.
8. Explain the applications of χ^2 test : (a) As a test of Independence, (b) As a Test of Goodness of Fit, (c) As a Test of Homogeneity, (d) As a Test of Population Variance.
9. Explain the alternative method and additive property of χ^2 test.
10. It is said that χ^2 test is more widely misused test, even though it the most popular parametric test. Comment.
11. How is χ^2 test used if the degree of freedom is more than 30?
12. Explain the constants of chi-square distribution.
13. Enumerate the various formulae for measuring the value of χ^2.
14. Which formula will you use for measuring the value of χ^2 if there are more fractions in the deviations and the use of earlier direct formula becomes tedious?

14.7 ANSWERS TO CHECK YOUR PROGRESS

A. CHOOSE THE RIGHT OPTION.

1. (a) Karl Pearson
2. (c) 1990
3. (b) Inferential
4. (b) Non-parametric

5. (c) Test of independence

B. FILL IN THE BLANKS.

1. Greek Letter
2. Popular
3. Independence
4. Expected
5. Parametric

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