Scheme of Evaluation
Internal Assessment Test 1 – March 2023

Sub:	Research Methodology and IPR							Code:	22RMI18
Date:	15-03-2022	Duration:	90mins	Max Marks:	50	Sem:	I	Branch:	MCA

Question #	Description	Marks Distribution	Max Marks
1.	**Research is much concerned with proper fact finding, analysis and evaluation." Do you agree with this statement? Give reasons in support of your answer.**		10
	Minimum three reasons to be given	3	
	Detail Justification for those three points to be given	6	
	Example and presentation	1	
2.	**What is research? Discuss the objectives and motivations in research.**		10
	Definition of Research	2	
	Objectives of research any Four Points	4	
	Motivation for research any Four Points	4	
3.	**Describe the different types of research, clearly pointing out the difference between an experiment and a survey.**		10
	List different types of research any eight types	2	
	Details explanation about Experiment Research minimum 4 points	4	
	Details explanation about Survey Research minimum 4 points	4	
4.	**Explain Cluster Samples with example**		10
	Definition/ Meaning of Cluster Sample	2	
	Examples for Cluster Sample	4	
	Detail Explanation for those examples	4	
5.	**Discuss Importance of Interpretation and Report Writing**		10
	Definition for Interpretation and Report Writing	2	
	Importance of Interpretation minimum 4 points to be answered	4	
	Importance of Report writing minimum 4 points to be answered	4	
6.	**Why computer science research to be carried out in 21st century in India. Justify**		10
	Meaning of open challenges any 5 points to be answered	5	
	Details Justification for those five points to be given	5	
7.	**What problems are encountered by researchers in India?**		10
	Any five problems to be explain	8	
	Detail explanation with examples	2	
8.	**Write the difference between Qualitative and Quantitative research**		10
	Quantitative research any 5 points to be answered	5	
	Qualitative research any 5 points to be answered(expected table form)	5	
9.	**Describe Signification of research with suitable example.**		10
	Signification of research any five points with explanation	6	
	Suitable examples for those points to be given	4	
10.	**Explain Quantitative research importance with an example**		10
	Qualitative research any 5 points to be answered	5	
	Examples	3	
	Explanations for the examples	2	

Solution for the Questions
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1. **Research is much concerned with proper fact finding, analysis and evaluation." Do you agree with this statement? Give reasons in support of your answer.**

Yes, research is about finding facts, analyzing them, and then evaluating the results. ... Given that research is based on proving or disproving a theory, it means that research is concerned with finding facts, analyzing facts, and evaluating the response, in order to form a conclusion regarding the research topic.

Research begins with a theory or thesis statement. This statement has to be proven or disproven as true/false. Given that research is based on proving or disproving a theory, it means that research is concerned with finding facts, analyzing facts and evaluating the response, in order to form a conclusion regarding the research topic.

There have been occasions, when research has been called into question. Corporate espionage and other issues such as; corporations skewing the facts to fit their data have existed. It is a downside to dishonesty in people; however, the ethical, moral, and scientific belief is that all research has to be based on facts.

This does not mean the facts will not change. Research is conducted with what information and tools are available at that time. This means that in 100 years research being conducted now could be found false, but at the time it is true because of the limited technology or facts that could be found.

As always when someone learns about research and the research method, one is told that a theory is never solely factual, but proved or disproved based on what could be found at that time. It goes back to the fact, that proper information, analysis, and evaluation are needed in order to conduct proper research. Inaccurate facts will skew the data and render the entire research invalid.

There is also the human interpretation of the information found. While research is concerned with these three topics, one also has to realize the writer of the research can limit the scope of the research and therefore change the results based on their viewpoint alone.

2• What is research? Discuss the objectives and motivations in research.

• 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; and at last, carefully testing the conclusions to determine whether they fit the formulating hypothesis".

• OBJECTIVES OF RESEARCH:

Research objectives as falling into a number of following broad groupings:

i. To gain familiarity with a phenomenon or to achieve new insights into it (studies with this object in view are termed as exploratory or formulative research studies);

ii. To portray accurately the characteristics of a particular individual, situation or a group (studies with this object in view are known as descriptive research studies);

iii. To determine the frequency with which something occurs or with which it is associated with something else (studies with this object in view are known as diagnostic research studies);

iv. To test a hypothesis of a causal relationship between variables (such studies are known as hypothesis-testing research studies).

v). Formulate new theories, principles etc.

• MOTIVATION IN RESEARCH:

The possible motives for doing research may be either one or more of the following:

1. Desire to get a research degree along with its consequential benefits;

2. Desire to face the challenge in solving the unsolved problems, i.e., concern over practical problems initiates research;

3. Desire to get intellectual joy of doing some creative work;

4. Desire to be of service to society;

5. Desire to get respectability.

3. **Describe the different types of research, clearly pointing out the difference between an experiment and a survey.**

The basic types of research are as follows:

i. Descriptive vs. Analytical: ***Descriptive research*** includes surveys and fact- finding enquiries of different kinds. The major purpose of descriptive research is description of the state of affairs as it exists at present. In ***analytical research***, on the other hand, the researcher has to use facts or information already available, and analyse these to make a critical evaluation of the material.

ii. Applied vs. Fundamental: ***Applied research*** aims at finding a solution for an immediate problem facing a society or an industrial/business organisation, whereas ***fundamental research*** is mainly concerned with generalisations and with the formulation of a theory.

iii. Quantitative vs. Qualitative: ***Quantitative research*** is based on the measurement of quantity or amount. It is applicable to phenomena that can be expressed in terms of quantity. ***Qualitative research*** is concerned with qualitative phenomenon, i.e., phenomena relating to or involving quality or kind.

iv. Conceptual vs. Empirical: ***Conceptual research*** is that related to some abstract idea(s) or theory. It is generally used by philosophers and thinkers to develop new concepts or to reinterpret existing ones. ***Empirical research*** relies on experience or observation alone, often without due regard for system and theory. It is data-based research, coming up with conclusions which are capable of being verified by observation or experiment.

v. Some Other Types of Research: All other types of research are variations of one or more of the above stated approaches, based on either the purpose of research, or the time required to accomplish research, on the environment in which research is done, or on the basis of some other similar factor.

- ***one-time research***: the research is confined to a single time-period
- ***longitudinal research***: the research is carried on over several time-periods.
- ***Field-setting research or laboratory research or simulation research***, depending upon the environment in which it is to be carried out.
- ***clinical or diagnostic research***: research follow case-study methods or in- depth approaches to reach the basic causal relations. Such studies usually go deep into the causes of things or events that interest us, using very small samples and very deep probing data gathering devices.
- ***Exploratory research***: The objective of exploratory research is the development of hypotheses rather than their testing
- ***Formalized research***: studies are those with substantial structure and with specific hypotheses to be tested
- ***Historical research***: utilizes historical sources like documents, remains, etc. to study events or ideas of the past, including the philosophy of persons and groups at any remote point of time
- ***Conclusion-oriented research***: a researcher is free to pick up a problem, redesign the enquiry as he proceeds and is prepared to conceptualize as he wishes
- ***Decision-oriented research***: is always for the need of a decision maker and the researcher in this case is not free to embark upon research according to his own inclination.

NOTE: FOR THIS QUESTION YELLOW COLOR CONTENTS IS NOT REQUIRED FOR IAT-1 ONLY POINTS IS SUFFICIENT. DEPENDS THE QUESTION IN VTU EXAMTO BE ANSWER

Survey

Survey refers to the way of gathering information regarding a variable under study from all or a specified number of respondents of the universe. Surveys are carried out by maintaining a structured form of data collection, through interview, questionnaire, case study etc. In surveys prepared questions are asked from the prepared formal questionnaire set and the output is collected in the same form.

For **example** – Survey among the students about the new education policy of India.

Experiment

Experiments refers to the way of experimenting something practically with the help of scientific procedure/approach and the outcome is observed. Experiments are carried out by performing the experiments by following scientific procedure or scientific approach. In experiments the investigator/examiner performs tests or experiments based on various factors and observes the outcome of the experiment.

For **example** – Experiment in the chemistry laboratory by a group of students and faculties specific to a topic.

Difference between Survey and Experiment :

S.No.	SURVEY	EXPERIMENT
01.	It refers to a way of gathering information regarding a variable under study from people.	It refers to the way of experimenting something practically with the help of scientific procedure/approach and the outcome is observed.
02.	Surveys are conducted in case of descriptive research.	Experiments are conducted in case of experimental research.
03.	Surveys are carried out to see something.	Experiments are carried out to experience something.
04.	These studies usually have larger samples.	These studies usually have smaller samples.
05.	The surveyor does not manipulate the variable or arrange for events to happen.	The researcher may manipulate the variable or arrange for events to happen.
06.	It is appropriate in case of social or behavioral science.	It is appropriate in case of physical and natural science.
07.	It comes under field research.	It comes under laboratory research.
08.	Possible relationship between the data and the unknowns in the universe can be studied through surveys.	Experiments are meant to determine such relationships.
09.	Surveys can be performed in less cost than a experiments.	Experiments costs higher than the surveys.
10.	Surveys often deals with secondary data.	Experiments deal with primary data.
11.	In surveys there is no requirement of laboratory equipment or there is a very small requirement of equipment just to collect any sample of data.	In experiments usually laboratory equipment are used in various activities during the experiment process.
12.	It is vital in co-relational analysis.	It is vital in casual analysis.
13.	No manipulation is involved in surveys.	Manipulation is involved in experiments.
14.	In surveys data is collected through interview, questionnaire, case study etc.	In experiments data is collected through several readings of experiment.
15.	Surveys can focus on broad topics.	Experiments focuses on specific topic.

4. **Explain Cluster Samples with example**

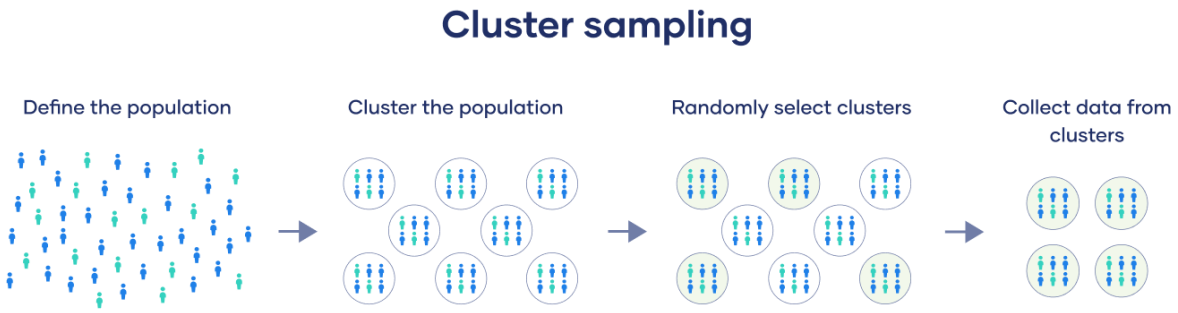
In **cluster sampling**, researchers divide a **population** into smaller groups known as **clusters**. They then randomly select among these clusters to form a **sample.**

Cluster sampling is a method of **probability sampling** that is often used to study large populations, particularly those that are widely geographically dispersed. Researchers usually use pre-existing units such as schools or cities as their clusters.

Steps to conduct Cluster Sampling

Here are the steps to perform cluster sampling:

1. **Sample:** Decide the target audience and also the sample size.
2. **Create and evaluate sampling frames:** Create a **sampling frame** by using either an existing framework or creating a new one for the target audience. Evaluate frameworks based on coverage and clustering and make adjustments accordingly. These groups will be varied, considering the population, which can be exclusive and comprehensive. Members of a sample are selected individually.
3. **Determine groups:** Determine the number of groups by including the same average members in each group. So make sure each of these groups is distinct from one another.
4. **Select clusters:** Choose clusters by applying a random selection.
5. **Create sub-types:** It is bifurcated into two-stage and multi-stage subtypes based on the number of steps followed by researchers to form clusters.



Example: A researcher wants to conduct a study to judge the performance of sophomores in business education across the U.S. It is impossible to conduct a research study that involves a student in every university. Instead, cluster sampling allows the researcher to club the universities from each city into one cluster. These clusters then define the sophomore student population in the U.S. Next, either using simple random sampling or systematic random sampling and randomly picking clusters for the research study. Subsequently, by using simple or systematic sampling, the sophomore's from each of these selected clusters can be chosen on whom to conduct the research study.

In this sampling technique, researchers analyze a sample that consists of multiple sample parameters such as demographics, habits, background – or any other population attribute, which may be the focus of conducted research. This method is usually conducted when groups that are similar yet internally diverse form a statistical population. Instead of selecting the entire population, cluster sampling allows the researchers to collect data by bifurcating the data into small, more productive groups.

5. Discuss Importance of Interpretation and Report Writing

Interpretation:

It refers to the task of drawing inferences from the collected facts after an analytical and / or experimental study.

- It is a search for broader meaning of research findings
- It has two important aspects:
  - i. The effort to establish continuity in research through linking the results of a given study with those of another.
  - ii. The establishment of some explanatory concepts.
- In one sense, it is concerned with relationships within the collected data, partially overlapping analysis.
- It also extends beyond the data of the study to include the results of other research, theory and etc
- Thus, interpretation is the device through which the factors that seem to explain what has been observed by researcher in the course of the study can be better understood and it also provides a theoretical conception which can serve as a guide for further research.

Techniques of interpretation:

Interpretation requires great skill and dexterity. It is an art that one learns through practice and experience.

*St*eps involved in interpretation:

- Researcher must give reasonable explanation of the relation and he must interpret relationship in terms of the underlying processes. This is the technique of how generalization should be done and concept be formulated.
- Extraneous information, if collected during the study, must be considered while interpreting the final results.
- It is advisable to get frank and honest opinion of experts.
- All relevant factors must be considered before generalization.

Report writing

A research report is a formal statement of the details of the research process and its results. It gives an account of the problem(s) studied, objectives, methodology, findings and conclusions of the research study.

Purpose or functions of a research report

- To communicate the methodology and results of the study to the targeted audience.
- To enable the person(s) concerned determine the validity of the results/conclusion and judge the quality of the research project as well and as the ability and competence of the researcher to do research.
- To provide as a base for formulating policies and strategies in the relevant areas.
- To provide additional knowledge to tackle certain problems / issues.
- To serve as a basic reference for future study.

Research report is divided into three parts as

I. First Part (Formality Part):
II. Main Report (Central Part of Report):
II. Appendix (Additional Details):

The various sections of a research report are:
1. Summary 2. Background/Introduction 3. Implemented Methods 4. Results based on Analysis 5. Deliberation 6. Conclusion

6. Why computer science research to be carried out in 21st century in India. Justify

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Computer science's ability to improve and accelerate various fields is one of the most exciting aspects of technology. AI and data science can help people and organizations get more done in a shorter time. One example is the healthcare industry, where advances in machine learning have helped lower costs significantly.

India stepped into the 21st century with tremendous optimism about information technology, which led to a subsequent boom in computer science (CS) education programmes across the country. Even now, a degree in CS is considered to be an aspirational hallmark for most students from middle-class Indian families looking to secure a job in the domestic or international markets. All of this buoyancy is not misplaced; after all, it is in this field that nearly half a million jobs will be created by 2024. Jobs across the spectrum, be it in STEM, engineering or mathematics will all eventually be computer-related. Computer science, thus, remains one of the most coveted educational programmes to pursue in India. However, when it comes to research in this arena, the landscape becomes a bit rocky.

Although India is among the world's top countries when it comes to scientific research output, the pace of original research projects in computer science specifically has been a bit slow. With more research projects and papers being concentrated in the applied sciences field, the pure sciences have a taken a bit of a backseat.This can largely be attributed to India being a developing nation with scores of economic, social and health challenges ahead of it. Solution-oriented and problem-solving research isn't uncommon in countries like India that pool their resources to address developmental problems.

• Silicon-based information technology, in contrast, is far from having become part of the environment. Customizing this book, even writing millions of other books, does not begin to capture the real power of literacy. Users don special goggles that project an artificial scene on their eyes; they wear gloves or even body suits that sense their motions and gestures so that they can move about and manipulate virtual objects.

• Most of the computers that participate in embodied virtuality will be invisible in fact as well as in metaphor. Already computers in light switches, thermostats, stereos, and ovens help to activate the world. This leads to our goals for initially deploying the hardware of embodied virtuality: hundreds of computers per room.

• Hundreds of computers in a room could seem intimidating at first, just as hundreds of volts coursing through wires in the walls did at one time. It will also act as an extension to computer screens: instead of shrinking a program window down to a small icon on the screen, for example, a user will be able to shrink the window onto a tab display. One way to think of pads is as an antidote to windows.

• Live boards can usefully be shared across rooms as well as within them. Prototype tabs, pads and boards are just the beginning of ubiquitous computing. Although processors and displays should be capable of offering ubiquitous computing by the end of the decade, trends in software and network technology are more problematic.

• Today's window systems, like Windows 3.0 and the X Window System, assume a fixed base computer on which information will be displayed. On the other hand, the transparent linking of wired and wireless networks is an unsolved problem.

And in virtual reality, the outside world and all its inhabitant effectively ceases to exist. Ubiquitous computers, in contrast, reside in the human world and pose no barrier to personal interactions. The computing environment knows the suit you looked at for a long-time last week because it knows both of your locations, and, it can retroactively find the designer's name even if it did not interest you at the time.

Example:

Take for example something as elemental as potholes on city roads – young researchers are trying to solve this problem with the help of the phenomenal work being done in AI-driven image processing. Algorithms are being designed in such a way that pot holes can be identified through smart street CCTV cameras—this includes ascertaining their depth and size—and alerts can be sent out to city authorities immediately.

7. What problems are encountered by researchers in India?

Researchers in India, particularly those engaged in empirical research, are facing several problems. Some of the important problems are as follows:

i. **The lack of a scientific training in the methodology of research** is a great impediment for researchers in our country. Many researchers take a leap in the dark without knowing research methods. A systematic study of research methodology is an urgent necessity. Efforts should be made to provide short duration intensive courses for meeting this requirement.

ii. There is **insufficient interaction** between the university research departments on one side and business establishments, government departments and research institutions on the other side. Efforts should be made to develop satisfactory liaison among all concerned for better and realistic researches.

iii. Most of the business units in our country do not have the confidence that the material supplied by them to researchers will not be misused and as such they are often reluctant in supplying the needed information to researchers. there is the need for generating the confidence that the information/data obtained from a business unit will not be misused.

iv. Research studies overlapping one another are undertaken quite often for want of adequate information. This problem can be solved by proper compilation and revision, at regular intervals, of a list of subjects on which and the places where the research is going on.

v. **There does not exist a code of conduct for researchers** and inter-university and interdepartmental rivalries are also quite common. Hence, there is need for developing a code of conduct for researchers which, if adhered sincerely, can win over this problem.

vi. Many researchers in our country also face the difficulty of adequate and timely secretarial assistance, including computerial assistance. This causes unnecessary delays in the completion of research studies. All possible efforts be made in this direction so that efficient secretarial assistance is made available to researchers and that too well in time.

vii. Library management and functioning is not satisfactory at many places and much of the time and energy of researchers are spent in tracing out the books, journals, reports, etc., rather than in tracing out relevant material from them.

viii. There is also the problem that many of our libraries are not able to get copies of old and new Acts/Rules, reports and other government publications in time. Efforts should be made for the regular and speedy supply of all governmental publications to reach our libraries.

ix. There is also the difficulty of timely availability of published data from various government and other agencies doing this job in our country. Researcher also faces the problem on account of the fact that the published data vary quite significantly because of differences in coverage by the concerning agencies.

x. There may, at times, take place the problem of conceptualization and also problems relating to the process of data collection and related things.

8. Write the difference between Qualitative and Quantitative research

Quantitative research is a more methodical approach to solving problems by generating and using data. This form of research is used in quantifying data and variables into concrete data. The surveys used in Quantitative Research includes online surveys, paper surveys and other forms of survey used to complete the research.

Qualitative Research	Quantitative Research
A method for developing a better understanding of human and social sciences, in understanding human behaviour and personalities better	It is the method used to generate numerical data by using a lot of techniques such as logical, statistical and mathematical techniques
It employs a subjective approach	It employs an objective approach
It is generally expressed using words	It is expressed using graphs and numbers
It has open-ended questions	It has multiple choice questions
Qualitative research needs only a few respondents	Quantitative research requires many respondents
The data collection methods involved are interviews, focus groups, literature review, ethnography	The data collection methods involved are experiments, surveys, and observations expressed in numbers
Qualitative research is holistic in nature	Quantitative Research is particularistic in nature
The reasoning used to synthesise data in this research is inductive	The reasoning used to synthesise data in this research is deductive
This method involves a process-oriented inquiry	This method does not involve a process-oriented inquiry
It develops the initial understanding of data	It recommends a final course of action
The data taken in the Qualitative research method is pretty verbal	The data taken in this method is pretty measurable
The objective of this research method is to engage and discover various ideas	The main objective of Quantitative research is to examine the cause and effect between the variables
It is one of the exploratory research methods	It is a conclusive research method

9. Describe Signification of research with suitable example.

• Research provides the basis for nearly all government policies in our economic system.

- Research has its special significance in solving various operational and planning problems of business and industry.
- Research is equally important for social scientists in studying social relationships and in seeking answers to various social problems.
- Decision-making may not be a part of research, but research certainly facilitates the decisions of the policy maker.
- research as a tool to economic policy has three distinct phases of operation, viz.,

i. investigation of economic structure through continual compilation of facts;

ii. diagnosis of events that are taking place and the analysis of the forces underlying them; and

iii. the prognosis, i.e., the prediction of future developments.

- the significance of research can also be understood keeping in view the following points:

(a) To those students who are to write a master's or Ph.D. thesis, research may mean a careerism or a way to attain a high position in the social structure;

(b) To professionals in research methodology, research may mean a source of livelihood;

(c) To philosophers and thinkers, research may mean the outlet for new ideas and insights;

(d) To literary men and women, research may mean the development of new styles and creative work;

(e) To analysts and intellectuals, research may mean the generalisations of new theories

10. Explain Quantitative research importance with an example

Quantitative research is a method to measure variables, analyze them and report relationships amongst the studied variables through a numerical system. Its objective is to understand, analyze, describe and make future predictions of a product or a service because after understanding the numbers, it becomes easier for people to make suitable changes. It deals in objective, logic, and numbers and puts its focus on convergent reasoning and detailed and unchanging data.

The quantitative researcher uses several tools to gather numerical data that is in the form of statistics and numbers and is arranged in non-textual forms like figures, charts, and tables.

Quantitative research examples

Some examples of quantitative research are:

Example #1

The Cure Hospital wants to know the details about doctors and patients of their hospital for analysis to be done by the company's management regarding the hospital's work. For this purpose, the survey was conducted to get information about the amount of time the doctor takes for one patient, how often a patient comes into the hospital, the patient's satisfaction level after taking the doctor's consultation, and related other questions. Patients were given the template of the patient satisfaction survey which includes the different survey questions having the answer options in numerical form. Like, answer choices to the question 'What is the amount of time which the doctor takes for one patient?' includes a slab of fewer than 10 minutes, 10 to 30 minutes, 30 to 50 minutes, and more than 50 minutes, answer options to the question 'How often a patient comes into the hospital' includes 1 time, 2-4 times, 4-8 times and more than 8 times.

The answer to these questions will be gathered in quantifiable data, so this is quantitative research conducted by the Cure hospital.

Example #2

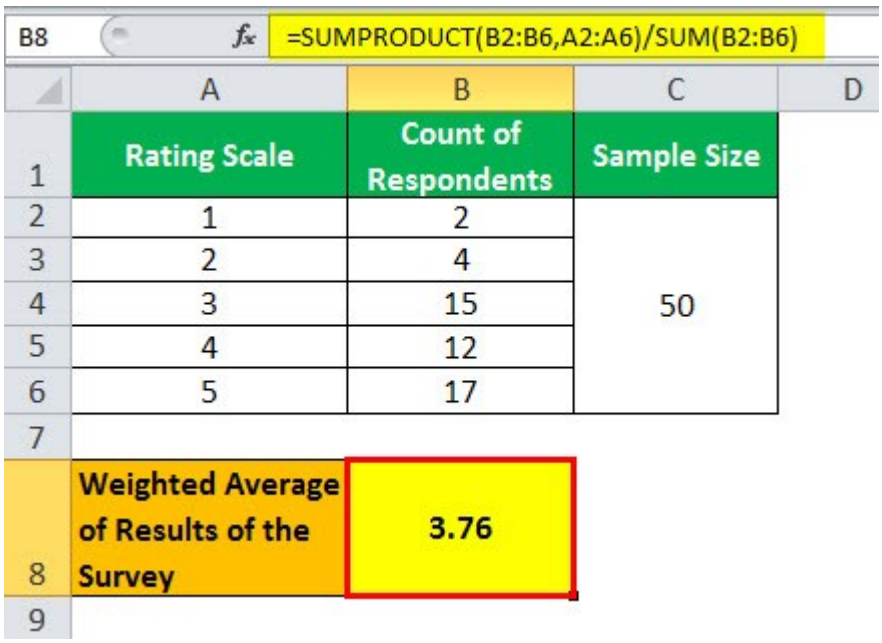
A survey was conducted among teenagers to study the impact of the usage of mobile phones on children. This survey sample includes youths and teenagers of 15-30 years age groups. The mobile phones, on the one hand, are educating the children and, on the other hand, are spoiling them as well because it shows some of the contents that the children should not watch. So, the question was asked by 150 respondents, of which 100 were male, and 50 were female, whether it is beneficial to give mobile phones to children or not. The answer contains the seven-point scale option, where 7 is strongly agreed, 6 is agreed, 5 is slightly agreed, 4 is neutral, 3 slightly disagrees, 2 disagrees, and 1 strongly disagrees.

These scales, also known as the Likert scale, enable opinion statements to be translated directly into numerical data. Thus it is a common type of quantitative research example.

Example #3: The survey was conducted in some of the offices in one city to study the number of hours employees spend in the office. Data were collected by observing employees, which provides the data in the quantitative form. All these data can be taken together to conclude.

Example#4 :A customer satisfaction template can be used if any organization would like to conduct a customer satisfaction (CSAT) survey. Through this kind of survey, an organization can collect quantitative data and metrics on the goodwill of the brand or organization in the customer's mind based on multiple parameters such as product quality, pricing, customer experience, etc. This data can be collected by asking a net promoter score (NPS) question, matrix table questions, etc. that provide data in the form of numbers that can be analyzed and worked upon.

Example#5 : Another example of quantitative research is an organization that conducts an event, collecting feedback from attendees about the value they see from the event. By using an event survey, the organization can collect actionable feedback about the satisfaction levels of customers during various phases of the event such as the sales, pre and post-event, the likelihood of recommending the organization to their friends and colleagues, hotel preferences for the future events and other such questions.



	A	B	C	D
1	Rating Scale	Count of Respondents	Sample Size	
2	1	2		
3	2	4		
4	3	15	50	
5	4	12		
6	5	17		
7				
8	Weighted Average of Results of the Survey	3.76		
9				