Research Methods

Muhammad Nadeem Anwar (Assistant Professor of English)
Government Graduate College of Science, Wahdat Road Lahore

Define research and its types.

The word research is derived from the Middle French "recherché" which means "to go about seeking", the term itself being derived from the old French term "recerchier" a compound word from "re"+"cerchier" or "searcher", meaning search. The earliest recorded use of the term was in 1577.

Gowin Colibao put forward a very broad definition of research. According to him research includes any gathering of data, information, and facts for advancement of knowledge. Creswell also states that research is a process of steps used to collect and analyze information to increase our understanding of a topic or issue. Research is a highly scientific and systematic investigative process employed to increase or revise current knowledge by discovering new facts.

It can be divided into two general categories: (1) Basic research, which is inquiry aimed at increasing scientific knowledge, and (2) Applied research, which is effort aimed at using basic research for solving problems or developing new processes, products, or techniques.

Explain research problem/statement of the problem/research gap/niche.

The first and most important step in any research is to identify and delineate the research problem: that is, what the researcher wants to solve and what questions he/she wishes to answer. A research problem may be defined as an area of concern, a gap or niche in the existing knowledge, or a deviation in the norm or standard that points to the need for further understanding and investigation. Although many problems turn out to have several solutions (the means to close the gap or correct the deviation), difficulties arise where such means are either not obvious or are not immediately available. This then necessitates some research to reach a viable solution.

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A good research problem should address an existing gap in knowledge in the field and lead to further research.

To write a persuasive problem statement, you need to describe (a) the ideal, (b), the reality, and (c) the consequences.

A statement of the problem is used in research work as a claim that outlines the problem addressed by a study. The statement of the problem briefly addresses the question: What is the problem that the research will address?

What are the goals of a statement of the problem?

The ultimate goal of a statement of the problem is to transform a generalized problem (something that bothers you; a perceived lack) into a targeted, well-defined problem; one that can be resolved through focused research and careful decision-making.

Writing a statement of the problem should help you clearly identify the purpose of the research project you will propose. Often, the statement of the problem will also serve as the basis for the introductory section of your final proposal, directing your reader's attention quickly to the issues that your proposed project will address and providing the reader with a concise statement of the proposed project itself.

A statement of problem need not be long and elaborate: one page is more than enough for a good statement of problem.

What are the key characteristics of a statement of the problem?

A good research problem should have the following characteristics:

It should address a gap in knowledge.

It should be significant enough to contribute to the existing body of

research

It should lead to further research

The problem should render itself to investigation through collection of data

It should be of interest to the researcher and suit his/her skills, time, and resources

The approach towards solving the problem should be ethical

Difference between research question and hypothesis?

Definitions

A hypothesis is defined as an educated guess, while a research question is simply the researcher wondering about the world. Hypothesis are part of the scientific research method. They are employed in research in science, sociology, mathematics and more. Research questions are part of heuristic research methods, and are also used in many fields including literature, and sociology.

Structure

As its name suggests, research questions are always written as questions. Hypothesis are written as statements preceded with the words "I predict." For example, a research question would ask, "What is the effect of heat on

the effectiveness of bleach?" A hypothesis would state, "I predict heat will diminish the effectiveness of bleach."

Before Writing

Before writing a hypothesis, the researcher must determine what others have discovered about this subject. On the other hand, a research question requires less preparation, but focus and structure is critical.

For example, a researcher using a hypothesis would look up studies about bleach, information on the chemical properties of the chemical when heated and data about its effectiveness before writing the hypothesis. When using a research question, the researcher would think about how to phrase the question to ensure its scope is not too broad, too narrow or impossible to answer.

Writing Conclusions

When writing the conclusion for research conducted using a hypothesis, the researcher will write whether the hypothesis was correct or incorrect, followed by an explanation of the results of the research. The researcher using only a research question will write the answer to the question, followed by the findings of the research.

What is Hypothesis?

Hypothesis is an assumption that is made on the basis of some evidence. This is the initial point of any investigation that translates the research questions into a prediction. It includes components like variables,

population and the relation between the variables. A research hypothesis is a hypothesis that is used to test the relationship between two or more variables.

Types of Hypothesis

There are six forms of hypothesis and they are:

Simple hypothesis

Complex hypothesis

Directional hypothesis

Non-directional hypothesis

Null hypothesis

Associative and casual hypothesis

Simple Hypothesis

It shows a relationship between one dependent variable and a single independent variable. For example – If you eat more vegetables, you will lose weight faster. Here, eating more vegetables is an independent variable, while losing weight is the dependent variable.

Complex Hypothesis

It shows the relationship between two or more dependent variables and two or more independent variables. Eating more vegetables and fruits leads to weight loss, glowing skin, reduces the risk of many diseases such as heart disease, high blood pressure and some cancers.

Directional Hypothesis

It shows how a researcher is intellectual and committed to a particular outcome. The relationship between the variables can also predict its nature. For example- children aged four years eating proper food over a five-year

period are having higher IQ levels than children not having a proper meal. This shows the effect and direction of effect.

Non-directional Hypothesis

It is used when there is no theory involved. It is a statement that a relationship exists between two variables, without predicting the exact nature (direction) of the relationship.

Null Hypothesis

It provides the statement which is contrary to the hypothesis. It's a negative statement, and there is no relationship between independent and dependent variables. The symbol is denoted by "HO".

Associative and Causal Hypothesis

Associative hypothesis occurs when there is a change in one variable resulting in a change in the other variable. Whereas, causal hypothesis proposes a cause and effect interaction between two or more variables.

Examples of Hypothesis

Following are the examples of hypothesis based on their types:

Consumption of sugary drinks every day leads to obesity is an example of a simple hypothesis.

All lilies have the same number of petals is an example of a null hypothesis.

If a person gets 7 hours of sleep, then he will feel less fatigue than if he sleeps less.

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Literature Review

Q1. What is literature review? Discuss sources for literature review.

The Literature

The Literature refers to the collection of scholarly writings on a topic. This includes peer-reviewed articles, books, dissertations and conference papers.

When reviewing the literature, be sure to include major works as well as studies that respond to major works. You will want to focus on primary sources, though secondary sources can be valuable as well.

Primary Sources

The term primary source is used broadly to embody all sources that are original. Primary sources provide first-hand information that is closest to the object of study. Primary sources vary by discipline.

In the natural and social sciences, original reports of research found in academic journals detailing the methodology used in the research, in-depth descriptions, and discussions of the findings are considered primary sources of information.

Other common examples of primary sources include speeches, letters, diaries, autobiographies, interviews, official reports, court records, artifacts, photographs, and drawings.

Secondary Sources

A secondary source is a source that provides non-original or secondhand

data or information.

Secondary sources are written about primary sources.

Research summaries reported in textbooks, magazines, and newspapers are considered secondary sources. They typically provide global descriptions of results with few details on the methodology. Other examples of secondary sources include biographies and critical studies of an author's work.

Q2. What is the importance of literature review?

Doing a careful and thorough literature review is essential when you write about research at any level. It is basic homework that is assumed to have been done vigilantly, and a given fact in all research papers. By providing one, usually offered in your introduction before you reach your thesis statement, you are telling your reader that you have not neglected the basics of research.

It not only surveys what research has been done in the past on your topic, but it also appraises, encapsulates, compares and contrasts, and correlates various scholarly books, research articles, and other relevant sources that are directly related to your current research. Given the fundamental nature of providing one, your research paper will be not considered seriously if it is lacking one at the beginning of your paper.

1. It Creates a Rapport with Your Audience

A literature review helps you create a sense of rapport with your audience or readers so they can trust that you have done your homework. As a result, they can give you credit for your due diligence: you have done your fact-finding and fact-checking mission, one of the initial steps of any research writing.

As a student, you may not be an expert in a given field; however, by listing a thorough review in your research paper, you are telling the audience, in

essence, that you know what you are talking about. As a result, the more books, articles, and other sources you can list in the literature review, the more trustworthy your scholarship and expertise will be. Depending on the nature of your research paper, each entry can be long or short. For example, if you are writing a doctoral dissertation or master's thesis, the entries can be longer than the ones in a term paper. The key is to stick to the gist of the sources as you synthesize the source in the review: its thesis, research methods, findings, issues, and further discussions mentioned in the source.

2. It Helps You Avoid Incidental Plagiarism

Imagine this scenario. You have written a research paper, an original paper in your area of specialization, without a literature review. When you are about to publish the paper, you soon learn that someone has already published a paper on a topic very similar to yours. Of course, you have not plagiarized anything from that publication; however, if and when you publish your work, people will be suspicious of your authenticity. They will ask further about the significance of repeating similar research. In short, you could have utilized the time, money, and other resources you have wasted on your research on something else. Had you prepared a literature review at the onset of your research, you could have easily avoided such mishap. During the compilation of your review, you could have noticed how someone else has done similar research on your topic. By knowing this fact, you can tailor or tweak your own research in such a way that it is not a mere rehashing of someone else's original or old idea.

3. It Sharpens Your Research Focus

As you assemble outside sources, you will condense, evaluate, synthesize, and paraphrase the gist of outside sources in your own words. Through this process of winnowing, you will be able to place the relevance of your research in the larger context of what others researchers have already done on your topic in the past (See Reference 1).

The literature review will help you compare and contrast what you are doing in the historical context of the research as well as how your research is different or original from what others have done, helping you rationalize why you need to do this particular research (See Reference 2).

Perhaps you are using a new or different research method which has not been available before, allowing you to collect the data more accurately or conduct an experiment that is more precise and exact thanks to many innovations of modern technology. Thus, it is essential in helping you shape and guide your research in the direction you may not have thought of by offering insights and different perspectives on the research topic.

Q3. What are different types of literature review?

Depending on your area of specialization, a literature review can take various forms: argumentative review, integrative review, historical review, methodological review, systematic review, and theoretical review (See Reference 1).

An argumentative review is written to present an opposing view to a given position. This will be valuable to persuade others to join you in supporting your thesis.

An integrative review is composed of examinations and critical analysis on a given topic to introduce a need for a new research. For example, you can use it on the spreading of a pandemic plague, arguing how the old methods of gathering and analyzing the data were inadequate and how modern technology, such as DNA analysis, will help make the same research more accurate.

Similarly, a historical review will assess all the historical records of scholarship chronologically while methodological review examines the research methods alone—collection of data, their critical analysis, interpretation, and research results, for example.

A literature review in any field is essential as it offers a comprehensive overview and recapitulation on the given scholarship from past to present, giving the reader a sense of focus as to which direction your new research is headed (See Reference 3).

Q4. What are different benefits of conducting literature review?

While there might be many reasons for conducting a literature review, following are four key outcomes of doing the review.

Assessment of the current state of research on a topic. This is probably the most obvious value of the literature review. Once a researcher has determined an area to work with for a research project, a search of relevant information sources will help determine what is already known about the topic and how extensively the topic has already been researched.

Identification of the experts on a particular topic. One of the additional benefits derived from doing the literature review is that it will quickly reveal which researchers have written the most on a particular topic and are, therefore, probably the experts on the topic. Someone who has written twenty articles on a topic or on related topics is more than likely more knowledgeable than someone who has written a single article. This same writer will likely turn up as a reference in most of the other articles written on the same topic. From the number of articles written by the author and the number of times the writer has been cited by other authors, a researcher will be able to assume that the particular author is an expert in the area and, thus, a key resource for consultation in the current research to be undertaken.

Identification of key questions about a topic that need further research. In many cases a researcher may discover new angles that need further exploration by reviewing what has already been written on a topic. For example, research may suggest that listening to music while studying might lead to better retention of ideas, but the research might not have

assessed whether a particular style of music is more beneficial than another. A researcher who is interested in pursuing this topic would then do well to follow up existing studies with a new study, based on previous research that tries to identify which styles of music are most beneficial to retention.

Determination of methodologies used in past studies of the same or similar topics. It is often useful to review the types of studies that previous researchers have launched as a means of determining what approaches might be of most benefit in further developing a topic. By the same token, a review of previously conducted studies might lend itself to researchers determining a new angle for approaching research.

Upon completion of the literature review, a researcher should have a solid foundation of knowledge in the area and a good feel for the direction any new research should take. Should any additional questions arise during the course of the research, the researcher will know which experts to consult in order to quickly clear up those questions.

Q5. What are different uses/purposes of literature review?

The purpose of a literature review is to:

Provide foundation of knowledge on topic

Identify areas of prior scholarship to prevent duplication and give credit to other researchers

Identify inconstancies: gaps in research, conflicts in previous studies, open questions left from other research

Identify need for additional research (justifying your research)

Identify the relationship of works in context of its contribution to the topic and to other works

Place your own research within the context of existing literature making a

case for why further study is needed.

Methods Section

Q1. What is the difference between quantitative and qualitative approaches?

Quantitative research

Quantitative research is expressed in numbers and graphs. It is used to test or confirm theories and assumptions. This type of research can be used to establish generalizable facts about a topic.

Common quantitative methods include experiments, observations recorded as numbers, and surveys with closed-ended questions.

Qualitative research

Qualitative research is expressed in words. It is used to understand concepts, thoughts or experiences. This type of research enables you to gather in-depth insights on topics that are not well understood.

Common qualitative methods include interviews with open-ended questions, observations described in words, and literature reviews that

explore concepts and theories.

The differences between quantitative and qualitative research

Quantitative and qualitative research use different research methods to collect and analyze data, and they allow you to answer different kinds of research questions.

Qualitative versus quantitative research

Quantitative research	Qualitative Research
Focuses on testing theories and hypotheses	Focuses on exploring ideas and formulating a theory or hypothesis
Analyzed through math and statistical analysis	Analyzed by summarizing, categorizing and interpreting
Mainly expressed in numbers, graphs and tables	Mainly expressed in words
Requires many respondents	Requires few respondents
Closed (multiple choice) questions	Open-ended questions
Key terms:	Key terms:
testing, measurement, objectivity, replicability	understanding, context, complexity, subjectivity

Q2. How to analyze qualitative and quantitative data?

Qualitative or quantitative data by itself can't prove or demonstrate anything, but has to be analyzed to show its meaning in relation to the research questions. The method of analysis differs for each type of data.

Analyzing quantitative data

Quantitative data is based on numbers. Simple math or more advanced

statistical analysis is used to discover commonalities or patterns in the data. The results are often reported in graphs and tables.

Applications such as Excel, SPSS, or R can be used to calculate things like:

Average scores

The number of times a particular answer was given

The correlation or causation between two or more variables

The reliability and validity of the results

Analyzing qualitative data

Qualitative data is more difficult to analyze than quantitative data. It consists of text, images or videos instead of numbers.

Some common approaches to analyzing qualitative data include:

Qualitative content analysis: Tracking the occurrence, position and meaning of words or phrases

Thematic analysis: Closely examining the data to identify the main themes and patterns

Discourse analysis: Studying how communication works in social contexts.