INTERNATIONAL JOURNAL OF ADVANCE RESEARCH, IDEAS AND INNOVATIONS IN TECHNOLOGY

ISSN: 2454-132X
Impact Factor: 6.078
(Volume 8, Issue 3 - V8I3-1433)
Available online at: https://www.ijariit.com

To study steps of the scientific research process

Nihal Nasir Waghu
nihalwaghu@gmail.com
Mahatma Gandhi Mission's College of Engineering and Technology, Navi Mumbai, Maharashtra

Jayesh Ekawade
ekawadej@gmail.com
Mahatma Gandhi Mission's College of Engineering and Technology, Navi Mumbai, Maharashtra

Pranav Kurkure
kurkurepranav2016@gmail.com
Mahatma Gandhi Mission's College of Engineering and Technology, Navi Mumbai, Maharashtra

Komal shiraskar
kom.shiraskar@gmail.com
Mahatma Gandhi Mission's College of Engineering and Technology, Navi Mumbai, Maharashtra

Amruta Patil
amrutaspatil7@gmail.com
Mahatma Gandhi Mission's College of Engineering and Technology, Navi Mumbai, Maharashtra

ABSTRACT

There is a diversification of approaches to research in any field of investigation, regardless of whether it isapplied research or basic research. Each particular research study is unique in some ways because of the particular time, setting, situation, and environment in which it is being approached. Even so, all research venture shares a common goal of stimulating our understanding of the problem, and thus all traverse through certain basic stages, forming a process called the research process. An understanding of the research process is mandatory to effectively carry out research and sequence the stages essential in the process.

Keywords— *Research Process, Steps Involve*

1. INTRODUCTION

Generally, the research process is considered systematic and controlled. It is also taken into consideration with hypothetic statements based on critical statements. Thinking is very dominant in the whole research process. Some other significances of the process are- scientific methods are adopted for a problem-solving, -a system of interconnecting phases, -using appropriate ways to solve scientific problems. The research process should refer to one of ongoing planning, searching, discovery, reflection, synthesis, revision, and learning (Jan Hanacek).

Many students get confused at the thought of conducting research, but in actual life, each of us carries out research projects in our day-to-day life. for example, buying a home involves a research process. This process includes collecting data on whether to buy a flat or bungalow? that helps to consider budget limitations, location, amenities, and so on. one we collect the all required data and analyzed to answer: "which home is meeting my needs and budget, and where should I purchase?" this is research process.

The general research process provides a basic description of the process generalized by the author when undertaking doctoral research. It is observed, that there are few articles to guide the qualitative small firm for the researcher, it is an intention to provide an account of the process andalso decisions involved when undertaking qualitative small firm research. From a discussion of the factors that are usually undertaken the author of the appropriateness of a qualitative approach, for a consideration of the outcomes generated. It describes the value of using such an approach when it refers to even a small firm's research. A guide to the qualitative research process: evidence from a small firm study (Eleanor Shaw;1999). Below a detailed flow chart is shown in figure 1 for the steps involved in the research process.

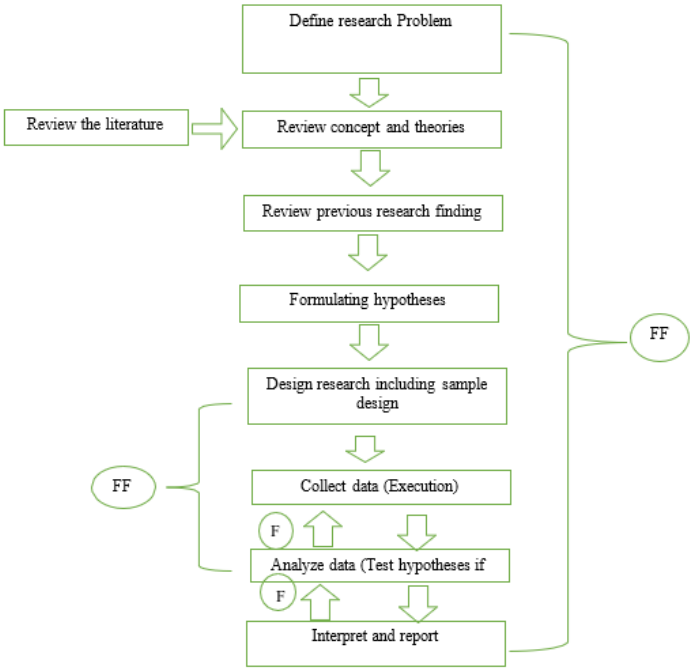
2. FLOW CHART

Scientific Steps of the Research Process

At times, the first step dictates the nature of the last step to be tackled. If successive procedures have not been taken into account in the early stages, serious difficulties may arise which may even prevent the completion of the study. One should remember that the various steps involved in aresearch process are not mutually exclusive; not they are separate and distinct.
They do not necessarily follow each other in any specific order and the researcher has to be constantly anticipating at each step in

© 2022, www.IJARIIT.com All Rights Reserved

the research process the requirements of the subsequent steps; however, the following order concerning various steps provides a useful procedural guideline regarding the research process.



2.1 Formulating the research problem:

There are two categories of research problems: those that deal with naturalphenomena and those that deal with relationships between variables. The researcher must settle on a broad topic of interest. Any ambiguities about the problem should be cleared up. Before a functioning formulation of the problem can be established, the feasibility of a certain solution must be evaluated. The transformation of a broad topic into a specific research problem is thus the first stage in a scientific investigation. Approach to comprehending the issue:1) Discuss it with colleagues or experts. 2) Review all accessible literature on the concepts and theories, as well as related investigations. The researcher then translates the problem into analytical or operational terms, i.e., to put the problem in as specific terms as possible. Formulating, or defining, a research problem is one of the most important steps in the research process. The problem to be researched must be clearly defined in order to distinguish relevant data from irrelevant data (Kothari 2019).

In keeping with the subject mentioned by Pardede (2018), he examined how secondary school students and teachers felt about Indonesian being used in EFL lessons. The subject of first language use in English has received very little attention, which is a problem.

2.2 Extensive research survey:

A concise overview of the problem should be written down once it has been formulated. It is mandatory for a research worker writing a Ph.D. thesis to create a synopsisof the issue and submit it for approval to the appropriate committee or research board. At this point, the researcher should be linked to the issue. The first areas to look at are obstructingand indexing a journal, as well as published and unpublished bibliographies. Depending onthe nature of the problem, academic publications, conference proceedings, government reports, and other sources must be consulted. It's important to note that one source will leadto another during this procedure. Previous research, if any, that is similar to the current study should be thoroughly examined.

In a study of the impact of communication skills training for oncologists on oncologist outcomes, Fujimori et al. (2014) highlighted the use of survey research. And results for patients (e.g., an oncologist's performance and confidence, as well as the patient's suffering, trust and satisfaction). 30 oncologists as a sample was obtained from two hospitals, and despite the authors offered a power analysis that came to an sufficient participation of oncologists Identify variations between baseline and follow-up data boost scores, the study's findings might not be generalizable to a broader population of oncologists. Oncologists were randomized to either an intervention group (i.e., communication skills training) or a control group (i.e., no training).

2.3 Developing a hypothesis:

It's crucial to understand the difference between a theory and a hypothesis before discussing how to construct one. A theory is a logical explanation or interpretation of a set of events. While theories can validate forms, they all have one thing in common: they go beyond the phenomena they explain by incorporating changeable structures, processes, functions, or organizing principles that haven't been directly observed. Take, for example, Zajonc's theory of social facilitation and inhabitation, which claims that being observed by others while executing tasks increases the possibility of dominating response theories and hypotheses having an if-then link. Although hypotheses are normally given as assertions, they can be rephrased as questions at any time (Paul C. Price, Rajiv Jhangiani, I-Chant A. Chiang, Dana C. Leighton, & Carrie Cuttler).

Typically, a challenge is where research begins. The problem statement/research question is specifically restated and clarified by

© 2022, www.IJARIIT.com All Rights Reserved

the questions, objectives, and hypotheses. A hypothesis is a speculative explanation for a group of facts that can be tested by more research. Statements should replace hypotheses describing the relationship between two or more measurably different factors. It should have obvious testing ramifications the relations mentioned. A hypothesis can be defined as a tentative proposition put up as a potential answer to a question or as a justification for a phenomenon. (Ary, Jacobs, and Razavieh;1984).

2.4 Preparing research design:

The research design is the understanding of circumstances for gathering and scrutinyof facts in a method that intends to divide relevance to the investigation reason with the economy in the process. So, it is called that research design is the theoretical configuration inside which investigation is performed. It presents a chart of what the investigator is leavingto execute in expressions of causing the hypothesis. Particularly, the research design includes the following points: (i) The intention of the research (ii) The character of the research (iii) The position wherever the research is performed (iv) The character of the necessary records

(v) The necessary information can be composed of where (vi) How much time should require to complete the study? (vii) What type of sample design is used? (viii) What type of procedure of information gathering would be used? (ix) The technique of data investigation that would be accepted (x) The way in which the statement would be organized (K. Friedman, 2003).

A research design is a preparation, arrangement, and strategy of examination [9] so consider acquiring answers to investigate problems/questions. The preparation is the totalsystem or series of the investigation. A research design is a summary of what the researcher will do as of script the hypotheses and their prepared suggestion (A. M. Pettigrew, 1992)

2.5 Determining sample design:

The sampling design in a general can be stated as definite steps of a plan used for obtaining samples from a selected population. It refers to techniques or procedures. The researcher would in selecting the samples. There are some essential steps for carrying out an appropriate sample design which is;1. Objective 2. Population 3. Sampling frame 4. Size of sample 5. Data collection 6. Non-respondent 7. Sample design 8. Organizing fieldwork 9.Pilot study 10. Budgetary constraint (C. R. 2019).

In the planning of sample design, it includes information about sampling frames. Also, their coverage, providing descriptions of the national sample designs which included in the stages of sampling, probabilities of selection, sampling units and at last sample sizes. Such sample selection plans have detailed information about the processes for sample selection at each stage during process of sampling. In addition to this, the countries were required to complete and to submit quality control for sample selection forms to the Consortium to verify that the sample selection was taken in an unbiased and randomized way consistent with theirrespective standards (Leyla Mohadjer, Tom Krenzke and Wendy Van de Kerckhove 2014).

2.6 Collection of data:

For solving any real-life problem, it is very much important to collect all data approximate. The data collected may be either from experiments or through surveys. When a researcher conducts experiments, he/she may observe some of the quantitative measurements, or data, with its help he or can examine the truth which contains in his hypothesis, and in the case of a survey, data can be collected in the following ways-1. By observation 2. Through a personal interview, Through telephone interview 4. By mailing questionnaires 5. Through schedules 6. Google forms. The data collection is important because how the information collected is used and what explanations it can generate are determined (Kumar, Ranjit, 2007)

Data are the bunch of values of one or more variables. A variable is a characteristic of samples that has different values for different subjects. Value can be numeric, counting, and category. The numeric values of continuous variables are these which have numeric meanings, a unit of measurement, and may be in fraction like – height, weight, blood pressure, monthly income etc. Another type of variables is discrete variables which are based on counting process like – number of student in different classes, number of patients visiting OPD in each day etc (Surya Raj Niraula Professor of Biostatistics).

2.7 Execution of the project:

The project's execution is a crucial element in the research process. If the project is carried out correctly, the data that will be obtained will be adequate and reliable. The researcher should ensure that the project is completed in a timely and systematic manner. Data can be easily machine-processed if the survey is done using structured questions. If the data is to be obtained through interviewers, suitable selection and training of the interviewers should be made. This means that procedures should be made to verify that the survey is statistically controlled and that the data collected meets the pre-determined accuracy criterion. (Kumar, Ranjit 2007).

In the execution work of project, it is observed that although project management is considered to be an execution limited discipline, the Body of project management Knowledgeis developed. Project Management Institute generally provides relatively little detail in the process of execution group as compared with other process groups like Planning and Monitoring, Controlling process groups. The project elements considered essential to the success of the project that contains project Scope, Cost, Schedule, and Risk Which are not included within the Executing process group. Likewise, project execution coverage in the Project Manager Competency Development Framework are authored by the Project Management Institute that appears to provide limited insight regarding what actually takes place in the period project execution. Such paper outlines a research agenda for a betterunderstanding that what actually occurs in projects when project managers carry out activities during the Executing process group. Such thing proposes a study that includes a pilot study, project manager interviews, focus group validation session, and also data collected by a survey instrument

© 2022, www.IJARIIT.com All Rights Reserved

2.8 Analysis of data:

After the data has been gathered, the researcher moves on to the work of analyzing it. Data analysis necessitates a series of interconnected tasks, including the creation of categories, and the application of these categories to raw data via coding, tabulation, and statistical judgments. For further analysis, the bulky data must be simplified into a few digestible groups and tables. At this point, the categories of data are usually turned intosymbols that can be tabulated and numbered, which is known as coding. Computers not only save time but also enable simultaneous examination of a huge number of variables affecting a problem. Statistical equations are used to do data analysis. Statistical tests can be used to determine whether such a thing exists. Is the discrepancy real or the result of random fluctuations? If the discrepancy is real, the conclusion is that the two samples belong to separate universes. Similarly, the analysis of variance technique can assist us in determining whether three or more types of seeds produced in certain fields provide significantly different results. In summary, the researcher might use numerous statistical measures to analyze the acquired data (Kothari, C. R., and Gaurav Garg:2019).

There are multiple ways to make sense out of data. The method you choose dependson the questions you're asking and the information you're looking to get from your dataset. If you want to explain what has happened and why, descriptive and diagnostic analytics will come in handy. If the questions relate more to what could happen in the future, you'll want to use predictive and prescriptive analytics. In this blog, we'll walk you through the four typesof data analysis, when you should apply them, and why (Abaquita)

2.9 Hypothesis testing:

In general, Hypothesis testing is a technique that helps to determine whether a specific treatment is having an effect on the individuals of a considered population. This formal procedure is used by either statistician or rejects statistical hypothesis work. Examining the entire population, the best way to determine e statistical hypothesis. Since the is often impractical, researchers typically examine a random sample from the population. If sampledata are not consistent with the statistical hypothesis, the hypothesis is rejected (Kumar, Ranjit; 2007).

Based on sample data, researchers use a rigorous approach to decide whether to reject a null hypothesis. There are four steps in this procedure, which is known as hypothesis testing. Describe the theories: Declaring the null and any potential hypotheses is required here. The declaration of the hypotheses makes them mutually exclusive. In other words, if one is true, the other has to be untrue. Create an analysis strategy: The analysis strategy outlines how to assess the null hypothesis using sample data. A single test statistic is frequently the focalpoint of the evaluation. Analyze some test data Analyze the analysis plan to determine the value of each test statistic (mean score, proportion, t-statistic, z-score, etc.). Results interpretation Use the decision-making strategy outlined in the analysis plan (Kolawole, Ayotunde O;2016)

2.10 Generalizations and Interpretation:

If a hypothesis is verified and confirmed multiple times, the researcher may be able to generalize, i.e., construct a theory. In fact, the true worth of research is in its ability to arriveat certain generalizations. If the researcher didn't have a hypothesis, to begin with, he can tryto explain his data using a theory. It's referred to as interpretation. The act of interpretation can frequently generate new questions, which can lead to additional research (Kothari, C. R., and Gaurav Garg 2019).

Making "Inferences pertinent to the research relation," from which generalizations are built, is what interpretation entails. The researcher's interpretation of the research results is informed by logic, reason, well-established ideas, and earlier discoveries. Understanding behavior's, experiences, and ideas as well as ingesting, synthesizing, and conceiving them are necessary for qualitative data (Abaquita, Hermie M. ames L. Paglinawan).

2.11 Preparation of the Report:

Finally, the researcher must write a report summarizing his findings. The following points should be kept in mind when writing a report: The report should be formatted as follows: The report's preliminary pages should have the title, date, acknowledgments, and preface, followed by the main material and the end matter. The table of contents should be followed by a list of tables and, if applicable, a list of graphs and charts throughout the report.

The following sections should be included in the report's primary text:(a) Introduction (b) Summary of findings (c) Main report(d) Conclusion Appendices for all technical data should be listed at the conclusion of the report. A bibliography, which includes a list of the books, journals, reports, and other sources used, should be included at the end. In a published study paper, an index should be included. The report should be prepared in a straightforward and impartial manner, using basic language and avoiding imprecise statements such as 'it appears,' 'there may be,' and similar expressions. Only use charts and graphics in the primary report if they clearly and forcefully portray the information. Calculated 'confidencelimitations' must be disclosed, as well as the numerous constraints encountered throughout research procedures (Kothari, C. R., and Gaurav Garg;2019).

The research report is divided into categories based on the type of study conducted and the intended audience. Research Methodology Report on Qualitative Research For qualitative research, a report of this kind is written. It provides an overview of the steps, procedures, and conclusions of a qualitative research methodology. A qualitative research report in educational research gives one the chance to put their knowledge to use and honetheir skills in project design and execution. Typically descriptive in character, a qualitative research report is one. Consequently, you must write a descriptive narrative of the facts in addition to outlining the specifics of the research procedure (Harish K Thakur;2016).

3. CONCLUSION

The research process includes scientific methods adopted to carry out research work.

© 2022, www.IJARIIT.com All Rights Reserved

In order to gain results with minimum bias and maximum information, it is important to know the research process thoroughly. Right from the formulation of the research problem tillthe preparation of a report, each step requires detailed investigation and proper presentation of data collected. In this paper, we have tried to highlight steps that are to be followed to carry out research work explained by various researchers. Mentioned research process steps are required to be followed by researchers to carry out research work efficiently.

4. REFERENCES

[1] Kothari, C. R., and Gaurav Garg. Research Methodology: Methods and Techniques. NewDelhi: New Age International Publishers, 2019. Print.
[2] Kumar, Ranjit. Research Methodology: A Step-by-Step Guide for Beginners. Noida: PearsonIndia Education Services Pvt Ltd, 2007. Print.
[3] A. M. Pettigrew, "The Character and Significance of Strategy Process Research," StrategicManagement Journal, vol. 13, no. S2, pp. 5-16, 1992.
[4] K. Friedman, "Theory Construction in Design Research: Criteria: Approaches, AndMethods," Design Studies, Vol. 24, no. 6, pp. 507-522, November 2003.
[5] Paul C. Price, Rajiv Jhangiani, I-Chant A. Chiang, Dana C. Leighton, & Carrie Cuttler
[6] Fujimori et al. (2014) used a quantitative approach to collect data on the study outcomevariables from oncologists and patient participants.
[7] Phases of research work by JAN HANACEK.
[8] KOLAWOLE, Ayotunde O.B. Agric. (Ado), M.Sc. Agric. (Israel) ADM/2016/230401/PG
[9] A review of the research process, data collection and analysis Surya Raj Niraula Prof. (Biostatistics), School of Public Health and Community Medicine, B.P. Koirala Institute of Health Sciences, Dharan, Nepal
[10] Author _ Abaquita, Hermie M. ames L. Paglinawan Ph.D. Educ 241 Methods Research in Education.
[11] A guide to the qualitative research process: evidence from a small firm study (Eleanor Shaw 1999)

© 2022, www.IJARIIT.com All Rights Reserved