

Research Methodology: An Overview

Prof. Sudhir Panse
sudhirpanse@yahoo.com

Presented at the 9th NTSC - Western Regional Workshop, held at Marathi Vidnyan Parishad, Mumbai, 27th August 2018.

Research Process

- **To identify and articulate a research issue**
- **To decide the most suitable research methodology to address the problem**
- **To collect data systematically**
- **To perform analysis objectively**
- **To interpret the results critically**
- **To perform tests for validating the results**
- **To record the results in a document like thesis or paper**
- **To present the results in a conference**

Methodology and Methods

Research Methodology is an overall framework to conduct research systematically and to ensure that the research process is carried out logically

Research Methods are the ways to perform research operations using various techniques

Research Methodology

- **Why this particular research study?**
- **How is the research problem identified?**
- **Why these questions or hypotheses?**
- **Why is this research method selected?**
- **What data are to be collected?**
- **What analysis technique to be used?**
- **How will the results be validated?**

Implementing Research Methodology

Research Strategy: A general approach to research determined by the kind of question at the core of the research study



Research Design: A plan for implementing a research strategy deciding say, variables



Research Procedure: An exact, step-by-step description of a specific research study

Research Strategy

- ❖ **Quantitative – numerical data collection and analysis**
- ❖ **Qualitative – non-numerical data collection and analysis like text and graphics**
- ❖ **Mixed Methods – both numerical and non-numerical data collection and analysis**

Research Design

- ‡ Purpose is to obtain maximum relevant information to address the research issue within available resources.
- ‡ It can belong to any of the following categories:
 - Exploration (flexible design)
 - Description (design should minimise bias)
 - Diagnosis (design should maximise reliability)
 - Experimentation (statistical design like randomised block design)

Research Methods

Field Research:

- **Non-participant or direct observation**
(observational behaviour scale, score card)
- **Mail questionnaire & Opinionnaire**
(obtain information and opinion using various sociometric scales and projective techniques)
- **Personal or group interview**
(obtain views through schedules/discussions)
- **Case study**
(focused data collection for intensive analysis)

Research Methods (2)

Laboratory Research:

- **Physical experiment**
(observation, audio-video recording)

Library or Desk Research:

- **Document analysis**
(recording of notes, content analysis and statistical compilations)

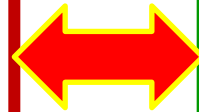
Initiation

- **Outline the general context of the problem supported by the literature review**
- **Highlight key concepts and ideas current in that problem area**
- **Enlist basic underlying assumptions and theory regarding the problem (i.e. proper grounding of the problem)**
- **Write down the identified important issues**
- **Focus on what is to be solved or resolved**

Map the Sub-themes & Res. Methodology

Sub-themes (9th NTSC):

1. New and emerging media for effective science learning
2. Transition to STEM education
3. Science comm. for all
4. Science learning for sustainable devlp.
5. Innovations in science comm.



- **Quantitative**
- **Qualitative**
- **Mixed methods**

- **Field Survey**
- **Lab. Exp.**
- **Desk Res.**

- † **Exploration**
- † **Description**
- † **Diagnosis**
- † **Experiment**

Moving Further

- ‡ **In case of a survey-based study :**
 - Identify relevant population
 - Decide sample size & selection method
 - Develop data collection tools & collect the data
- ‡ **In case of experiment-based study :**
 - Design the experiment/s (control extraneous factors)
 - Gather and record observations
- ‡ **Analyse the data (by quantitative, qualitative or mixed methods)**
- ‡ **Interpret and validate the results**
- ‡ **Report the results in a specified format**

**Sound research methodology
ensures quality research work**

Thank you,

Prof. Sudhir Panse
sudhirpanse@yahoo.com

All the sources used for this presentation are gratefully acknowledged.