CHAPTER-4
RESEARCH METHODOLOGY

The methodology chosen for this study is Multi-Case Study of Indian scientists. An endeavour is made to study the contributions of Indian Scientists in Science communication with focus on Public Communication of Science or Public dissemination of science.

Scientists form a large part of academic and professional body in any country. The first challenge of this study was to be able to identify a substantial group of science communicators from amongst the vast multitude of scientists who were communicating science at different levels, be it laboratories or classrooms. For the purpose of this research the cases were selected from the National Directory of Science Communicators issued by the National Council for Science and Technology Communication, DST, Government of India, New Delhi and Centre for Science Communicators, Department of Marathi Vigyan Parishad, Mumbai. This is the most authentic and reliable documentation of Science communicators working in India.

Sample of the study

The number of Science communicators working in Delhi as per the directory is 38. This comprises of the sample of the study.

A qualitative evaluation was utilized for this research leveraging subjective methods such as interviews and observations to collect substantive and relevant data. Such a qualitative approach was valuable here due to the varying experiences of the scientists. The research from this project shall become an asset to the established body of literature on science communication, however now with a special point of interest.

Data Collection Procedure

Data Collection consisted of structured interview of scientists, document analysis of work related to science communication and observation of the scientists through their public profiles.

In-depth Interviews

Over a period of 10 months 17 in-depth interviews were conducted, each lasting conducted 45 minutes.(Seidman, 2006 as cited by Calder, 2009) have recommended a three stage interview structure covering following topics:
This structure has been used in the conduct of interviews of the study.

All the interviews took place at the participant’s workplace or home setting. Once enrolled, subjects were given a disclosure form to read. Any questions and concerns the subjects may have had about the study were answered. The structured questionnaire to gauge scientists responses on different issues related to public dissemination of science and professional roles and responsibilities was administered to the sample of scientists.

Arrangements were made so that the subjects could complete the questionnaire before, during or after the appointment or a later time coordinated with researcher. After obtaining consent by subjects to participate in the study, the researcher privately administered the questionnaire after which subjects completed self-administered questionnaire. The duration of the subjects participation in the study was approximately 45 to 50 minutes: 10 minutes for consent process, 15 minutes for the questionnaire administered and 20 minutes for self-administered questionnaire. Once all study questionnaires were completed the researcher checked for any missing data and also collected articles written by the scientists for document analysis.

In most cases, the researchers using case study research are continuously making judgments about the significance of the data collected. For this reason a major determinant of the quality of case study research is the quality of insights and thinking brought to bear by the particular researcher. (Hodkinson & Hodkinson, 2001 as cited by McDermott, 2010). The challenge is to subjectively analyze data without any prejudice. (Gay, 1996; Merriam, 2002 as cited by McDermott, 2010)

Case studies cannot make claims to be typical or generalizable as the sample is small and idiosyncratic and because data is predominantly non-numerical, there is no way to establish the probability that data are representative of some larger population (Hodkinson & Hodkinson, 2001 as cited by McDermott, 2010). The special features of qualitative case studies is that it is particularistic, meaning it has a specific focus; a case study is descriptive, with rich thick details of description and heuristic, meaning it illuminates the reader’s understanding (pp.29-32) according to Merriam (1998 as cited by Calder, 2009). Calder (2009) further contended that to
present a rich, descriptive case the researcher needs to devote time to investigate the phenomenon within its context. With enough time at his disposal the researcher can develop a complete understanding of the case and can take the reader into the case situation, a person’s life”. (*Patton2002*, cited by *Calder (2009)*). In addition to this the participants in the study limit their responses to their own personal and professional experiences. (*McDermott, 2010*)

Challenges for this research study were identified as pertaining to the sample, characteristics, instruments and data collection procedures. The longest questionnaire was in media access section Descriptive questions in part 3 and 4 with tables and questions which meant that subjects took approximately 45 minutes to complete the questionnaires. In some situations participants appeared to be anxious about time even though the researches provided the opportunity to complete the questionnaires, before, during or after their appointment or at a later time of their convenience. Respondent burden such as issues of lack of time, tiredness, anxiety were prevalent at the time of conducting the interviews.

All study data was gathered by self-report methods and observation and public documents. Many scientists had not kept a record of their publications, some did not have the copies of their publications and even if some had preserved their documents, they were unable to tell the exact name of the publication, where the article was published or the date of publication. Culling out the scientists’ work from public domain was a challenging task.

**Research Questions**

Based on the problem proposed above, the researcher formulated the following research questions. The research questions were classified into three categories:

- **Objective Questions**
- **Descriptive Questions**
- **Relational Questions**

1. Is there enough information of scientific and technological information in the society?
2. Will there be any relationship between science and society?
3. Will there be any relationship between science and media?
4. Will there be scientists who are interested in science communication?
5. Will there be barriers in communicating science to the masses?
6. Will there be scientists using social media?
7. Will there be scientists writing for print media-popular science?
8. Will there be scientists taking up any formal media training?
9. Will there be scientists shying away from media?
10. Will there be scientists who are against public dissemination of science or public outreach activities?

**Timeline for the study**

Prolonged engagement is the strategy used by case-study researchers to ensure rigor and believability (Calder, 2009 cites Lincoln & Guba; Merriam, 2002). It implies that the researcher spends enough time in the field to ensure that he gets to understand the case completely. The data was collected from March 2012 to December 2013.

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<td>3. Obtained approval from the scientist</td>
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<td>4. Conducted in-depth interviews</td>
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<td>5. Conducted observations</td>
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<td>6. Collected documents from scientists</td>
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<td>7. Received filled questionnaires from scientists</td>
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<td>8. Analyzed and interpreted the data</td>
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<td>9. Wrote findings and implications</td>
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<td>10. Revised the final manuscript</td>
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