Research Design and Methodology

4.1 Introduction

Research methodology is a way to solve the research problem systematically. It may be understood as a science of studying how research is done. It presents the various steps employed by the researcher, generally, to study the research problem along with the logic of why a particular research study has been undertaken, how the research problem has been defined, in what way the hypothesis has been formulated, what data have been collected, what particular method has been adopted, why a particular technique of analysing data has been used and a host of similar other questions are usually answered, when one goes through research methodology concerning a research problem to study.

This chapter is intended to describe the research design and methodology employed to analyse ICT awareness of the research scholars and usage of e-resources. The research design and methodology adopted for the study is described under the following subheadings such as design of the study, conceptual framework, methodology, sampling design, population of the study, sample for the study, pilot study, tools used for the study, description of the questionnaire used, reliability of the measuring tool, procedure of the study, and statistical techniques adopted for the study.

4.2 Design of the Study

Research design is the plan of investigation conceived so as to obtain solution to the research problem, as well as to test the research hypotheses. The present study intended to measure the extent of usage of e-resources among the research scholars in Manonmaniam Sundaranar University in relation to ICT awareness, and information literacy. The jurisdictional area of the university is spread over the three southern districts of Tamilnadu namely Tirunelveli, Thoothukudi and Kanyakumari and research scholars
are scattered in university recognized research centers of university departments and affiliated colleges. Thus, the study is based on the primary data collected from the research scholars enrolled for research programme at Ph.D level. Therefore, the appropriate method adopted for the present study is survey method.

4.3 Conceptual Framework

The present study is to determine the utilization of e-resources among the research scholars in relation to ICT awareness and information literacy. Based on the objectives of the study, the major dependent variables of the study are usage of e-resources and attitude towards e-resources. Since, positive and favourable attitude towards e-resources enhances the usage of e-resources among the research scholars. Similarly, selected independent variables of the present study are gender, locality of the respondents, age, discipline, type of institution namely university departments and recognized research centers of affiliated colleges, and nature of research programme namely part-time and full-time scholar.

The ICT awareness, constraints in use of ICT and information literacy of the research scholars are measured initially and analysed based on selected independent variables of the study. Similarly, attitude score is measured and level of attitude scores is determined. Further, attitude scores are compared with respect the selected independent variables of the study. Finally, the interrelationship between ICT awareness, constraints in use of ICT, information literacy and attitude towards e-resources are measured.

Therefore, the conceptual framework of the study is that ICT awareness and information literacy positively influence the attitude of the research scholars towards e-resources which in turn enhances the usage of e-resources. The conceptual framework is presented in diagram 4.1.
Figure - 4.1: Conceptual Framework
4.4 Population of the Study

The scope of the study is limited to Manonmaniam Sundaranar University. All those research scholars who were enrolled for the research at Ph.D level in the university recognized research centers in any discipline either in the University Departments or research centers of affiliated colleges from 2012-2013 to 2016-17 are the population of the study.

4.5 Samples for the Study

The jurisdictional area of the Manonmaniam Sundaranar University is spread over the three southern districts of Tamilnadu namely Kanyakumari, Tirunelveli and Thoothukudi. Proportionate number of respondents are selected using stratified random sampling techniques by giving due weightage to various categories of variables under study. The final version of the questionnaire is administered among the sample of 800 respondents of the three districts. On the basis of population, 800 questionnaires are distributed, of which 275 each to Kanyakumari and Tirunelveli district and the remaining 250 questionnaires to the respondents of Thoothukudi district. Out of 800 questionnaires, only 626 questionnaires are complete in every aspect and hence selected for analysis and the overall response rate of the questionnaire is 78.3 per cent. The details of distribution of questionnaire on district-wise and response rate of the questionnaire for the present study are presented in table 4.1.

<table>
<thead>
<tr>
<th>S.No</th>
<th>District</th>
<th>No. of Questionnaire Distributed</th>
<th>No. of Questionnaire Returned</th>
<th>Response Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Kanyakumari</td>
<td>275</td>
<td>219</td>
<td>79.6</td>
</tr>
<tr>
<td>2</td>
<td>Tirunelveli</td>
<td>275</td>
<td>210</td>
<td>76.3</td>
</tr>
<tr>
<td>3</td>
<td>Thoothukudi</td>
<td>250</td>
<td>197</td>
<td>78.8</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>800</td>
<td>626</td>
<td>78.3</td>
</tr>
</tbody>
</table>

Table 4.1
District-wise Distribution of Questionnaire and Response Rate
4.6 Pilot Study

Eventhough, a few similar studies were conducted on various aspects of ICT, information literacy, and attitude towards e-resources using survey method. No standardized tool except Information literacy scale has been developed so far to measure ICT awareness and attitude towards e-resources. Hence, the researcher along with the research supervisor has developed ICT awareness tool to measure the perceived awareness towards ICT and standardized by establishing the reliability and validity after conducting a pilot study. Similarly, constrains in the use of ICT and attitude towards e-resources are developed and standardized through pilot study.

4.7 Description of ICT Awareness Scale and Attitude Scale

To measure the ICT awareness and attitude of the research scholars towards e-resources, the investigator has developed an ICT awareness scale and attitude scale. To ensure the validity and reliability of the tool, the tool is modified and validated by the investigator based on item analysis.

4.7.1 Preparation of the Draft Tool

As the first step towards the preparation of ICT awareness scale, the investigator has gone through and reviewed the literature of library and information science and previous studies on ICT awareness in relation to usage library resources. No standardized tool was identified to assess the ICT awareness of research scholars. Hence, the investigator constructed and validated the tool to assess the ICT awareness of research scholars. The investigator prepared 30 statements related ICT and its importance for research work and for accessing electronic resources. Each items had some alternatives. These items were given to the experts and they scrutinized the items and suggestions provided by the experts were carried out. Ambiguous and overlapping items were eliminated and some items were modified. The final version of the ICT awareness scale
consisting 20 statements. The items of the ICT awareness scale are designed in such a way to be rated on a five point scale.

Similarly, due to lack of standardized tool to measure the attitude of users towards e-resources, the investigator has constructed and validated the tool to assess the attitude towards e-resources of research scholars. The investigator prepared 42 statements. These items were given to the subject experts and they scrutinized the items. Some of the items were modified or deleted based on the suggestions provided by the experts. Then the attitude scale with 36 statements of Likert type is prepared for pilot study

4.7.2 Item Analysis

The draft questionnaire along with ICT awareness and attitude scale towards e-resources were administered among 370 respondents of selected colleges of Kanyakumari district. The salient aspects of e-resources and ICT awareness tool were explained to them. Item discrimination power and item difficulty index were calculated. The responses were scored and arranged in the ascending order. The highest 27% of answered papers (100 sheets) were selected and it was called upper group and lower 27% of answered papers (100 sheets) were selected and it was called lower group. The items that were answered correctly were noted down and then the difficulty value and discrimination indexes were found using the formula:

\[
\text{Difficulty value} = \frac{(RU + RL)}{(Nu + NL)} \times 100
\]

\[
\text{Discrimination index} = \frac{RU - RL}{Nu} \quad \text{or} \quad \frac{NL}{Nu}
\]

Where;

\[RU \quad \text{– Number of correct responses from the upper group.}\]
\[RL \quad \text{– Number of correct responses from the lower group}\]
\[NU \quad \text{– Number of respondents in the upper group.}\]
\[NL \quad \text{– Number of respondents in the lower group.}\]
The items, which had difficulty value below 50–60 and discrimination index above 0.23, were retained and other items were eliminated. The difficulty index values of items are appended. Finally the ICT awareness scale and attitude scale have 20 and 28 statements respectively.

a. Establishing Validity

The validity of the tool has been established using different methods. For the present study, the investigator established content validity. In order to establish content validity the tool was given to a panel of experts. The suggestions and opinions of the experts are incorporated in the final version of the questionnaire. Thus the content validity was established.

b. Establishing Reliability

Test-retest method was employed to establish the reliability of the tool. The investigator has given the tool to sixty research scholars. The time taken for completing the tool was noted and then the responses of the scholars were collected and scored. After 20 days the same tool was re-administered to the same set of scholars. Their responses were scored and correlation co-efficient was obtained for the two sets of scores. The correlation co-efficient of the ICT awareness tool and attitude towards e-resources are respectively 0.68 and 0.73. Thus the reliability of the tool was established.

The scoring key was prepared, ‘strongly agree’ as 5, ‘agree’ as 4, ‘undecided’ as 3 and ‘disagree’ as 2 and ‘strongly disagree’ as 1. Based on item discriminating power and index, certain questions have been deleted or modified, few questions have been included to suit the predetermined objectives of the study. Accordingly, a revised version of the questionnaire is prepared for the final study.
4.8 Descriptions of the Final Questionnaire

The tool used for the final study is a well structured questionnaire consisting of tools to measure ICT awareness, constraints in use of ICT, information literacy and attitude towards e-resources along with other demographic variables, familiarity of ICT products and e-resources access behaviour. The secondary data pertaining to the study are collected from the institutional website of Manonmaniam Sundaranar University, and annual report of the university. The detailed description of the questionnaire is presented as follows.

The first part of the questionnaire deals with demographic variables of the study namely gender, locality, age, type of institution, discipline, educational qualification, nature of research, stage of research, and academic productivity.

The second part deals with their familiarity of ICT products, purpose of using ICT resources, frequency of using ICT products and ICT applications and computer literacy.

The third part of the questionnaire is E-resources access behaviour of the research scholars. It includes purposes of using e-resources, motivation to use e-resources, preferred place for accessing e-resources, frequently used e-resources, frequency of using internet, user satisfaction, and frequently used search techniques for accessing e-resources.

The fourth part of the questionnaire is to determine the ICT awareness among the research scholars. It consists of 20 statements on various dimensions of ICT for researchers. Each of these statements are Likert type and they are rated on a five point scale ranging from strongly agree to strongly disagree.

The fifth part of the questionnaire is to determine the perceived constraints in use of ICT among the research scholars. It consists of nine statements and each of these statements are rated on a five point scale ranging from strongly agree to strongly disagree.
The sixth part of the questionnaire is the information literacy tool, standardized tool to assess the information literacy of the research scholars. The tool consists of 12 statements covering various aspects of information literacy on a five point scale ranging from ‘do not know at all’ to ‘excellent’. The statements for assessing information literacy skills are adopted from big six information literacy skills of Eisenberg; Lowe and Spitzer (2004).

The final part of the questionnaire is intended to determine the attitude of the research scholars towards e-resources. It consists of 28 statements of Likert type rated on a five-point scale. It consists of both positive as well as negative statements; scoring procedure is reversed for negative statements.

4.9 Collection of Data

The method adopted for the present study is the survey of descriptive as well as inferential methods. The investigator collected the required data in an orderly manner by getting prior permission from the heads of the institutions. The investigator visited the selected institutions in the three districts of southern Tamilnadu namely Kanyakumari, Tirunelveli and Thoothukudi. After giving self introduction and establishing good rapport with the research scholars, the investigator explained the purpose of research and encouraged them to be free and frank to give responses. Selection of the sample is done on the basis of stratified random sampling technique by giving due weightage to various personal variables such as gender, locale, age, discipline, type of institution, and nature of research.

Then the investigator distributed the booklets of research tools to the respondents and they were asked to read all the items carefully after filling the personal data form given in the first page. Then they were asked to put tick mark in the corresponding places. Research scholars took 60 minutes to complete responding the research tools by reading
carefully and answering the statements. Afterwards, the investigator collected the filled-in questionnaires. The collected questionnaires are edited, the incomplete ones are removed. And 626 questionnaires are complete in every respect are selected for the final study. The response rate is 78.3 per cent. The collected data are analysed using Software Package for Social Sciences (SPSS) version 22.0 and interpreted accordingly.

4.10 Statistical Analysis used for the study

Both descriptive as well as inferential statistics are used. The following statistical techniques are applied to analyse the data.

a. Determination of Levels

The levels are fixed as follows

<table>
<thead>
<tr>
<th>Score</th>
<th>Levels</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean +0.5 S.D</td>
<td>High</td>
</tr>
<tr>
<td>Between Mean ±0.5 S.D</td>
<td>Moderate</td>
</tr>
<tr>
<td>Mean - 0.5 S.D</td>
<td>Low</td>
</tr>
</tbody>
</table>

This criteria is followed throughout the thesis to classify the opinion score namely ICT awareness, barriers in use of ICT, determination of information literacy level and determination of the attitude score of the research scholars towards e-resources.

b. ‘t’ test

‘t’ test or test of significance of the difference between means for large independent samples (Garret, 1969) is used to compare the means between any two groups on any of the variables. If the‘t’ value is below a cut-off point at 5% level, the difference in means is considered as not significant and the null hypothesis is accepted. When‘t’ value exceeds a cut-off point at 5% level, then the difference is considered to be significant and null hypothesis is rejected.
c. **ANOVA**

Analysis of Variance (ANOVA) is an extremely useful technique for testing the difference between the means of multiple independent samples. The basic principle for ANOVA is to test the difference among the means of samples by examining the amount of variation between the samples relative to the amount of variation among samples. The value of ANOVA is compared in the ‘F’ limit for given degrees of freedom at 5% level. If the ‘F’ value worked out is equal to or exceeds the ‘F’ limit value from the table indicated, then there are significant differences among the samples between the means.

d. **Chi-square Test**

Chi-square distribution ($\chi^2$-distribution) with k degrees of freedom is the distribution of a sum of the squares of k independent standard normal random variables. It is one of the most widely used inferential statistics. It is used for goodness of fit on an observed distribution to a theoretical one of qualitative data. The value of $\chi^2$ is compared in the $\chi^2$ limit for given degrees of freedom at 5% level. If the $\chi^2$ value worked out is equal to or exceeds out the $\chi^2$ limit value from the table indicated; then there are significant association between the samples.

e. **Karl Pearson’s Product Moment Correlation**

Pearson $\gamma$ is used for estimating the extent of relation existing among different variables taken in pairs for all the different groups. Garret (1969) presents the following classification for interpreting the various values of $r$, which is adopted for the study.

- $r$ from 0.00 to ± 0.20 denotes negligible correlation.
- $r$ from ±0.20 to ±0.40 denotes low correlation.
- $r$ from ±0.40 to ±0.70 denotes substantial correlation.
- $r$ from ±0.70 to ±1 denotes high correlation.
The correlation is interpreted only after the statistical significance of coefficient

correlation is considered from the tables. In the present study it’s found that $r$ exceeds
0.062, it is significant at 5% level and if it’s below 0.062, it is not significant at 5% level.

The collected data are analysed and interpreted using appropriate statistics and the
details are presented in the next chapter.