CHAPTER 3
RESEARCH DESIGN AND
METHODOLOGY
3.0 Introduction

Research design is the intended blueprint of the proposed study and methodology or modus operandi corresponds to the system of methods and techniques employed in identifying sources, collecting data, organizing them, and producing valid interpretations and inferences for solving the problem identified for investigation. Here, the methodology followed for the study is discussed in length and breadth.

Library system of the universities is in a transformation state with the implementation of automation and also by providing electronic resources and services to the user community. Computers were introduced in both the university libraries during 1999 and Cochin University of Science and Technology was a step ahead, and it computerized all its sections during 2000.

The methodology adopted for the study includes personal observation, survey method using questionnaire, supplemented by interview wherever clarification was required. For getting a clear idea about the topic, an exhaustive literature search was carried out, for this many primary periodicals and secondary periodicals like LISA, bibliographies etc were also consulted.

3.1 Research population

The present study intends to compare and determine the ISB of science and technology teachers and research scholars of Cochin University of Science and Technology (CUSAT) and University of Kerala. The total population of the study is 957; it includes permanent teachers and full-time research scholars of both universities.
University of Kerala is the oldest University in the state; it was established much before the birth of Kerala State. The University of Travancore, which became the University of Kerala, was established in 1937, by a promulgation of the Maharaja of Travancore, Sri Chithira Thirunal Balarama Varma who was also the first Chancellor of the University. Sir. C. P. Ramaswamy Ayyar, the then Diwan of the State, was the first Vice-Chancellor. It was the sixteenth University to be set up in India and ten colleges within the State of Travancore which were affiliated to the Madras University became the affiliated colleges of the University of Travancore. In 1957, the University of Travancore was renamed as University of Kerala with three campuses located in three different parts of the State viz. Thiruvananthapuram, Ernakulam and Kozhikode. Initially the jurisdiction of University of Kerala spans over the state of Kerala, but with the establishment of various other Universities in the state, including Cochin University of Science and Technology the area of the jurisdiction of the University of Kerala has been limited to Thiruvananthapuram, Kollam, Alappuzha Districts and some parts of Pathanamthitta District. (University of Kerala)

At present, the University has sixteen faculties and forty one departments of teaching and research. There are one hundred and eighty eight affiliated colleges. Of these, sixty three are Arts and Science colleges. There are two Law colleges, eighteen Engineering colleges (of which fifteen are unaided), five Medical Colleges (three are self-financing) forty eight aided Teachers Training Colleges, four Ayurveda Colleges, two Homeopathy Colleges, one Sidha Medical College, two Fine Arts colleges, one Music College, five Dental Colleges (of which two are unaided), five unaided Pharmacy Colleges and one college of Physical Education. Besides these, there are four affiliated institutions conducting two year full time MBA course, four colleges offering MCA and nineteen Nursing Colleges, all in the unaided sector (University of Kerala).

The University’s engineering college in Kariyavattom campus offers B.Tech courses in Information Technology, Computer Science and Engineering, Electronics and Communications etc. The University Departments offer a wide range of teaching and research at post-graduate, M.Phil and Ph.D levels. At present, about thirty two colleges
offer post graduate teaching programmes. Some of the affiliated colleges offer M.Phil courses and some colleges have been recognized as research centers.

There are seventeen science and technology departments in University of Kerala. The departments that come under the category of science and technology are Aquatic Biology and Fisheries, Biochemistry, Bioinformatics, Biotechnology, Botany, Chemistry, Computer Science, Demography, Engineering, Environmental Science, Future studies, Geology, Mathematics, Optoelectronics, Physics, Statistics and Zoology. The total research population in these departments is four hundred and forty.

The University of Kerala has academic cooperation with some foreign universities like Valladolid of Spain and Claremont of the United States of America.

3.2.1 Library system of University of Kerala

The library system of the University of Kerala comprises of university library, campus library, 41 department libraries and three study centre libraries. Most of the postgraduate and research departments of the university are located at Kariyavattom, which is situated about fifteen kilometers from the main Palayam campus at Thiruvananthapuram. University library is situated at Palayam to satisfy the information requirements of the students and teachers of University of Kerala and other members, and campus library at Kariyavattom caters to the research and academic needs of the academics of the departments located there. In addition to this each postgraduate department has its own department library.

The Kerala University Library was established in 1942. It has a collection of more than 3 lakh books and over 1000 bound volumes of journals. The library subscribes to 43 foreign journals, over 400 Indian periodicals, 35 popular magazines and 20 newspapers. The total number of membership of the library is over 30,800 out of which student memberships comes to over 12,270 and that of teachers comes to 2850. Nearly 400 to 500 students, teachers and others visit the main library daily for reference and issue of books.
The library was automated using Libsys software during 2000 and has a computer system for a LAN & CD-ROM networking. A microfilm reader printer and a rare collection of journals in microfilm are also available in the library. The library has CD-ROM on many subjects and offers e-journals through consortia’s, OPAC and internet facility for its members. E-journal access is provided at Kerala University Library, campus library Kariyavattom and at all the teaching departments simultaneously. More than 10,000 scholarly journals from all over the world are made available to its members. The University of Kerala offers e-journals in all areas of learning, from 23 major publishers. In addition to this, University of Kerala is getting access to Ingenta gateway portal which is a free-searchable bibliographic database of 15.2 million articles from 28,000 journal titles from 11,400 publishers. The Kerala University Library Net Information Centre (KULNIC) was established during August 2002 with the financial assistance from the Information Technology Department, Government of Kerala. Kerala University library is providing the e-journal access to its users through this centre.

The campus library is located at Kariyavattom under the administrative control of the University librarian. It has a modest collection of over 7000 books and subscribes to over 60 periodicals. Library facilities are also offered at the study centres of the University at Kollam, Alappuzha and Pandalam. The total number of books available at Kollam is about 3,750 and that of Alappuzha is 2,794 and Pandalam is over 200.

3.3 Cochin University of Science and Technology

The erstwhile University of Cochin was established on 10th July 1971 by the Cochin University Act, 1971 for the promotion of higher education with particular emphasis on postgraduate studies and research in science and technology. It was reorganized and converted into Cochin University of Science and Technology (CUSAT) in 1986 for the promotion of graduate and postgraduate studies and advanced research in Applied Science, Technology, Industry, Commerce, Management and Social Science.

The University has three campuses namely, Thrikkakara, Lakeside and Pulicunnoo and a few recognized engineering colleges. The main campus of CUSAT is located at Thrikkakara, about 15 kilometers north of Ernakulam city. Another campus of
university, the Lakeside campus is situated in Ernakulam city. Pulimunnoo campus is situated in Alapuzha, the neighboring district of Ernakulam, this campus is about 60 kilometers south of Ernakulam. Thrikkakkara campus offers various postgraduate and research studies as well as B.Tech programmes. University library and the main administrative office function here. Lakeside campus at Ernakulam offers postgraduate and research studies in Marine science and related subjects. Proximity to the sea and infrastructural facilities like a jetty, several sea-going vessels provide an environment and facilities essential for marine and related science studies. Pulimunnoo campus at Alappuzha district offers various B.Tech programmes. In addition to this there are various centres for interdisciplinary studies; Microprocessor Research, National Manpower Information, Rural Development & Appropriate Technology, Sophisticated Test and Instrumentation and Science in Society besides a Science Park functions in this campus. (Cochin University of Science and Technology)

CUSAT is academically structured into nine faculties namely Engineering, Environmental Studies, Humanities, Law, Marine Sciences, Medical Science & Technology, Science, Social Sciences and Technology. It has at present 27 departments of study and research offering postgraduate programmes across a wide spectrum of disciplines, especially in frontier areas of science and technology.

CUSAT has contacts and collaborative tie-ups with various international universities and institutions and is in the path of growth as a global centre for generation of new knowledge in frontier areas of learning. CUSAT has entered into academic collaborations and exchange programmes with many notable institutions across the USA, Europe, Russia, Japan, France, Korea etc.

In CUSAT twenty one departments come under the category of science and technology. The departments coming under the study include; Applied Chemistry, Atmospheric Science, Biotechnology, Centre of Excellence in Laser and Optoelectronic Sciences (CELOS), Chemical Oceanography, Computer Applications, Computer Science, Electronics, Engineering, Environment Science, Industrial Fisheries, Instrumentation, Marine Biology Micro Biology and Bio Chemistry, Marine Geology and Geo Physics, Mathematics, Photonics, Physical Oceanography, Physics, Polymer Science and Rubber Technology, Ship Technology and Statistics.
Total research population in these departments is five hundred and seventeen.

3.3.1 Library system of Cochin University of Science and Technology

Library system of CUSAT comprises of university library and department libraries. The university library was established in 1975 as a central agency for meeting the information requirements of the academic community of the university. It houses a balanced and rich collection on all disciplines and books of general interest. Library resources are organised according to Universal Decimal Classification and indexed according to Anglo American Cataloguing Rules with local modifications.

The library has a collection of about 70000 volumes, 280 current journals, about 800 theses and more than 300 CD-ROMs. The library has also a good collection of multimedia encyclopedias and dictionaries. The library is a depository of Indian patents and over 27,500 odd patents form an important part of the special collection. It is supplemented by a patent database on CD-INPAT, which is an index to about 50,000 records on patents granted in India from 1972 to December 1997 and brought out by INSDOC, New Delhi. The library is an active participant in the Information and Library Network (INFLIBNET) and Developing Library Network (DELNET). Through these networks, library offers databases of books, current periodicals, periodical articles, CD-ROM databases, theses etc, available among the various member libraries to its users.

Automation of the library was inaugurated on 10th March, 2000 with ADLIB software. The bibliographic records of books, journals, and theses in the library are available globally through OPAC from 2000 onwards. Library uses DSpace software for making digital repository.

Library LAN is a part of campus wide network, which has made it possible for the academic community of all the departments to have access to information from their location itself. CUSAT library has IP enabled access to online journals under the UGC-INFONET c-journals consortia and INDEST consortia set up in the campus network. In addition to this CUSAT library subscribes to e-journals and some online databases. University library has a link on the CUSAT home page and all information
pertaining to the library including OPAC, new arrivals, seminar alerts etc is available there. Online journals and databases along with a short description and its link are available in the University site, which helps users to have access to the digital collection from any where in the campus.

The library membership is open to faculty, research scholars, students and administrative staff of the University. Graduates from recognized Universities of three years standing who are residents of Greater Cochin Area are also permitted to avail of membership in the library. Industrial and research institutions are granted institutional membership.

3.4 Selection of sample and the techniques used

Sampling involves the study of a few representative units of the universe. It is a key element which determines the outcome of research; hence a careful unbiased and representative selection is required from the population under investigation. Another important factor in sample selection is the size of the sample; the sample should reasonably represent the population.

Here in this study, to have maximum representation and reliability investigator adopted an almost census method. The chance for sampling error was very much minimised by considering an almost full population.

3.5 Survey instrument

Various methods of tools have been used in the study for eliciting data from the academics' of both the universities. Questionnaire method was the central instrument for the data collection.

Based on informal interviews and observations on the research population and also with the consultation of library staff of both the universities a draft questionnaire was prepared. This was supplemented with the check points obtained while reviewing similar studies. The draft questionnaire was modified after consultation with the experts in the field of user studies. This draft questionnaire was subjected to a pilot study and
was sharpened in accordance with the user's reactions and also with the objectives set apart for the study. The data obtained through questionnaire was validated using indirect means.

The questionnaire requires about thirty minute's patience in filling up. Barring four or five questions, all the questions are close-end questions. Some questions were designed to elicit user's preference.

The survey questionnaire was designed in four parts namely; Personal information, Stages of research, Source of information and means of communication and finally, Library use and services. Questionnaire of the study is given as appendix 1.

Part I of the survey instrument was designed to obtain the basic user characteristics; Part II was intended to elicit data on the stages of research and the types of information sought during various stages of research; Part III of the questionnaire was designed mainly for getting a vivid picture of users preference on the information sources and their means of communication; and Part IV of the questionnaire provides insights into their library use and to gauge the users awareness to the services provided by the library, this part of the questionnaire also deals with the impact of technologies on libraries.

3.6 Data collection procedure

A pilot survey was conducted from fifty students, twenty five each from both the universities to test the questionnaire, for that the investigator himself administrated the questionnaire in two departments namely Aquatic Biology and Fisheries and Mathematics of University of Kerala and Physics department of CUSAT. The pilot survey was carried out during the month of May 2006, at both the universities. The questionnaire was modified accordingly and the actual survey was undertaken during the month of June 2006 to December 2006 at University of Kerala and from August 2006 to January 2007 at CUSAT.
The investigator approached the heads of departments under study and sought permission and then collected the list of respondents of each department and subsequently contacted the academics personally with the questionnaire and handed over it to them with a brief description of the study, and in many cases sat with them and clarified their doubts and elicited their data, and in some cases prior permission through phone was obtained and interview method was adopted for eliciting the data.

Data collection was a very daunting task. Total population in both the universities was nine hundred and fifty seven, out of which investigator was able to see eight hundred and fifty nine academics only and questionnaires were distributed in person. Six hundred and forty six (75%) academics responded to the survey, out of which five hundred and sixty four (66%) of them were good responses. A total of eighty two invalid questionnaires were rejected, which included thirty six partially filled in questionnaire and forty six blank questionnaires. The questionnaires returned without answering, include those of faculties also, the reason they cited was that the questions were not answerable or they don’t have enough time to look into it and in some case irrespective of approaching them personally for more than four or five times they were reluctant to return the questionnaire. There were many instances of academics refusing to accept the questionnaire also.

3.7 Techniques used for data analysis

Science and technology departments of the universities are not identical. In University of Kerala, seventeen departments that come under the broad category of science and technology are listed under three faculties namely faculty of Applied Science, faculty of Science and faculty of Engineering and Technology. In CUSAT, twenty one departments that come under the broad category of science and technology are categorised under Faculty of Engineering; Environment Science; Marine Science; Science and Technology. Since the study focused on science and technology departments, the different departments of both the universities were broadly categorised under two disciplines namely science and technology.

Data was coded and analysed using Statistical Package for Social Sciences (SPSS) statistical software and also with the help of Microsoft excel package. In addition to
simple and common statistical techniques, ANOVA, nominal regression, logistic regression, testing for proportion were used to check the relationship between variables.

References

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