Research to enhance LIS skills

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User expectations

- Users expect value added services, easy to use interface and want tailored information relevant to their needs
- Prefer to use the various information resources available in electronic form through a single click

Occupational changes

- Digital era needs not only a traditional Librarian but it needs Knowledge Manager, Information Expert or Resource Manager
- The librarian needs to hone his/her skills and knowledge to deliver the expectations of today's users

Competencies

- Knowledge managers have to have the domain knowledge of their specific subject
- At the same time, one should not ignore the core library subjects and our role in the knowledge generation-supply-use chain

Path of Progress

- Need to keep one self updated about the technological developments as well as domain specific subjects
- Also one needs to keep abreast of latest research happening in the library field
- Need to add to the knowledge corpus in the field of library science by carrying out research in the areas we work in

What is research ?

- Research and development is a backbone of any profession
- Research is a systematic investigation designed to develop or contribute to generalize the observed phenomenon

Need of Research

- Whenever traditional theory is found lacking in explaining the existing phenomena and a novel situation is faced, research originates
- Research rejects either old theories or modifies them or suggests new theories

Definition

- The Webster's International Dictionary (1986) defines research as “a careful, critical enquiry or examination in seeking facts or principles, diligent investigation in order to ascertain something.”

Why is research important ?

- It inculcates scientific and inductive thinking and it promotes the development of rational thought process
- It enables finding solutions to problems and to resolving conflict in society

Research Culture

- Times Higher Education (THE) report states that in India there is an absence of commitment towards research

- Workshops organized by Knowledge Consortium of Gujarat (KCG), across the state, will help in building a culture of research in Gujarat

Forms of Research output

- Research articles published
- Dissertation (Master degree)
- Thesis (Ph D degree)
- Patents

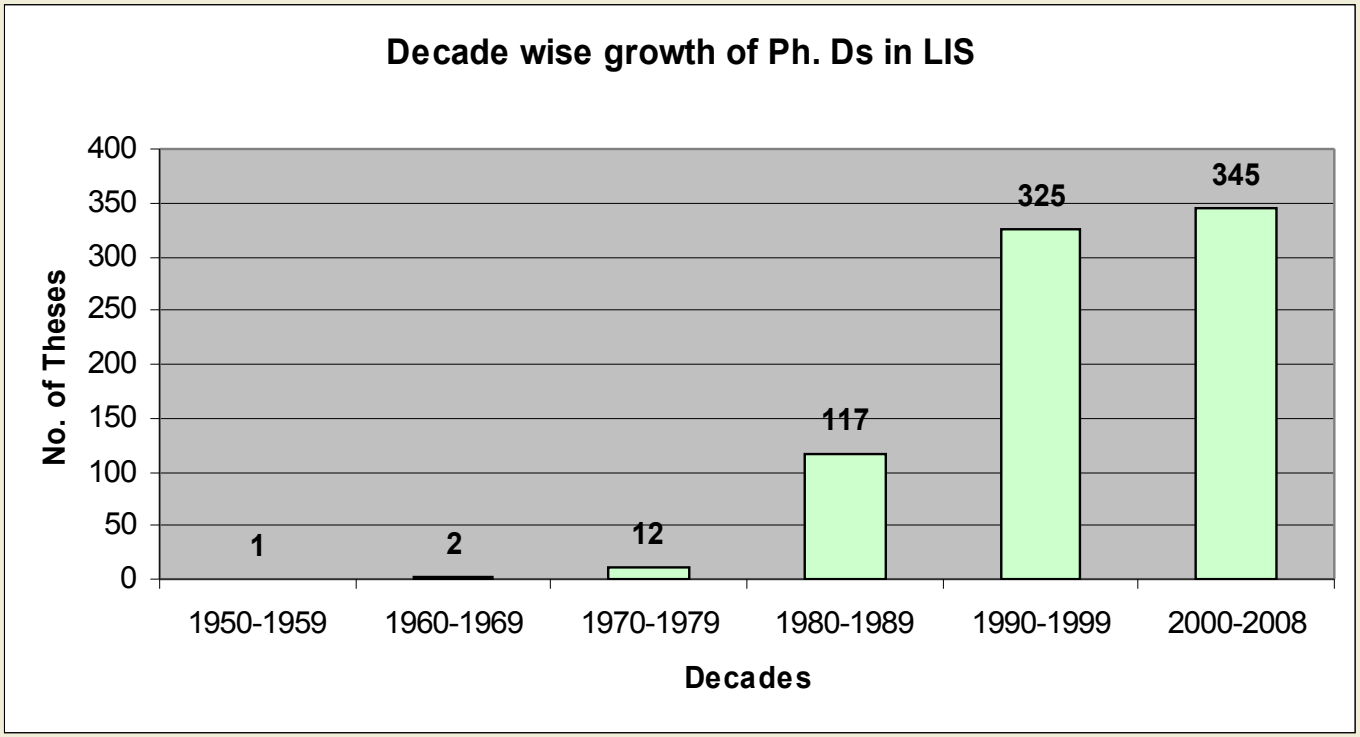
Doctoral Research

- Thesis is a document submitted in support of candidature for a degree or professional qualification presenting the author's research and findings
- Boyer (1973) describes it as "the capstone to a formal academic training process"

Research Programme in LIS in India

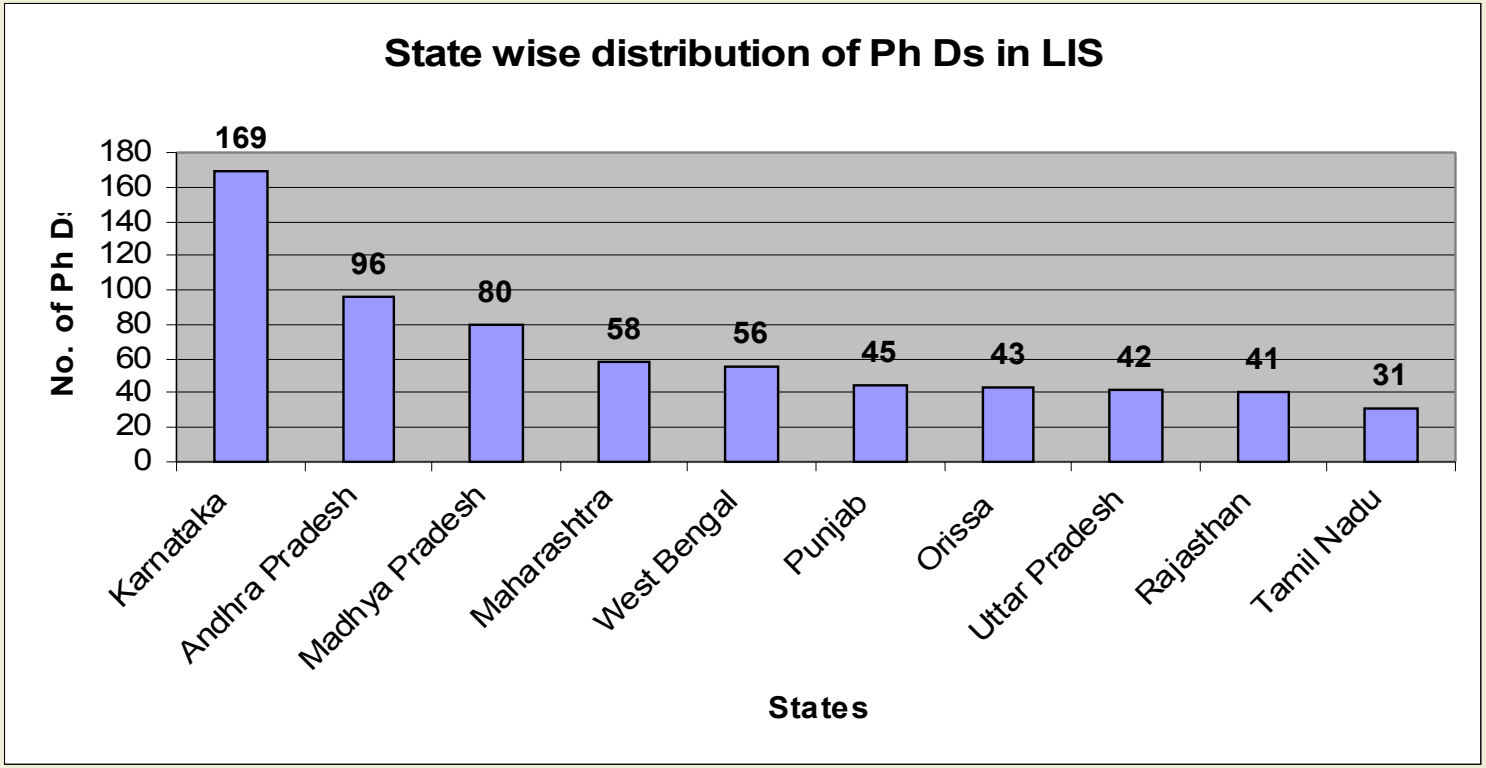
- University of Delhi was the first university to institute the doctoral programme leading to Ph.D. in Library Science in 1951
- Dr. D.B. Krishna Rao was the first recipient of Ph.D. in Library Science in India in 1958 from University of Delhi, under the guidance of Dr. S. R. Ranganathan

Research Trend : Decade wise



(Source : Chandraekhar M and Ramasesh (2009)

Research Trend : State wise



(Source : Chandraekhar M and Ramasesh (2009)

Research Trend : Topic wise

Decade	Subjects undertaken
1950's – 1970's	Types of Libraries (public, academic), facet analysis, history of librarianship, universe of knowledge and topics depicting classical approach to librarianship.
1970 – 1980	Library services, documentation, users' surveys, needs identification, technical processing, cataloguing, resource sharing.
1980's – 2000	Bibliometric studies, computer applications, children's literature, bibliographic data bases, patent literature, collection development.
1990 – 2000	Networks and networking, Internet, non-book material, preservation, distance and continuing education, Total Quality Management, library automation, systems approach, library software.
2000– onwards	**Grey Literature, institutional repositories, open archives, consortia, content management, knowledge management, ontology, metadata**

(Source : Pratibha Gokhale (2010))

The Beginning : Thesis proposal

- Thesis proposal acts like a beacon of light and helps to navigate through the multiple cross roads one comes across during the course of research
- Thesis proposal is generally written in the present and future tense and a thesis on the other hand is always written in past tense

Research Question

- Dr Wendy Carter has summarised the steps of going through the research process :
- First formulate the research question. Restate the question in the form of a statement
- State the significance of the problem
- State the purpose of the study
- Benefit of the study

Literature search

- Literature Review - Locate and briefly describe those studies that support and oppose your approach to the problem
- Hypotheses – State clearly what you expect the results of your study to show
- Definition of Terms – Describe the exact meaning of all terms used in the problem, purpose and methodology sections

Research Methodology

- Methodology - List three research methodologies you could use and describe why each might be appropriate and feasible. Select the most viable
- Describe briefly the tools you will use for the study and why

Scope and Limitations

- Assumptions – Describe untested and untestable positions, basic values, world views, or beliefs that are assumed in your study
- Scope and Limitations – Disclose any conceptual and methodological limitations

Citations

- Do not forget to give references in the text of the proposal as well as the final thesis. These should reflect exactly at the end of the thesis proposal/thesis
- Besides acknowledging the authors of the papers you have consulted, it gives the indication of breadth of reading and knowledge about the subject

Major Referencing Styles

- American Chemical Society (ACS)
- American Psychological Association (APA)
- British Medical Association (BMA)
- Chicago Manual of Style

Reference Management Software

- Citation Manager
  - Saves time in creating and managing the references
  - Easily creates a bibliography for thesis or journal article in the preferred citation style
  - **Examples :**
    - » **Endnote, Bookends**
    - » **Ref Works, Ref Man**
    - » **Zotero, Mendeley, Quiqqa, Jabref**

A Case Study

- Pressure building up for research managers in the universities and research institutes to justify the money spent on research

- Universities and institutes are keen to assess the research output of their scientists

Selecting the topic

- As no bibliometric study for PRL had been done, present study titled “Research Undertaken in Physical Research Laboratory (PRL) : A Bibliometric study”
- This study tries to find the publication pattern and thrust areas of research carried out in the institute

Objectives of the Study

- To study the publication pattern of PRL research publications
- To study the research trends in PRL
- To determine the usage of library collection
- To find the usage of electronic vs. print resources in the theses of the Ph. D. stud ents

Physics Research

- A study by Dhavan & Gupta (2007) examined the broad characteristics of India's publication output in Physics
- It finds that India's physics related contribution is significantly high (86 per cent) in SCI covered journals
- R & D sector exceeds all other sectors in publications output per institute

Publication Pattern of Research

- Research output of PRL
  - mainly available in two forms –
    - research publications of the scientists and
    - doctoral theses of the Ph. D. students
- The record of papers published (in journals & conference proceedings) and invited talks delivered is used to study the publication pattern

PRL Research Analysis

- Content analysis of papers published in journals – to identify active areas of research

- Citation analysis of bibliographies of theses submitted by doctoral students of PRL – to identify the citing pattern which will indicate the use of library resources

Review of Literature

- For the present study, preliminary literature survey of the studies was done using LISA database
- Full-text on-line databases of Springer-link, Sage Journals and Emerald Publishing were also searched for reviewing the literature

Tools used

- According to Lancaster (1991) 4 types of tools are predominantly used :
  - i) citation analysis
  - ii) content analysis
  - iii) user studies and
  - iv) circulation statistics
- The present study uses two of these tools (citation analysis and content analysis) to fulfil the objectives of the study

Scope of the Study

- The study aimed to measure the research output of Physical Research Laboratory (PRL) during a 10 year period (1997-2006)
- The data consisted of papers published in journals, conference proceedings and invited talks delivered
- Other research outputs like technical notes, project reports were not included for the study

Scientific Task Force

- About 140 scientists (60 are academic faculty and remaining are technical faculty and Post doctoral fellows) carry out research in PRL
- Every year about 15 students join for the Ph. D. program
- Up till now 316 doctoral theses have been submitted by the PRL students

Data Collection process

- Data collection for the study was done during 2007-2010
- For each paper in journals/conference proceedings, the record consisted of names of the authors, name of the division, name of the journal/ conference, whether it is national or international, whether it has single author, double author or multi authors, whether the collaboration is international, national or domestic and the year of publication

Content Analysis

- To identify the research trend in PRL during the study period
  - Content analysis of the research articles published in journals was done by providing the keywords to each article
  - The keywords were then used, to allot a PACS number (Physics and Astronomy Classification Scheme) to each article

PACS (Physics & Astronomy Classification Scheme)

- PACS is a hierarchical subject classification scheme designed to classify the literature of physics and astronomy
- The PACS codes of all the articles are grouped and arranged in descending order. This is done for each year
- Data for all the years is then added up to arrive at top 20 subject headings put together corresponding to the PACS numbers and are indicated as the thrust areas of research carried out by PRL

Citation Analysis

- Citation analysis tool was used to study the 68 bibliographies of the doctoral theses submitted by the Ph. D students of PRL during 1997-2006 to find the usage of different types of documents in the library collection
- During the period of study, 68 theses were submitted by the Ph. D. students. These studies yielded a total of 10,864 citations for which citation analysis was done

Limitations of the Study

- The researcher has not included the number of projects completed and students guided by faculty members during the 10-year period
- As the researcher did not have access to either of the citation databases – Web of Science or Scopus, so researcher could not get the citation data of the papers published by PRL

A few findings

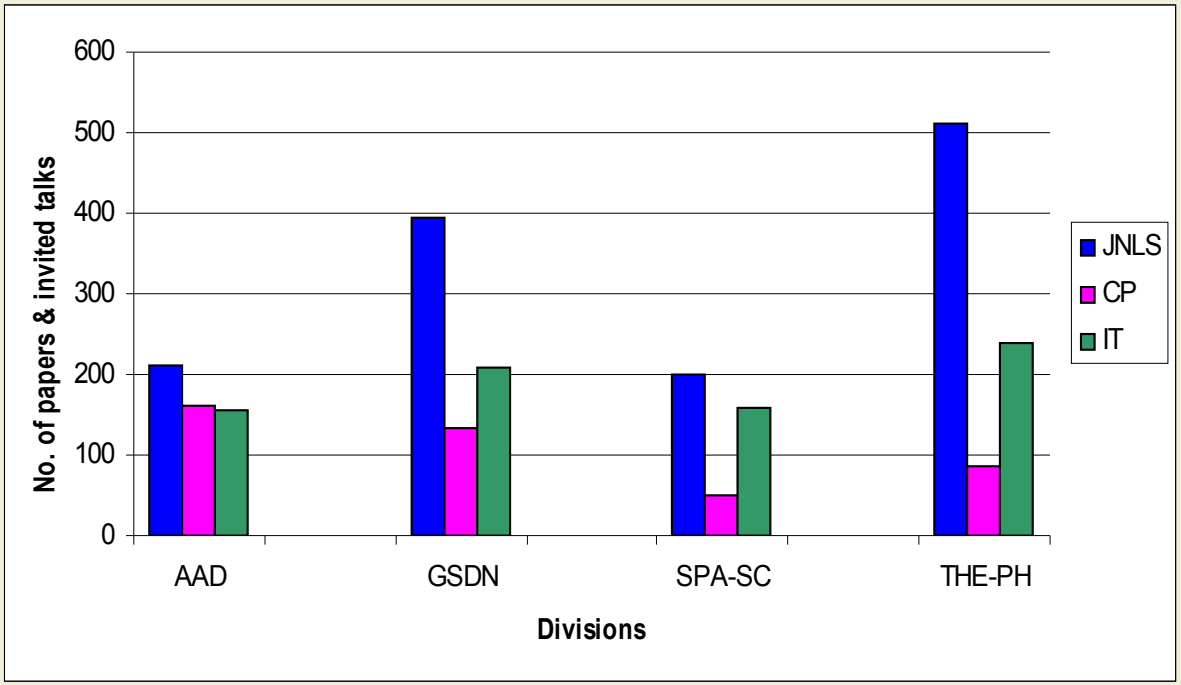
- The research output of PRL scientists during the period of 1997-2006 was 2518 units out of which 1318 were papers published in journals, 436 papers in conference proceedings and 764 were the invited talks delivered

- The result of the present study shows that the multiple authored and double authored papers are on the rise in PRL
- International collaboration is higher in journals than in conference proceedings while domestic collaboration is higher in conference proceedings

Division Productivity

- The study revealed that Theoretical Physics division is most productive in terms of papers published in journals and invited talks delivered
- Geosciences division comes second in all the three categories of the research output

Division wise consolidated research output of PRL during 1997-2006



- Note : AAD – Astronomy, GSDN – Geosciences, SPA-SC – Space & Atmospheric Sciences, THE-PH – Theoretical Physics

Most preferred journals for publication

Journal Name	No of Papers	IF
Physical Review A	83	2.866
Current Science	68	0.782
Physical Review D	50	4.922
Journal of Geophysical Research (ALL)	47	3.082
Physics Letters B	41	5.083
Astronomy and Astrophysics	37	4.179
Solar Physics	37	3.628
Journal of Earth System Science	34	0.819
Physical Review E	33	2.400
Advances in Space Research	30	1.079
Geophysical Research Letters	25	3.204
Meteoritics and Planetary Science	23	3.253
Physical Review Letters	22	7.328
Pramana	22	0.349
Astrophysical Journal	21	7.364

Thrust areas of research at PRL during 1997-2006

PACS No.	Micro Topics	No.of Papers
92.6	**Atmosphere dynamics & meteorology**	**114**
96.6	Solar physics	82
42.5	Quantum optics	80
92.4	Hydrology and glaciology	70
96.3	Solar system objects, Meteorites	63
94.2	Physics of the ionosphere	49
91.8	Geochronology	45
14.6	Leptons	44
3.65	Quantum mechanics	41
82.33	Reactions in various media	36
91.6	Physical properties of rocks and minerals	30
5.45	Nonlinear dynamics and chaos	28
92.2	Chemical and biological oceanography	26
95.55	Astronomical, Space research instrumentation	25
52.27	Basic studies of specific kinds of plasmas	21

Citation Analysis of Theses

- The citation analysis of the bibliographies of theses submitted by the doctoral students at PRL revealed the preference for electronic resources from 1997 through 2006
- Journals comprise major part of the documents cited, followed by Books and Other Documents.
- From 1997 through 2006, the use of the non-subscribed journals is on the rise
- In ‘Other documents’ category, most used are the ‘Reports’ followed by ‘Proceedings’

Research Process : Tips

- Extensive literature search is must in any research to be carried out
- Choose the sample in a logical manner
- Design the questionnaire keeping in mind the data you need
- Do a pilot survey using the questionnaire and then revise it for the full sample

Research Process : Tips

- Before collection of data make sure that there is no ambiguity in the sample used and the relevant codes used
- Validate the data at every step
- Go back to the thesis proposal whenever in doubt

Data Analysis : Tips

- Only presenting the data collected is never enough in doctoral research
- Data has to be analysed and interpreted
- Then only the results of the research would be meaningful
- Knowledge of basic statistical concepts is an added advantage

Thesis writing : Tips

- It is best to start writing the thesis with chapter on survey of literature
- This may be followed by the chapters on Methodology, Data Collection & Analysis, Conclusions and Suggestions
- And first chapter (Introduction) is written the last as most of it would be the extended version of the thesis proposal

Pointers to Current research

- LISA is a good starting point to know the current areas of research in the field of Library Science
- Professional organizations often post their Research Agenda on their web site
- Read the suggestions for further research at the end of most scholarly articles
- Annual conferences of professional associations like OCLC, SLA, IFLA, etc. give good idea about the research happening at international scene

Research Topics

- Study of Liscence Agreements
- Relevance of Copyright in the digital era
- Cost benefit analysis of library services
- Return on Investment (ROI) studies
- Impact of online buying (flipcart, infibeam) on library procurement

More Research Topics

- Arthur W. Hafner (2010) has compiled a list of topics on which research can be carried out :

1) Advances in search engine technology and their impacts on libraries

2) Changing nature of library space requirements to meet student and collection requirements

3) Developing an annual academic agenda for the library, including benchmarks and performance measures

Next step

- Form Collaborative Linkages
  - Collaborative research gives broader perpective
  - Publication productivity improves
  - Impact of research improves

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Thank you !