Impact of Information and Communication Technology (ICT) on Information Seeking Behaviour of Users in Astronomy and Astrophysics Centres of India: A Survey

HEMANT KUMAR SAHU
Scientific Officer-B, Library
Inter-University Centre for Astronomy and Astrophysics, Pune
&
DR. SURYA NATH SINGH
Sr. Library and Information Officer
National Institute of Virology (ICMR), Pune

Introduction

- Last two decades research and education have contributed to better understanding of information needs and information seeking behaviours (ISB) among users and AA are not exception. Impact of ICT on Information centres and libraries of AA and ICT holds the key to the success of modernizing information services.
- Not only does ICT introduce new ways of information handling, it also brings about change in the very structure of information and its communication.
- This paper is part of research work done on the topic "**Information Seeking Behavior of Users in Astronomy Information Centers and Libraries in India: The Impact of New Information Technology"** and thesis submitted to University of Pune on September 2009.

Need of Study

- A better understanding was required to know the needs, kind of resources and ICT based services that could make education and research work more effective and efficient.

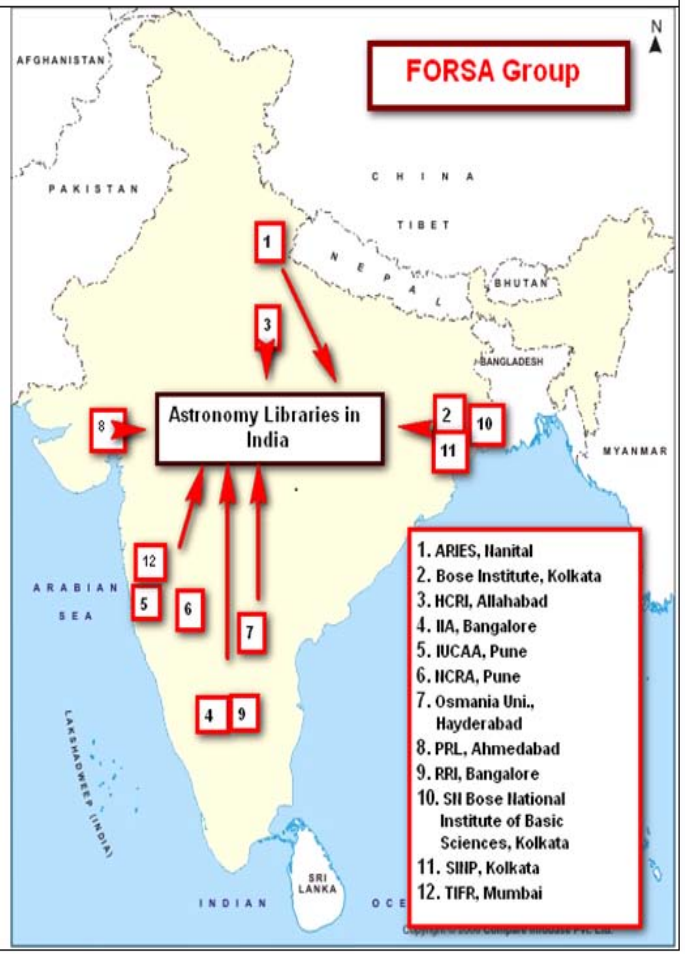
Objectives of the Study

- To investigate the extent of adoption/impact of ICT by/on Astronomy & Astrophysics Information Centres and Libraries in India.
- To determine and analyse the impact of these systems on communication and exchange of professional knowledge among scientists.
- To assess the possible factors and problem faced by AA scientists, which trigger the information, need and the association of ideas, or logical consequence that leads to a particular ISB, with seeking and using information.
- To identify types and range of electronic information resources currently used/accessed by academics/researchers in field of AA and also to find put the level and spread of their use and awareness for seeking information and tools and process for information seeking.
- Furthermore, to assess for generic use of ICT for their ISB viz various databases, search engines, strategies, catalogues, internet/intranet, particularly from journals/books and review articles, for their various purposes, etc.

Astronomy Information Centres and Libraries (ICLs) in India

During the period 2004-2008, Researcher had distributed/ hosted on web a comprehensive survey/ questionnaire designed to determine the Impact ICT on information seeking behaviour of AA to faculty, research associates, postdoctoral researchers and graduate students at 12 main AA respective institutions of India.

The Inter-University Centre for Astronomy and Astrophysics (IUCAA), which is a leading centre in Astronomy library in India, is chosen as main sources with the others 12 Astronomy libraries.

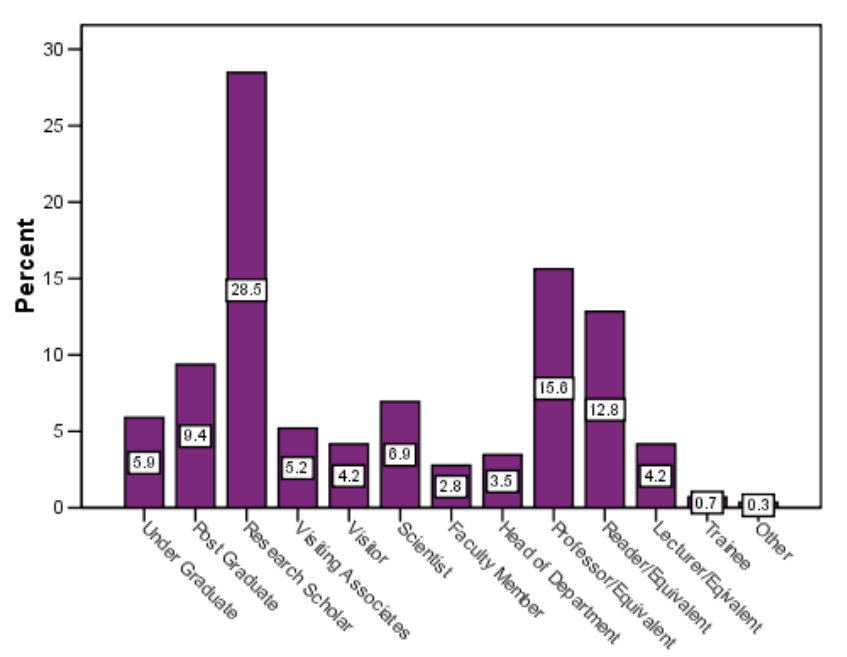
List of FORSA Members	Location of FORSA Members in India
1. Aryabhatta Research Institute of Observational Sciences (ARIES), Nanital 2. Bose Institute, Kolkata 3. Harish-Chandra Research Institute (HRI), Allahabad 4. Indian Institute of Astrophysics (IIA), Bangalore 5. Inter-University Centre for Astronomy and Astrophysics (IUCAA), Pune 6. National Centre for Radio Astrophysics (NCRA), Pune 7. Osmania University, Hyderabad 8. Physical Research Laboratory (PRL), Ahmedabad 9. Raman Research Institute (RRI), Bangalore 10. S.N. Bose National Centre for Basic Sciences (SNBNCBS), Kolkatta 11. Saha Institute of Nuclear Physics (SINP), Kolkata 12. Tata Institute of Fundamental Research (TIFR), Mumbai	

Methodology

- The main users of AA information are research scholars, visiting associates, scientists, faculty members and decision makers. The main survey/questionnaire consisted of total main 41 questions with 20 sub questions which were design to know and explore user's ISB and impact of ICT and their view about their libraries and services provided by their libraries.
- Total 400 questionnaires were sent by post and the same is also hosted on the Internet (http://www.iucaa.ernet.in:8080/iucaa/jsp/questionnaire.html) and requested via e-mails during 2004-2008. The response rate was 72% (288/400).

Results and Analysis

Academic Rank (Category) wise Distribution of Respondent Users



As the category-wise distribution of respondent users, it was found that maximum 28.2% respondents are ***research scholars***, followed by 5.2% ***visiting associate***, 4.2% visitors, 6.9% scientists, 2.8% ***faculty members***, 3.5% Head ***of Department***, 15.6% professor***/equivalent,*** 12.8% ***reader/equivalent***, 4.2% ***lecture/equivalent.***

Impact of ICT on ISB of AA Users

Awareness and Use of ICT for Information by Users

Option → / Type of Information Technology ↓	Used Frequently		Used Sometime		Used Rarely		No		No Opinion		Total	
	Nos	%	Nos	%	Nos	%	Nos	%	Nos	%	Nos	%
Computer and Its Facilities	258	89.6	23	8.0	6	2.1	1	0.3	-	-	288	100
Telecommunication and Its Facilities	93	32.3	78	27.1	75	26.0	23	8.0	19	6.6	288	100
Photocopying / Printing	118	41.0	93	32.3	59	20.5	7	2.4	11	3.8	288	100
Microfilm / Microfiche	37	12.8	30	10.8	78	27.1	115	39.9	28	9.7	288	100
Internet / Intranet	225	78.1	27	9.4	19	6.6	13	4.5	4	1.4	288	100
Multimedia and Its Facilities	74	25.7	68	23.6	69	24.0	52	18.1	25	8.7	288	100
Digitisation Facilities	41	14.2	37	12.8	104	36.1	79	27.4	2	0.7	288	100
Satellite / Modem Facilities	53	12.8	36	12.5	77	26.7	85	29.5	37	12.8	288	100
Video Conferencing / Video Text/Tele Text	30	10.4	39	13.5	85	29.5	97	33.7	37	12.8	288	100

- The finding reveals that majority of them 89.6% users use ***computer and its facility*** as frequently, 8.0%% sometimes and 2.1% rarely for their research and teaching works.
- Table also displays that 78.1% users use ***Internet/Intranet*** as frequently, 9.4% sometimes and 6.6% rarely for research and teaching work.
- Status of others ICT based facilities also shown in the table.

Use of Formal Sources of Information by Users

Frequency of Use / Formal Sources	Daily		Weekly		Monthly		Hardly		Never		No Opinion		Total	
	Nos	%	Nos	%	Nos	%	Nos	%	Nos	%	Nos	%	Nos	%
Books/Monographs	146	50.7	94	32.6	39	13.5	8	2.8	-	-	1	0.3	288	100
Scientific / Technical Journals	96	33.3	108	37.5	64	22.2	12	4.2	-	-	8	2.8	288	100
Reference Sources	22	7.6	84	29.2	67	23.3	48	16.7	17	5.9	50	17.4	288	100
Patents /Reports/ Standards	12	4.2	42	14.6	47	16.3	67	23.3	49	17.0	71	24.7	288	100
Data Sheets /Books	16	5.6	49	17.0	46	16.0	83	28.8	17	5.9	77	26.7	288	100
Conferences / Workshops, etc	12	4.2	35	12.2	83	28.8	103	35.8	13	4.5	42	14.6	288	100
Online Journals /Databases	131	45.5	82	28.5	30	10.4	5	1.7	4	1.4	36	12.5	288	100
Internet /Intranet Sources	107	37.2	64	22.2	34	11.8	31	10.8	4	1.4	48	16.7	288	100
Library Catalogues /OPAC	32	11.1	77	26.7	58	20.1	55	19.1	2	1.0	63	21.9	288	100
Review Articles /Theses	28	9.7	68	23.6	97	33.7	39	13.5	5	1.7	51	17.7	288	100
Data from Vizier/ Virtual Observatory	24	8.3	29	10.1	44	15.3	65	22.6	37	12.8	68	30.9	288	100

Table point out that maximum 96.8% respondent indicated the use of formal sources was for ***books/monographs*** for their research and teaching works followed by 93.0% ***scientific/technical journals***; 84.4% ***online journals/database/e-archive***; 71.1% ***Internet/Intranet Sources***; 57.9% ***library OPAC*** and 67.0% ***review articles/theses.*** It can be summarized that AA users are using all type of sources for their information; however, books and monographs are still favourite source of information with full text e-journals/bibliographical databases for them.

Databases/Archive/E-Resources Used by Respondent Users

Opinion / Database /E-Resources Group		Know: Used Frequently (A)		Know: Used Some time (B)		Know: Used Rarely (C)		Total (A+B+C)		Unknown		No Opinion		Total	
		Nos	%	Nos	%	Nos	%	Nos	%	Nos	%	Nos	%	Nos	%
One	Astronomical Data System	211	73.3	41	14.2	17	5.9	269	93.40	9	3.1	10	3.5	288	100
Two	Archives [Lanl (Astro-ph, gr-qc, math-ph, physics, etc.)]	131	45.5	105	36.5	26	9.0	262	90.97	13	4.5	13	4.5	288	100
Three	PROLA/ IoP Archive/ Science Direct (Commercial databases)	59	20.5	114	39.6	44	15.3	217	74.34	41	14.2	30	10.4	288	100
Four	E-Resources available from UGC-INFONET Programme	41	14.2	115	39.9	58	20.1	214	74.30	38	13.2	36	12.5	288	100
Five	Others databases /archives	38	13.2	55	19.1	55	19.1	148	51.38	56	19.4	68	23.6	288	100

Table indicates that maximum 93.40% respondents used (including frequently, sometime and rarely) database/e-resources from group one (i.e. ***Astronomical Data System)*** for their information need, followed by 90.97% from group two (**e-*archives)*** 74.34% respondents obtained articles from commercial databases subscribed by their library as group three (***PROLA, IoP archive and from Science Direct link)*** and 74.30% of them used articles from group four (***E-Resources available from UGC-Infonet programme*** for their information need. It can be concluded that maximum AA users making use of ADS as best tool for getting references for their research and education followed by e-archive for the latest references. It may be due to both databases are available free and freely on the Internet.

Users' Preferences to Obtain Articles / References Materials

Option ➡ / Version ⬇	Yes		No		No Opinion		Total	
	Nos	%	Nos	%	Nos	%	Nos	%
Print Copy	45	15.6	3	1.0	240	83.3	288	100
Electronic Copy	98	34.0	1	0.3	189	65.6	288	100
Both (Print and Electronic Version)	194	67.4	-	-	94	32.6	288	100

- ***Table*** displays that 15.6% respondents prefer to used only ***print version*** of documents for their research as well as teaching works followed by 34.0% prefer to used only ***electronic version, but it is interesting to know that*** 67.4%of them prefer to used *both* ***print version*** *as well as* ***electronic version*** of documents for their research and teaching works .

Electronic Sources on User's ISB in the Last Five Years

Figure-1 displays 63.9% respondents indicated about their ISB which were **affected by electronic technology in last five years in comparison to five years ago**. It also reveals that majority of user's ISB were affected by electronic dissemination of information. ***Figures – 2*** summarizes that 22.9% respondents indicated that their ISB are same and indicated option that **they still use the same sources as had used five years ago** and their information gathering habits were not changed due to electronic dissemination of information.

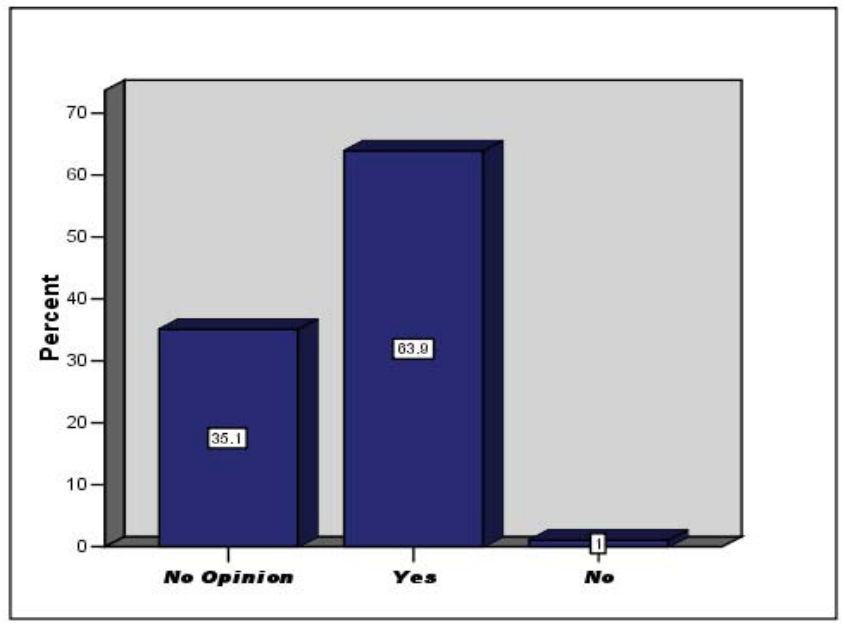


Figure-1: Very different [I use completely different sources than I did five years ago]

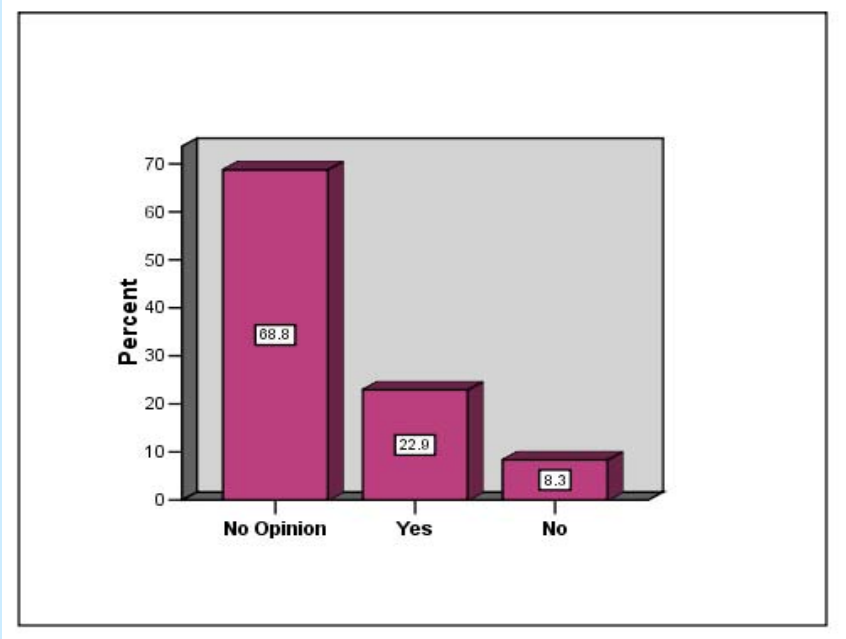


Figure-2: About Same [I still use the same sources as I did five years ago]

Impact of Electronic Sources to Gather and Use of Information

Option ➡ / Effect of Electronic Sources ⬇	Yes		No		No Opinion		Total	
	Nos	%	Nos	%	Nos	%	Nos	%
Easier *[I have more time for other tasks]*	257	89.2	1	0.3	30	10.4	288	100
About the same *[I spend about the same amount of time on information gathering with or without electronic sources]*	20	6.9	37	14.8	231	80.2	288	100
More Difficult *[It takes more time to gather and sort through information]*	13	4.5	-	-	231	80.2	288	100
Much More Difficult *[There is too much information for me to sort through efficiently]*	45	15.6	-	-	243	84.4	288	100

- ***Table*** summarizes that maximum 257 89.2%)respondents indicated that electronic sources had make it ***easier*** to find their desire information very quickly and they are also getting more time for others tasks. It can be concluded that majority of users are very comfortable with electronic sources for searching their desire information. The table also concluded that 6.9% respondents did not make any change by electronic sources and finding information from electronic sources ***about the same*** as it was earlier, However, 13 (4.5%) respondents summarized that gather information from electronic sources is ***more difficult*** than traditional sources, while 15.6% from electronic sources ***much more difficult*** than traditional sources.

Impact of ICT on Visit of Parent ICL

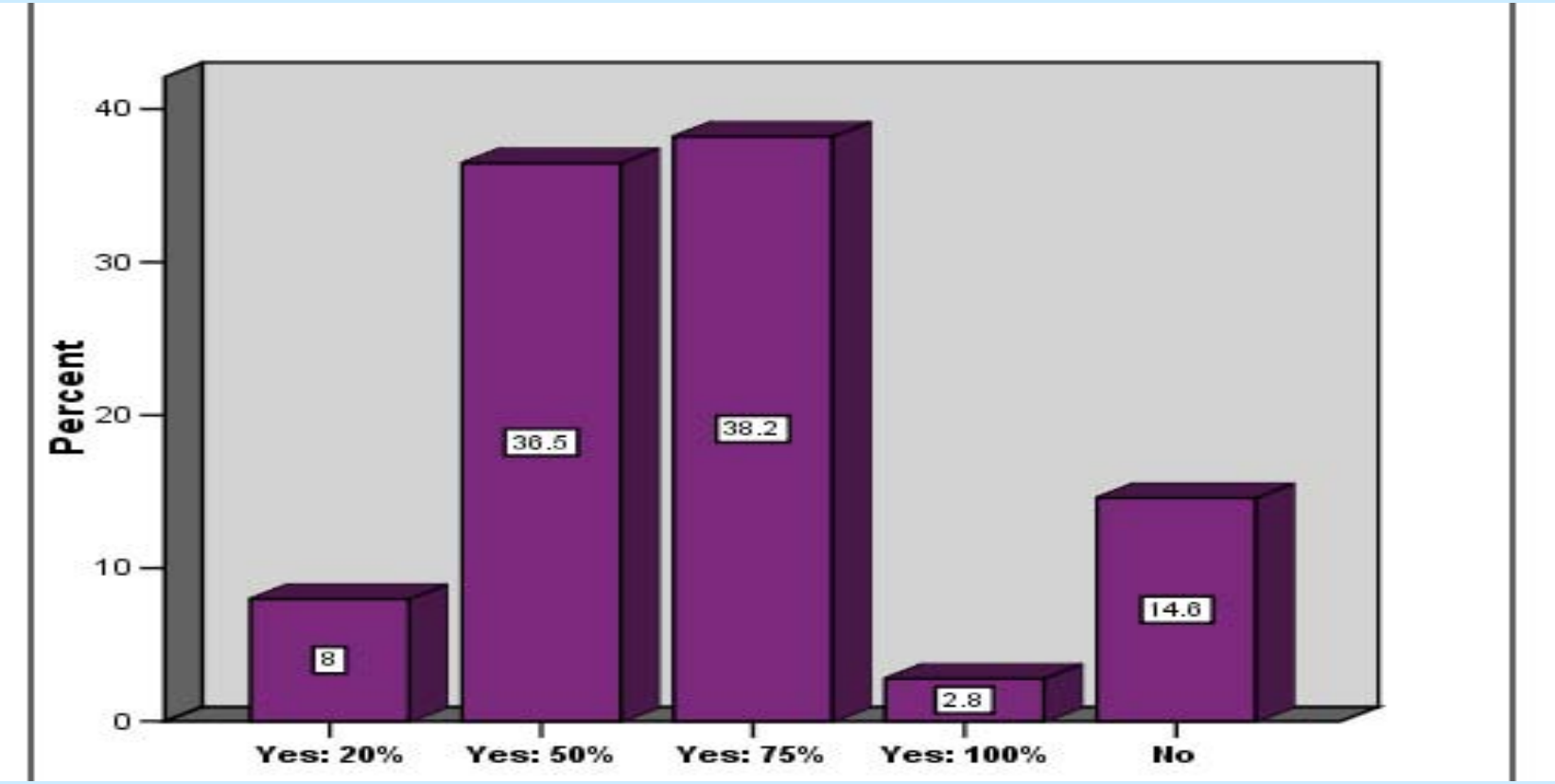


Figure reveals that 38.2% respondents indicated ICT had affected their ***75%*** visit of their parent ICL, while 36.5% of them indicated that ICT had affected their ***50%*** visit of their parent ICL, whereas 8.0% respondents indicated that ICT had affected that their ***20%*** visit of their parent library 2.8% respondents indicated that ICT had affected that their ***100%*** visit of their parent library. However, 14.6% respondents indicated that ICT did not affect their own information centre and library visit.

Effect of ICT on ISB

- The study reveals that majority of users found different in their ISB due to ICT.
- The overwhelming ICT preferences were to ask the questions by e-mail/telephone, with no interest in completing internet access forms. Day by day physical visit of users are decreasing, however online access has increased drastically.

Discussions

- The study has given a state-of-art about the ISB of AA users in India i.e. currently users of AA are using difference sources of information including electronic information sources for their research and teaching and getting latest and updated information in their subject's fields.
- Online journals preferred by all age groups. Journals were the single most important resources for AA information users and online journals were very much preferred by all types of users irrespective of their age, sex, designation, etc. However among the respondents 67.4% expressed preferences for both printed and online.
- Now a day's most of AA users using computer facilities and found very useful (95.8%), followed by internet/intranet (80.2%), e-resources (76.4%), satellite and telecommunication facilities (37.2%), video conferencing (38.2%) for their research work and graded very useful.
- AA information are dependent on their ICLs, however they are also learning ICT based **fields** and implementing the same to become self sufficient.
- This objective has been achieved in this research as it found that users are using various IT based components for ISB for their various purpose as research and teaching works, etc and using different databases (both free and commercial databases), search engines through internet/intranet and as well as conventional sources of information available at their local libraries.
- Mostly AA users preferred both versions print as well as electronic to use/obtain their required information, but it is certain that AA users preferred to get their required information in form of e-version compare to print version.

Conclusions

- The survey provided useful insights into the impact of ICT on information-seeking behaviour users and usage of ICT by for 12 AA similar astronomy and astrophysics institutes and organizations. The highly use of Internet recorded in this study probably related to its expansion, the growing familiarity of AA professional with e-resources. It can be summarized that maximum AA users using e-resources for their research and education, being made available to them by their parent ICLs.
- Due to ICT and availability of all e-resources on user's desktop/laptop, their library's visit is affected on some extent and AA users and not visiting library on regular basic like in the past, but it observed that AA users used to visit their parent library for books/monographs and communicate with library staff through e-mails/Instant Messaging and asking help and giving suggestions as and when is required.
- There are more challenges to LISc professionals for exciting new initiatives to be discovered unfamiliar places about more opportunities are also coming up due to ICT.

Thank you very much for your Attention !!!

QUESTIONS PLEASE!!!