International Journal of Multidisciplinary Research And Studies

Available online at https://ijmras.com/

INTERNATIONAL JOURNAL OF MULTIDISCIPLINARY RESEARCH AND STUDIES
ISSN: 2640 7272
Volume:03; Issue:12 (2020)

Page no.- 15/15

INDIAN ASTRONOMY INFORMATION CENTERS' INFORMATION-SEEKING PATTERNS IN LIBRARIES

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M.Phil. Roll No. :150665: Session: 2015-16

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ARTICLE INFO

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ABSTRACT

Information seeking behavior is an essential component in the designing and developing of need-based information centers for meeting the information requirements of users. The undertaken study describes the information needs and information-seeking behavior of post-graduate students and research scholars of Banaras Hindu University, Varanasi, Uttar Pradesh. The main objective of this research study is to analyses the information seeking pattern of students in the social sciences stream. The survey was conducted to look more closely at specific areas of the study for an in-depth examination of trends and patterns in seeking information. It is found that almost all students used to get information through Internet but they prefer print material over digital resources for study purpose. They face a lots of difficulties and obstacles to access those electronic and print resources. Therefore, orientation programs and users‟

education programs are imperative to give them information on library services and activities. This study can be helpful for students as well as for teachers, librarians and mentors who provide information to the students and researchers

I. KEYWORDS: Information seeking behavior, Information seeking pattern, Information use

INTRODUCTION

Information is a nebulous idea that is challenging to pin down. But everyone handles it differently throughout their lives. In fact, information has been classified as man's sixth need, behind air. Information in particular, and knowledge in general, become more significant as it is given and communicated. It is common to infer one another regularly in a variety of settings because of how closely these two concepts are related. Additionally, there is a close relationship between information and communication. When the first is discussed, the other is revealed. Or to put it another way, information is activated through conversation (Sridhar, 1995). (366).

A person uses a set of behaviors known as the information seeking behavior (ISB) to communicate their information needs and to find, evaluate, choose, and apply the information they discover. For a number of purposes, there are numerous methods and procedures for obtaining different types of information from enumerate services. For a multitude of reasons, including the explosion of knowledge, social considerations, population, cost, complexity, languages, form, and location, many of these are however difficult to access. You can obtain any significant information from a number of sources at the Information Center and Library (ICL). To address the information demands of their users, librarians, information officers, and ICLs are therefore essential in their roles. They must therefore be able to understand the ISB of their consumers. It is essential to comprehend the ISB of various professional groups in order to help with the development, operation, deployment, and decision-making of information systems and services in specific work contexts. As a result, the user's ISB should be considered.

ICLs are a crucial part of education and research & development, including organisations that conduct both of these activities. It not only serves to achieve the objectives of the institute and its users' research demands, but it also organises to satisfy the information needs of scientists, faculty, users, and employees. In recent decades, there have been alarming changes

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in both the higher education and research industries. As a result, ICLs' traditional role has come under attack.

The Cambridge Advanced Learner's Dictionary, 2009 defines information as "Facts regarding circumstance, person, occurrences, etc" (60). However, once it is made available to users, it becomes information. Information is seen as a vital resource for a nation's development.

The Cambridge Advanced Learner's Dictionary, 2009, page 60, defines seeking as "to try to locate or gain anything, especially anything which is not an actual object."

Behaviour, according to the 2009 Cambridge Advanced Learner's Dictionary, is "how someone behaves."

ARYABHATTA RESEARCH INSTITUTE OF OBSERVATIONALSCIENCES (ARIES), NAINITAL

The ARIES Research is an independent organisation devoted to astronomy, astrophysics, and atmospheric science research and development (ARIES). It offers challenging opportunities in theory, observation, and instrumentation for motivated researchers. Around 60 academics, including professors, researchers, post-doctoral fellows, and guests, are associated with ARIES (16).

BOSE INSTITUTE, KOLKATA

Based on the constant growth of scientific knowledge over the past 85 years, the institution has created a research programme for its tenth five-year plan that will allow it to preserve its competitive edge in the twenty-first century. The institute's good overall performance is also attested to by the consistently high rate of peer-reviewed publications and scientists' individual triumphs in their particular fields of specialization, which supports the continuation of the Institute's research activities. Over 50 academics are employed by the Bose Institute, including professors, researchers, post-doctoral fellows, and visitors. (2008) Bose Institute (39).

HARISH-CHANDRA RESEARCH INSTITUTE (HRI), ALLAHABAD

Each research team focuses on a distinct subtopic, such as correlated electron systems, large-scale structures, microscopic systems, N-body simulations, neutrino physics, quantum chromo dynamics, quantum field theory in curved space-time, spintronics, string theory, and super symmetric field theories, according to the Harish-Chandra Research Institute (2008). (152).

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INDIAN INSTITUTE OF ASTROPHYSICS (IIA), BANGALORE

The main observatories of the Institute are located in Kodaikanal, Gauribidanur, Hanle, and Kavalur. Solar system studies, stellar physics, galactic astronomy, cosmology, solar terrestrial physics, instrumentation, space astronomy, stellar astronomy, galaxies, and institute guests are some of the topics covered. Involved in IIAP's astronomy and astrophysics research and development efforts are more than 300 members of the academic community. Cosmology, extragalactic astronomy, and theoretical astrophysics (Indian Institute of Astrophysics, 2008) (172).

INTER-UNIVERSITY CENTRE FOR ASTRONOMY ASTROPHYSICS(IUCAA), PUNE

There are two sorts of IUCAA activities: visiting academic programmes and core academic programmes. The principal academic activities include basic research, the PhD programme, advanced research seminars and schools, the gigantic metre-wave radio telescope, and guest observer programmes. The visiting academic programmes, which also include associates and visitor programmes, include support with the introduction and growth of astronomy and astrophysics at Indian universities as well as refresher courses for teachers (IUCAA, 2008). (174). The IUCAA has a beautiful campus with academic facilities, housing, and entertainment areas. It is a premier location for both teaching and research. With capacity for growth, the centre now employs roughly 50 academics, including faculty, post-doctoral fellows, and graduate students. Galactic and extragalactic astronomy, gravity waves, cosmic magnetic fields, cosmology and large-scale structures, and high-energy astrophysics are the several areas where the IUCAA conducts its research and development (174). As part of its active visitors programme, scientists from India and beyond are welcome to stay at IUCAA for brief or extended periods of time. The IUCAA is the owner of the Southern African Large Telescope (SALT) and a 2 m optical telescope (IGO) (IUCAA, 2008). (174).

NATIONAL CENTRE FOR RADIO ASTROPHYSICS (NCRA), PUNE

Astronomers from all over the world use it as a national facility, and as a result, significant discoveries have been made. About 25 academic staff members, including faculty, postdoctoral associates, and research scholars, worked at the NCRA (NCRA, 2008). (266).

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OSMANIA UNIVERSITY, HYDERABAD

Osmania University may have the biggest higher education system in the country. The Nizamia Observatory, which was established at Begumpet in 1908 and still stands today, is where Osmania University's department of astronomy got its start. It has been the intention of the department of astronomy to provide postgraduate students with knowledge of AA in order to prepare them for more advanced study in the challenging areas of AA.

As a result, in order to carry out cutting-edge observational astronomy research, a new observatory was constructed at the village of Japal-Rangapur in 1966. The department was given permission by the UGC, New Delhi, to establish a Center for Advanced Study in Astronomy in 1964. (CASA). The department of astronomy at one institution in India is the only one with master's-level AA courses and a facility with a 1.2-meter telescope. The roughly 25 academic staff members concentrate their research efforts on binary stars, unusual stars, pulsating stars, galactic clusters, galaxy dynamics, binary stars, positional astronomy, radio astronomy, celestial mechanics, galaxy dynamics, ionospheric research, and study on issues related to colliding and interacting galaxies using analytical methods and N-body simulations. The academic staff of the AA department at Osmania University works on research projects with other eminent scientific institutions. Computer-controlled procedures have been used to update the 48-inch reflector, and work on the project is still ongoing. With the aid of this updated telescope, the department will enter a new phase of astronomical research (Osmania University, 2009). (280).

PHYSICAL RESEARCH LABORATORY (PRL), AHMEDABAD

Additionally, the influence of solar activity on space weather is being studied using radio techniques (PRL, 2008). (303).

RAMAN RESEARCH INSTITUTE (RRI), BANGALORE

The institute's primary focus was on fundamental physics research in fields that Prof. Raman found particularly fascinating. In December 1934, the government of Mysore granted the Indian Academy of Sciences (IAS) a plot of land in Bangalore, which is how the institution was founded.

The RRI employs about 40 academic staff members who focus on projects in the areas of soft condensed matter, AA, theoretical physics, and light and matter physics. They also include academics, post-doctoral fellows, and research scholars (RRI, 2008). (323).

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SAHA INSTITUTE OF NUCLEAR PHYSICS (SINP), KOLKATA

The SINP employs about 25 academic staff members, including professors, post-doctoral fellows, and research scholars.

S N BOSE NATIONAL CENTRE FOR BASIC SCIENCES, KOLKATA

The SNBCBS has research programmes in the following fields: material sciences, chemical sciences, biological sciences, macro-molecular sciences, astrophysics, cosmology, and more. SNBCBS has two units, the Advanced Materials Research Unit (AMRU) and the unit for Nano science and technology. About 40 academic staff members who work in the aforementioned research fields are employed there (SNBNCBS, 2008). (358).

OBJECTIVES

- To make it easier to view each library's website;
- Merging databases to make it easier to access combined databases and combine library holdings (books and journals);
- The archive materials of the institutions are being digitally preserved and made online accessible;
-

DESIGN OF RESEARCH METHOD

The purpose of the research design is to answer the research questions while also testing the research hypotheses and managing variance. The research design should maximise the experimental variance or systematic variance and reduce error variance in order to get precise and meaningful data and interpretation. The nature and goals of the field study research used to design and implement the survey sample method were taken into consideration. The majority of LISc specialists tend to concur that the technique for gathering the necessary data is the first real step in the study of patrons of astronomy libraries in information centres in India. The research contends that the choice of methodology must be influenced by the goals of the study and the accessibility of appropriate tools. It is a well-known truth that the investigator will provide unreliable or misleading results if they are unclear about the goals for which the survey is to be done or if they choose a method that is inappropriate for those goals. Therefore, during

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the course of this study, the aims of the study continued to serve as a guiding factor in the current researcher's choice of a few particular survey methodologies.

RESEARCH POPULATION AND SAMPLE DESIGN

There are numerous organizations and institutions that provide academic research activities in Group forum member and the top center for AA research in India, is chosen as the primary source. A research population is connected to each study. Population refers to all individuals who belong to a specific group of people, things, or events. All users from AA organizations and institutes (FORSA Group) (Sahu and Singh, 2008) (327), chosen users from physics and astrophysics departments at Indian universities and colleges The researcher spoke with the majority of users and gathered their opinions.

DESIGN OF QUESTIONNAIRE

The current questionnaire was first designed and delivered to a small group of users/scientists, LISc topic matter specialists, and a research guide for their comments and ideas. Faculty members and students served as the samples for a pilot research in which the survey questionnaire was pre-tested. The questionnaire was adjusted in accordance with the comments.

DATA ANALYSIS

PERSONAL INFORMATION

Respondents were asked to provide personal information (Part A: age, sex, general and technical qualifications, status, language proficiency, position, etc.) in this section of the survey. These can affect users' ISB and are also important for the co-relation and cross-interpretation of the various variables. The following observations were made to fulfil the goals (1-6) and hypotheses (1-3) outlined.

Sex-wise Distribution of Users

Users (research researchers, scientists, astronomers, academicians, decision makers, trainees, and others) were invited to provide their personal information (bio-data) in the questionnaire Part A in order to learn more about the various facets of ISB and IT advances and their interactions. Figure-4.1shows responses to this question.

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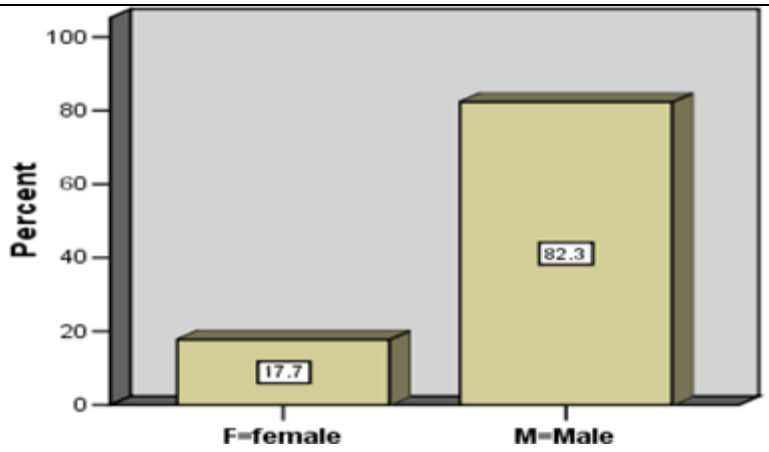

Figure 1: Sex-wise Distribution of Users

Figure 1. shows that 51 (17.7%) women and 237 (82.3%) men were present. It might be because Indian society is dominated by men and because fewer women are interested in careers in AA. However, it was discovered during the poll that AA's interest in women is growing.

Age-wise Distribution of Users

The entire user base was separated into 4 age groups to provide a thorough study: First group: under 30, second: between 31 and 40, third: between 41 and 50, and fourth: over 50. Respondents were asked that it could be used to understand and link to ISB and other variables with age-wise distribution. The specifics of the answers to this query are provided in Table 1

Table 1: Age-wise Distribution of Users

S.N.	Range of Age (years)	Total Respondents	Percentage
1	< 30	139	46.26
2	31- 40	41	14.23
3	41- 50	42	14.58
4	> 50	66	22.91
	Total	**288**	**100%**

Table 1. shows that the largest number of respondents, 139 (46.26%), were primarily in the first age group, which is defined as being between the ages of 1 and 30, with 41 (14.23%) being the lowest. Third age group, or those between the ages of 41 and 50, comprised 42 people (14.28%), and the fourth age group, or those above 50, 66 people (22.91%). It is clear that the needs of young people and young scientists are greater than those of other age groups in academic ICLs, which also reflects their information needs and ISBs.

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Education Qualification-wise Distribution of Users

One of the most crucial factors in understanding ISB of consumers is educational background. The results of different investigations suggested a correlation between educational attainment and ISB. In order to meet the objectives, respondents were requested to provide information about their educational background in order to compare how frequently they used academic ICLs for information needs and ISB. Figure 4.2.3 provides information on respondents' educational backgrounds**.**

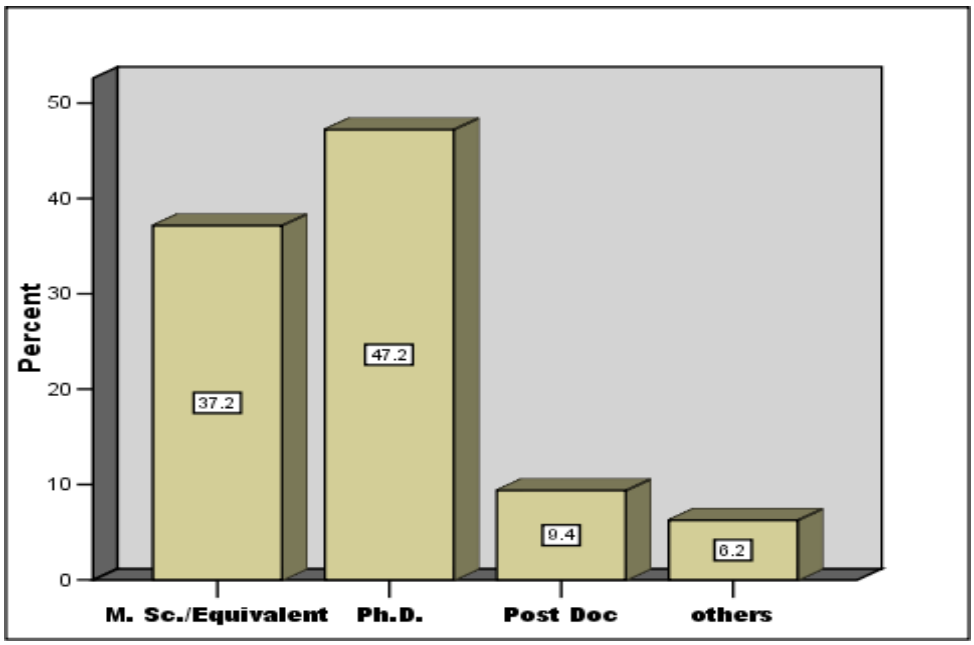

Figure 2 : Education Qualification-wise Distribution of Users

Figure-4.2 reflects that a maximum of 107 respondents (37.2%) either have an MSc or equivalent or are in the process of obtaining one, while 27 respondents (9.4%) are either Post Doc/Equivalents or are in the process of obtaining one. It also shows that at least 18 people, or 6.2%, did mention their educational background.

Academic Rank (Category)-wise Distribution of Users

Users have been divided into thirteen categories, including undergrads, graduates, research scholars, visiting associates, guests, scientists, faculty members, department heads, professors and their equivalents, readers and lecturers, trainees, and others. Before users were sent the survey, the types of respondents were determined. However, the aforementioned question asked respondents to choose their category from a list of options. The responses' specifics are summarized in Figure 3.

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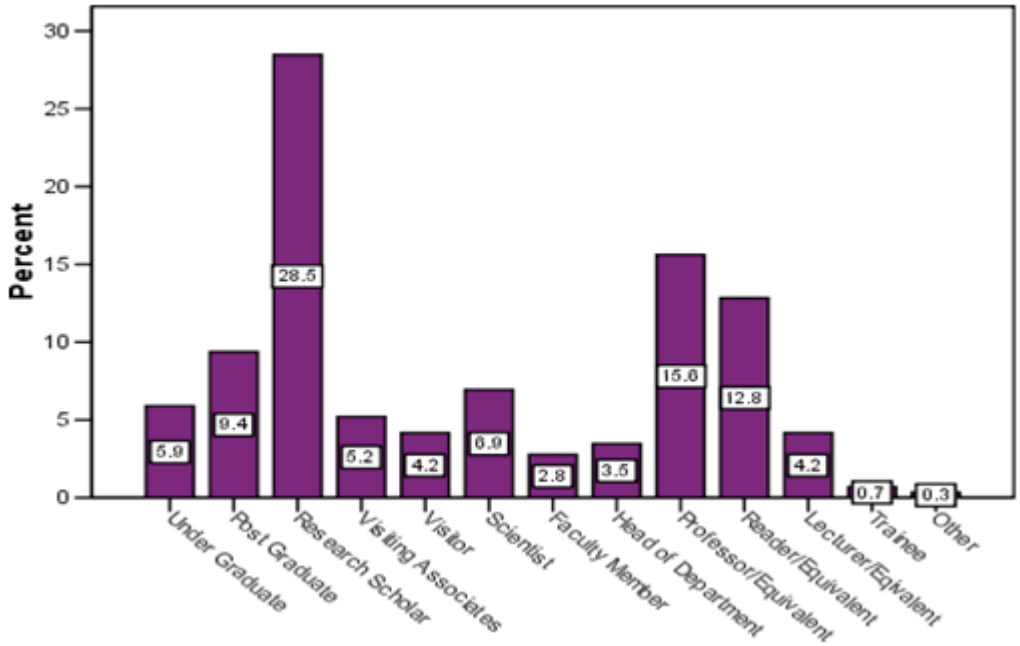

Figure 3: Academic Rank -wise Distribution of Users

Figure 3 Shows that 27 (9.4%) were postgraduate, whereas 17.9% were undergraduate. However, the majority of them—82 (28.5%)—were research researchers. They were followed by 15 (5.2%) visiting associates, 12 (4.2%) visitors, 20 (6.9%) scientists, and 8 (2.8%) faculty members. 10 (3.5%) of them were department heads, while the remaining 45 (15.6%) were professors or their equivalents, 37 (12.8%) were readers, 12 (4.2%) were lecturers, 2 (0.7%) were trainees, and only one (0.3%) was listed under the "other type" heading.

Language-wise Distribution of Users

The most crucial aspect of information communication is language, and there are many languages in which to find information sources. Therefore, it relies on the language the person is familiar with. In this section, respondents were also asked to list any languages other than English, Hindi, and English that they were familiar with. The specifics are shown in Table 2**.**

Table 2: Language-wise Distribution of Users

	Frequency	Percent	Valid Percent	Cumulative Percent
User English	17	5.9	5.9	5.9
Both (Hindi & English)	157	54.5	54.5	60.4
Others				
(Hindi+English+Other)	114	39.6	39.6	
Total	288	100.0	100.0	

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Table 2 reveals that 157 (54.5) respondents knew both Hindi and English, and 17 (5.9%) respondents only knew Hindi. These results demonstrate that respondents valued knowing Hindi and English as a second language. However, 114 (39.6%) visitors were able to access the site in Hindi, English, and other regional languages for research and educational purposes. Additionally, it shows that while the majority of users in institutes and universities use English, many of them occasionally also prefer to use Hindi. Along with English and Hindi, a respectable proportion of respondents also knew other regional languages and used them for informational exchange. The information linked to AA is primarily available in English, which may be the reason why they are adopting it for their ISB. Almost no scientific literature is available in other widely spoken languages. According to research, the majority of users are fluent in English, Hindi, and sometimes a third language that is their native tongue. Almost no respondents said they knew any languages other English, which is rare.

Present Assignment of Users

Users are asked to choose their ISB for the current work assignment in Q.4 from the list of choices, which also includes education, teaching/training, and basic/applied research. Details of this investigation are provided in Figure 4.

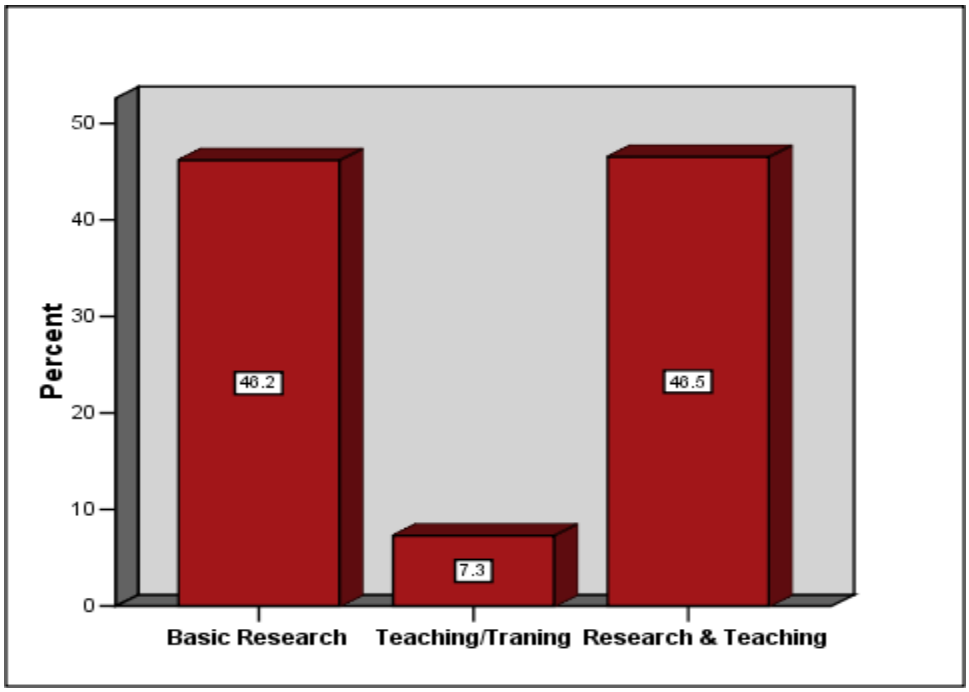

Figure 4: Present Assignment-wise Distribution of Users

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Figure 4 reveals that 133 (46.2%) respondents said their current assignment was basic research, 21 (7.3%) said it was teaching or training, and nearly the same number, 134 (46.5), said it was both.

INFORMATION SEEKING BEHAVIOUR CHARACTERSTICS

Subjects' Department-wise Distribution of Users

The primary topic that users were focusing on for their research or teaching initiatives was asked for in

Q. 6.1 Select the available options—Physics, Mathematics, Physics-Astronomy, Electronics, and other, if any—from the list that was provided. The characteristics of the answers are shown in full in **Figure 5**.

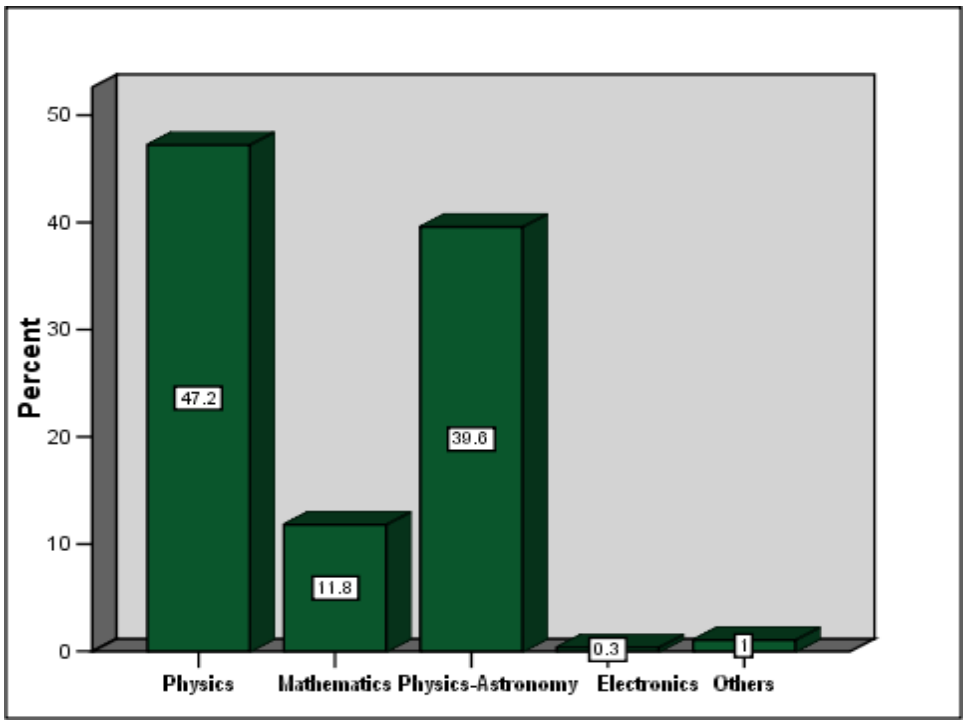

Figure 5: Subjects' Department-wise Distribution of Users

Figure- 5 indicates that 114 (39.6%) respondents indicated their subject field is both Physics and Astronomy, whereas 34 (11.8%) of them opted for Mathematics. 136 (47.2%) respondents chose Physics as their main subject. Only 1 (0.3%) of those who identified their subject field chose other, compared to almost 3 (1%) who chose electronics.

Specialised Field of Research -wise Distribution of Users

Users were asked to choose from the following options (in Question-6.2) to identify their area of expertise in research and instruction: classical general relativity, the early universe, astronomical instrumentation, gravitational waves, relativistic astrophysics, galaxies cluster,

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quasars, elliptical galaxies, artificial neural networks, black holes, radio astronomy, cosmology, and others. The responses' specifics have been compiled in **Table 3.**

Table 3: Specialised Field of Research-wise Distribution of User

	Frequenc	Percent	Valid Percent	Cumulative Percent
Not decided	21	7.3	7.3	7.3
Classical General Relativity	34	11.8	11.8	19.1
Astronomical Instrumentation	41	14.2	14.2	33.3
Relativistic Astrophysics	10	3.5	3.5	36.8
Quasars, Elliptical Galaxies	19	6.6	6.6	43.4
Black holes Astrophysics	15	5.2	**5.2**	**48.6**
Cosmology	31	10.8	10.8	59.4
Early Universe	6	2.1	2.1	61.5
Galaxies Cluster	7	2.4	2.4	63.9
Artificial Neural	6	2.1	2.1	66.0
Radio Astronomy	24	8.3	8.3	74.3
Other	74	25.7	25.7	100.0
Total	288	100.0	100.0	

Table-3 reveals that 34 (11.8%) respondents identified Classical and General Relativity as their area of expertise, while a maximum of 41 (14.2%) respondents identified Astronomical Instrumentation as their area of expertise, and 10 (3.5%) respondents identified Relativistic Astrophysics. Only 19 (6.6%) people identified Quasars and Elliptical Galaxies as their area of study, whereas 15 (5.2%) people identified Black Holes Astrophysics and 31 (10.8) people identified Cosmology. However, a minimum of 6 (2.1%), a maximum of 7 (2.4%), and a minimum of 6 (2.1%) identified Artificial Neural Networks as their area of study. Additionally, according to the study, 24 users (8.3%) identified radio astronomy as their primary research area, with a maximum of 74 users (25.7) identifying additional research areas. A respectable amount of respondents, 21, or 73.0%, did not choose their research topic or field before beginning their investigation.

Table -4.4: Purpose /Motivation of Information Seeking by Users

Options / **Purposes**	Yes		No		No Opinion		Total	
	Nos	%	Nos	%	Nos	%		Nos
Research Work	272	94.4	1	0.3	15	5.2	288	100

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General Awareness	185	64.4	1	0.3	102	35.4	288	100
State-of -Art Investigations	130	45.1	2	0.7	156	54.2	288	100
Preparing Answers to Questions	93	32.3	4	1.4	191	66.3	288	100
Reading/ Thinking Purpose	181	62.8	1	0.3	106	36.8	288	100
Prepare the Class Notes	120	41.7	7	2.4	161	55.9	288	100
Observations and Experiments	89	30.9	10	3.5	189	65.6	288	100
Preparing/Supplementing Lectures	80	27.8	2	0.7	206	71.5	288	100
Discussions	69	24.0	4	1.4	215	74.7	288	100
Other Purposes	5	1.7	-	-	283	98.3	288	100

Table 4 reflects the state of various respondents' information-seeking goals and motivations. Maximum respondents, or 272 (94.4%), claimed that acquiring knowledge for research purposes was their top priority. General awareness was cited by 185 (64.4%), reading and thinking by 181 (62.8%), and cutting-edge research by 130 (45.1%). Although 93 (32.3%) respondents said they were preparing answers to questions, 89 (30.9%) said they were preparing observations or experiments, 120 (41.7%) were preparing class notes, and 80 (27.8%) were supplementing lectures. However, 69 (24.0%%) respondents said they were preparing information for discussions with coworkers, and 5 (1.7%) respondents said they were preparing information for some other purposes. **Table 4**

also lists the number of users and the percentage of users that chose the options "No" and "No Opinion" respectively.

CONCLUSIONS

Understanding the actual needs of information users and taking steps to satisfy them is the first step towards effective service provision. This can best be achieved through formalin–depth studies. Based on the data available through questionnaire, it can be concluded that there is trend to use the various components of ICT by AA users for seeking required information has increased. 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 observed that ICT has much

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impacted on ISB of AA users and noticed that use of the e- resources/databases/archive by AA users is more than comparing to others subject's discipline users.

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