

Information Seeking Approaches by Scientists of Defence Research and Development Establishment, (DRDO), Gwalior, India

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ABSTRACT

This paper analyzes the information needs and information seeking behavior of Defence Research and Development Establishment (DRDE) working under the Defence Research and Development Organization (DRDO), Ministry of Defence situated at Gwalior (Madhya Pradesh). Data were collected using a structured questionnaire distributed among 134 DRDE Scientists. In the present study 130 responded to the questionnaire and collected data were analyzed using the latest version of Σ - PLOT for appropriate statistical methods (frequencies, per cent, means, and standard deviations). It was observed that various strategies and procedures have been used by the DRDE Scientists in meeting their information needs. The obtained data were also analyzed for the user information needs and their information seeking strategies. Investigations to study the types of information sources used by the DRDE Scientists in order to examine their information behavior and factors that affect these behaviors. The outcomes of the present study are in frame with the previous published articles and included the preferred information formats, importance of using certain information sources and the use of various formal, informal sources. Our results revealed that DRDE Scientists have great dependence in meeting their information requirement on their respective institutional library/information centre. Our results also indicate that seventy eight per cent of the population uses library information centers as their most preferred source suggesting the implications of library services for accessing information by DRDE scientists and the need to further strengthen these centers for effectively complementing the users.

Keywords: DRDO, DRDE, Information seeking behavior, Science Scientists.

Library Science Classification: ZA 4050-4480

1. INTRODUCTION

In 1924, the Maharaja of Gwalior established a research laboratory to explore forest products and mineral resources. In 1947, the Jiwaji Industrial Research Laboratory (JIRL) was inaugurated by C. Rajagopalachari, the then Governor General of India. In 1966, it was taken over by the Ministry of Defence and the research activities were expanded. In the year 1973, JIRL was renamed as Defence Research & Development Establishment.

DRDE is the primary defence laboratory involved in the development of NBC detection and protection systems. It conducts research in the fields of Chemistry, Biochemistry, Microbiology, Biotechnology, Virology, Entomology, Bio-sensors, and Toxicology. It conducts research on three different areas viz, Detection, Protection and Decontamination strategies against Bio-threat agents. Research activities on toxicological evaluations of hazardous chemicals and biological materials are also undertaken at DRDE. It also develops rapid and diagnostic tests for pathogens and investigates preventive measures for the control of diseases. To protect from chemical weapons, it also conducts research in the area of detection, protection and decontamination of hazardous chemicals. It also develops rapid diagnostic tests for pathogens and investigates preventive measures for the control of diseases. The annual budget of Technical Information Resource Centre (TIRC) for the year of 2009-2010 was Rs 1.55 Crore that was spent on subscription of Journals and purchase of other library materials.

2. LITERATURE REVIEW

The amount of information that is available for users has flooded organizations and has created problem of information overload leading to lot of confusions. Question arises as to how user seek and obtain information relevant to their needs and if the widely disseminated information is the kind of "facts" or only meaningless data. Over 1000 papers on user behavior and the use of information systems have been published during the past 35 years, yet little is known about how people use time, space and other environmental resources to accomplish their behavior in the organization. The intent of this article is to examine the information seeking behavior of organizational members and the factors that affect the user's behavior based on the findings of previous research.

"Information" which is also called the "stock of knowledge" can be divided into two arenas based on whether or not it "diminishes uncertainty" or is "entertaining"^[1]. In the first type, kind that is that is to be discussed in relation to organizational information behavior can be classified as "program" or "parameter information". Program information refers to the systematic way of thinking that is required to solve a given problem and parameter information refers to the data required to use the program information to solve a given problem^[1]. While it is unusual for individuals to recognize these differentiation and is important to realize the evolving information process that occurs. Organizational information behavior then is simply the way in which information is obtained by individuals who are in specified system or setting.

Drucker states that the systematic and purposeful acquisition of information and its systematic and purposeful applications are emerging as the new foundations for work, productivity and efforts throughout the world.^[2] Daniel responds to his statement by saying that "organizations exists only to provide the necessary rules for channeling and filtering information within an organization and from it out into the environment."^[3] She continues by arguing that "organizational structure largely determines the information flow within the organization and the kinds of resources attended to."^[3] Different functions or environment have different information needs, but organizations do have certain common characteristics that allow the information behavior of its members to be generalized.^[4]

Information seeking behavior is the purposive seeking of information as a consequence of a need to satisfy some goal.^[5] An examination of these factors has implications for the managers who wish to restructure information behavior. In order to have effective results, management must have a detailed understanding of organizational dynamics and be aware of the staff's perceptions of the organization structure.^[6] Knowledge about the information-seeking behavior and information use of individuals is crucial for effectively meeting their information needs^[7]. A study of this nature is

invaluable to anyone involved or interested in organizations, and is especially relevant to the information professions.

3. OBJECTIVES OF THE STUDY

The present study comprises the following specific objectives.

- (i) To identify the purpose of seeking information, the nature and types of information required by Scientists of DRDE.
- (ii) To examine the information seeking strategies of DRDE Scientists.
- (iii) To find the effectiveness of existing information systems and services in the field of life sciences and the extent to which they meet the information requirement of Scientists.
- (iv) To identify, the information sources and types of publications used by the scientists, with particular reference to secondary and tertiary sources, and
- (v) To identify the problems faced by the scientists of DRDE while gathering information and to provide appropriate suggestions to overcome them.

4. SCOPE AND METHODOLOGY

A structured questionnaire was designed for the purpose of data collection and was distributed personally among the life scientists of DRDE⁸. A total of 134 questionnaires were distributed, out of which 130 questionnaires were received back (97.01%). The questionnaire covered five basic areas in addition to their personal data viz, user's characteristics such as age, sex, levels of education, field of specialization, institution affiliation and purpose of current research. Strategies of seeking information, use of the libraries/information centers and suggestions for the improvement of the information centers/systems were also included. The data collected / were analyzed using the latest version of Σ -Plot, for appropriate statistical procedures for description of frequencies, percentage, means, and standard deviations, etc. Three-point scale and five-point scale were developed. Likert scale, which ranged from 0 (not important) to 4 (extremely important), was used in the present study.

The population of the study mainly comprised the scientists who are working in different laboratories of DRDE. Among total respondents, Scientist 'B' were 36 in number, Scientist 'C' were 45, Scientist 'D' were 15, Scientist 'E' had 12, Scientist 'F' had 17 numbers. Scientist 'G' had four numbers and one Scientist 'H'. All the above scientists fell under four categories (Category-I, category-II, category-III and category-IV). Our data also indicates the gender distribution in DRDE with respect to different categories. Under Cat-I there were 26 male and 10 female employees. Number of male employees under Cat-II were 50 and 10 female. Number of male employees under Cat-III were 27 and female were 02. Lastly the Cat-IV had only 05 male employees without any female employees.

5. FINDINGS AND INTERPRETATION OF THE PRESENT STUDY

5.1 Preference of Source

A number of possible sources of DRDE Scientists were identified and considered potentially relevant to help Scientists in meeting their information requirements. The preferences of Scientists for information sources and their accessibility have been conceptualized in terms of information seeking strategies in which they first access the most preferred sources, followed by other sources if the problem remains unsolved. It was found from the study that DRDE Scientists have expressed great dependence in meeting their information requirement on their institutional libraries / information

requirement on their institutional libraries/information centre. From table 1 it is evident that, among first priority in use of Information sources, Library information centre is the most preferred source for 73.72% (87 out of 118) of the respondents for all categories of Life Scientists with a mean ranked from 2.66 to 1.98. Experts in the field were followed by 62.03 percent of the respondents (67 out of 108). Among the second priority, Discussion with Librarian/reference staff of library constituted 42.01% (50 out of 119) followed by Indexing and Abstracting journal with 44.44% (48 out of 108); Discussion with Supervisor constituting 37.03% (40 out of 108). The third priority in the use of information sources was opted towards consulting Bibliography by 67.6% of the total population (48 out of 71) occupying the first place. Followed by Discussion with Librarian/reference staff of library by 36.13% (43 out of 119); Discussion with colleagues elsewhere by 38.82% (33 out of 85).

Among different categories of Scientists, categories I and II give more priority to collect information by library visit/information centre with a mean of 2.80 and 2.51 respectively than the Scientists of categories III who opted for consulting indexing journal with a mean of 2.3. Whereas Category IV opted for discussion with expert with a mean of 2.08. Among all categories of DRDE Scientists prefer to visit library/information centre for information collection. Consult indexing journals source ranked second in order of priority. Discussion with experts in the field occupied third rank. Consulting review articles occupied fourth position in the priority ranking as seen in Table 2. Further the other sources of information such as discussion with colleagues elsewhere, Publisher's catalogue and consulting library catalogue, were found least significance. Table 2 shows the priority in the use of information sources with respect to different categories.

Table 1. Priority in the use of Information Sources

Information Sources	Priority (%)			
	I	II	III	Total
Discussion with				
Colleagues within the organization	58 (51.78)	34 (30.35)	20 (17.85)	112
Colleagues elsewhere	20 (23.52)	32 (37.64)	33 (38.82)	85
Librarian / Reference staff of your library	26 (21.84)	50 (42.01)	43 (36.13)	119
Experts in the field	67 (62.03)	33 (30.55)	8 (7.4)	108
Supervisor	47 (43.51)	40 (37.03)	21 (19.44)	108
Visit				
Library information centre / documentation centre	87 (73.72)	18 (15.25)	13 (11.01)	118
Consult				
Bibliography	10 (14.08)	13 (18.3)	48 (67.6)	71
Library catalogues	37 (45.12)	21 (25.6)	24 (29.26)	82
Publishers catalogue	16 (28.57)	22 (39.28)	18 (32.14)	56
Indexing and abstracting journal	44 (40.74)	48 (44.44)	16 (14.81)	108
Databases	26 (35.61)	25 (34.24)	22 (30.13)	73

Table 2: Priority in the use of Information Sources by different categories

Source of Information	Category					
	I	II	III	IV	Mean	Rank Order
Visit Library/ Information centre / document centre	2.8	2.51	2.14	1.98	2.35	1
Consult review article in a periodical	2.37	1.97	2	1.95	2.07	4
Discussion with colleagues within the organization	2.00	1.98	1.35	1.00	1.58	7
Consult indexing journal	1.98	2.00	2.31	2.32	2.15	2
Discussion with experts in the field	1.86	2.03	1.99	2.43	2.08	3
Consult bibliography	2.46	1.99	1.98	1.25	1.92	5
Discussion with librarian / reverence staff of your library.	2.6	0.98	0.7	0.45	1.18	9
Consult library catalogue	1.02	0.5	0.81	0.25	0.65	12
Discussion with supervisor	2.41	1.59	1.4	0.5	1.48	8
Consult indexing and abstracting journals	2.6	1.61	1.22	1.00	1.60	6
Publisher's catalogue	1	0.5	0.81	0.91	0.81	11
Discussion with colleagues else where	1.09	1.00	1.00	1.04	1.03	10

5.2 Strategies for Checking the References

Table 3 shows the extent of dependence on different sources for checking of references by the DRDE Scientists on their own effort gets the first rank. Checking original documents, Checking reference sources were placed second and third respectively by the Scientist of DRDE. The other high-ranking order was given to Experts in the field, supervisor had fourth and fifth place respectively. Dependence on colleagues and consulting library catalogues were ranked sixth and seventh respectively by the respondents. Both the modes research assistant placed in eighth position. As Librarian is not available at DRDE, no scientist opted for this mode of dependence.

Table 3. Extent of dependence on different modes for collection of Information

Source	Extent of Dependence						Rank
	Solely	Most of the time	Often	To some extent	Not at all	Weight Index	
Own efforts	65	45	11	9	0	4.28	1
Checking original documents	33	68	10	16	3	3.86	2
Checking reference sources	24	51	13	40	2	3.42	3
Consulting the library catalogue	3	10	9	97	11	2.21	7
Expert in the field	19	27	33	42	9	3.04	4
Supervisor	75	3	80	112	89	2.88	5
Colleagues	18	21	36	30	25	2.82	6
Research Assistant	0	9	22	43	56	1.88	8
Librarian	0	0	0	0	0	0	0

Note: Number of respondents is 130 Weighted index is calculated as a 5-point scale with assigned as solely = 5, most of the time = 4, Often = 3, to some extent = 2 and not at all = 1.*

5.3 Purpose Vs Need of Information Sources

A scientist's need of information, whether from print or other sources, arises due to three different reasons viz (1) to collect specific information on the subject of their research; (2) to Keep up-to-date information on the subject and (3) for collecting background information. It is important to analyze these needs in order to understand what DRDE scientists have recently done or are doing. The need to keep up-to-date with the current progress is called the current approach. The second need arises during the course of work-a need for some specific piece of information. This need, directly connected with the research work or problem at hand, is called everyday approach. And the third need comes less often but is equally important. This is the need to find and check, through the relevant information system on a given subject for background information when the scientists start working on their scientific problem. This requirement can be called the exhaustive approach.

The DRDE Scientists makes use of a variety of information sources while seeking information for different purposes. Table 4 shows that a range of sources is used for obtaining specific information, keeping up-to-date and acquiring background information. The successive table enumerates the sources of information in the order of importance for purpose separately. From the present study it is evident that, Journals occupy the first rank for specific information followed by Conversation with colleagues and experts. Under Keeping Up-to-date information category, Journals take the first rank followed by attending conference/lectures/seminars etc as second rank. Under acquiring background information, Year books/annual reviews etc took first rank followed by Conversation with colleagues and experts as second rank.

Table 4: Purpose Vs Information Sources

Information sources	For Specific information		For Keeping up-to-date information		For acquiring background information	
	No of responses	Rank	No of responses	Rank	No of responses	Rank
Journals	108	1	112	1	78	5
Abstracting journals	96	6	91	5	63	8
Indexing journals	91	7	78	8	51	10
Books, monograph, etc.	101	4	81	7	117	3
Bibliographies / library catalogues	91	7	12	13	35	11
Library acquisition lists	60	9	35	12	30	12
Technical / research reports	11	13	71	9	68	7
Workshop, seminar and conference proceedings	86	8	83	6	60	9
Pre-prints / reprints directly from authors	43	11	63	11	27	13
Databases	99	5	69	10	69	6
Attending lectures, conferences, seminars etc.	102	3	108	2	81	4
Conversation with colleagues and experts	106	2	81	7	121	2
Dissertations / theses	40	12	102	3	30	12
Year books / annual reviews, etc.	59	10	92	4	122	1

5. CONCLUSION

The study indicates that the DRDE scientists are much diversified in the information they seek, the sources they access and the use they make of the information. It is difficult to maintain support for the idea of a single mode of formal information channel. However, the journals have been ranked first for obtaining specific information and keeping up-to-date. It has been ranked, second with regard to acquiring background information. The preferences DRDE scientists have for these sources varied with characteristics of the individual scientist, nature of information needed, personal knowledge of sources and their accessibility. The most frequently used sources were those with good physical, functional, and intellectual accessibility. The users tend to use these information sources, which are personally known to them and also easily accessible, regardless of the quality of information. Information may be sought for a particular purpose in particular circumstances, or collected in advance because it is likely to be useful. It is of maximum use when it matches a need, which is highly specific. Thus, in view of above, it may be concluded that the working culture of the individual needing information, the importance placed on getting it, the facilities available for seeking it, the knowledge about these facilities, the judgment of their value, the probability of getting what is wanted, all of these factors may affect information seeking behavior.

To determine the effectiveness of existing information systems attached to the institutions, the DRDE Scientists were asked to suggest some measures for improving of the existing libraries and information services during which recruitment of qualified Librarian was strongly suggested. Due to lack of Librarian, no response was observed for Dependence on different modes of collection of information. The present study on information seeking behavior was restricted only to Scientists of DRDE.

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