GEOSCIENCE INFORMATION:

USER NEEDS AND LIBRARY INFORMATION

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Abstract – Geoscience libraries and their users were the subjects of a two part questionnaire dealing with user background and attitudes in conjunction with library organization systems.

The 23 libraries responding to the first questionnaire varied in size, setting, and organizational systems. A variety of classification systems are utilized in the libraries, but the majority (82.6%) of responding librarians felt the systems they use meet their users' needs. In contrast to this, the majority of libraries make use of Library of Congress subject headings, but there is a clear trend in librarians' views that this system is not adequate for their users' needs.

336 library users responded to the second questionnaire. A picture of the "average" geoscience information user emerged as a highly educated male geologist in his early thirties to forties.

Users generally took a positive attitude toward the library and their skills as a user. The information access points they consider the most important are: author name, subject heading, asking the librarian, and title. No difference was found in the type or importance of information access points used in libraries using only Library of Congress subject heading.

Further study into users' information seeking habits in differing library environments is recommended, as well as an increase in libraries' use of bibliographic instruction.

Who are the users of geoscience information? Is there such a thing an average user of geoscience information? What information access points do users consider important, and does the organization of the libraries they use affect the information gathering process? These are some of the questions the author attempted to answer with two questionnaires sent to geoscience librarians and library users.

Questionnaires were sent to 64 librarians chosen from the GeoScience Information Society membership list. The first questionnaire was a Library Survey to be filled out by the librarian. This questionnaire was used to obtain background on the library and the librarian's assessment of the effectiveness of the library organization. The second questionnaire was to be made available to the users of the library, in order to obtain information on their background,

their approach to information, and self-assessment of their library skills and attitude toward the library.

GIS Library Survey

Of the 64 libraries approached for this project, 23 responded with returned questionnaires, for an overall response rate of 36%. Nine out of 22 academic libraries (40%), 7 out of 20 government libraries (35%), 7 out of 11 industry libraries (63%), and 0 out of 11 "other" libraries (0%) responded.

The responding libraries varied in size, from 7 libraries with over 60,000 volumes to 6 libraries with less than 20,000 volumes. In the middle ranges, 4 libraries reported their holdings between 20,000 and 30,000 volumes, and 3 libraries with between 40,000 and 50,000 volumes. No libraries reported their holdings to be between 50,000 and 60,000 volumes.

The librarians were asked what classification systems are used to catalog materials in their libraries. Eleven libraries use the Library of Congress (LC) classification system, 7 libraries use Dewey, 8 libraries classify by technical report or document numbers, and 10 libraries use other systems.

Nine of the responding libraries use more than one classification system. Of these libraries, 4 use LC in combination with technical report numbers or other systems, 2 use Dewey in combination with technical report numbers or other systems, 2 use both LC and Dewey, and 1 uses neither LC nor Dewey, but makes use of technical report numbers and other systems.

The systems termed as "other" by the respondents to the classification question included shelving theses and dissertations by author name, the use of SUDOC classification for federal documents, arrangement by in-house departmental divisions, and the use of accession numbers.

Three highly developed in-house classification schemes were reported being used by five of the responding libraries. Three libraries make use of the U.S. Geological Survey classification system. Similar in many ways to Dewey classification, this system is specifically geared toward the classification of geological materials, as well as those from related sciences. Materials are classified by a decimal system which divides them into broad subject areas, such as mineralogy or economic geology. Numbers given in parentheses indicate the geographical coverage of the work. A given source may be given one or both numbers as appropriate, and then an author number.

The Hawaii Institute of Geophysics has adapted the USGS system to meet its own specific needs. Subject classification has been geared toward their areas of concern, such as increased coverage in the areas of geophysics, volcanology, and oceanography.

The Florida Bureau of Geology uses a similar type of classification, but approaches the problem from a slightly different direction. Materials are given a primary numerical designation for specific geographic location (generally within the state of Florida) and then a secondary designation for subject matter. Author designations are also made to distinguish materials.

Librarians were asked if they believed that the classification system(s) they use meet their users' needs. Nineteen libraries (82.6%) responded "yes". Of the 4 libraries that responded "no" to this question, 2 make use of technical report numbers only, 1 uses technical report numbers and another system, and 1 uses both Dewey and LC.

Librarians were also queried on the subject heading lists they make use of. Seventeen libraries use LC subject headings, 9 use in-house systems, 2 use other established systems, and one library reported making use of a modified version of Sears.

In the categories of "other established" and "in-house" systems, three libraries reported use of GeoRef descriptor terms, two use TULSA network terms, and others adapted established lists or created their own to meet users' needs for increased local geographic area and formation name coverage.

Librarians were then asked if they believe that the subject heading lists they make use of meet their users' needs. Almost half of the libraries (11 libraries or 48%) responded "no." Nine libraries (39%) responded "yes," and 3 libraries (13%) did not respond to the question.

Table 1 below shows a comparison between the libraries which responded "yes" to the above question and those responding "no". From the response to this question, it appears that librarians perceive difficulties arising for their patrons from the use of LC subject headings alone.

Table 1 – Comparison of perceived adequacy of subject heading lists.

SYSTEM(S)	ADEQUATE – No. Libraries	%	INADEQUATE – No. Libraries	%
LC + other system	4	44.4%	2	18.2%
In-house system	2	22.2%	2	18.2%
LC only	1	11.1%	7	63.6%
LC w/modifications	1	11.1%	-	--
Sears w/modifications	1	11.1%	-	--
TOTALS	9	100%	11	100%

When queried as to the physical make-up of card catalog, 4 libraries responded that they use an on-line catalog, 5 libraries use a catalog in drawers, 11 libraries have a combination of both drawers and an on-line system, 1 library maintains a comfiche catalog, and 2 libraries have no catalogs. Eleven of the libraries that are on-line are members of a network or consortium.

Librarians were asked what kind of bibliographic instruction they used to help orient their users. The largest response, from 21 libraries, was that they used individual instruction on an as needed basis. This response was followed with 16 libraries using orientation for new users, 12

libraries using pamphlets or flyers, 12 libraries using tours, and 7 libraries using other methods. Nineteen of the 23 libraries use more than 1 method.

The bibliographic instruction methods listed as "other" included 3 academic libraries which make use of classroom instruction. Other methods listed were library manuals, acquisition lists, company newsletters, workshops, and none.

Library User Survey

Three hundred thirty-six library users from 24 libraries responded to the users' questionnaire. The response rate per library varied from a low of 0 to a high of 76. The average rate of return was 14 questionnaires per library.

When asked to describe themselves, 57% of the respondents called themselves geologists. Professors made up 10% of the respondents, and students 12%. Persons filling administrative or management positions made up 8%, engineers 5%, and hydrologists 4%. Nineteen percent described themselves as "other." 48 respondents (14%) gave two or more answers to this question. The most common combinations were those describing themselves as both a geologist and an administrator/manager, a geologist and a student, or a geologist and a professor. Other multiple responses included hydrologist/professor, hydrologist/geologist/professor, geologist/hydrologist, professor/other, student/other, geologist/engineer, and geologist/other.

The terms respondents used to describe themselves in the "other" category were most commonly geophysicist, chemist, geochemist, and paleontologist. Other science-related jobs titles listed were mineralogist, economic mineralogist, physical chemist, organic chemist, oceanographer, meteorologist, soil physicist, geobotanist, hydrogeologist, limnologist, geographer, and consultant.

Support function job titles listed as "other" included researcher, systems analyst, negotiator, cartographer, engineering assistant, technician, information broker, graphic artist, research assistant, technical information specialist, and document researcher.

In a break-down by sex, 82% of the respondents are male, 17% are female, and 1% did not respond to the question. Of the women responding to this question, approximately 68% of them hold professional, scientific positions. This is in contrast to the male respondents, 90% of whom hold professional, scientific positions. The women respondents also tended to be younger and less educated than the males.

Users were asked to state their educational level for the survey. 11% have completed post-doctoral work, 30% have their doctorate, 34% have masters' degrees, 21% have a BA/S, 1% have an AA.S, and 2% have high school diplomas. Education showed no effect on users' ranking of familiarity with the library or their satisfaction in the use of it.

Users were also asked to give their age. Their answers ranged from 21 to 73. The mean age was 39.6, the median age was 43, and there were twin modes of 32 and 33. The largest

percentage of respondents (32%) are in their 30s. 8% did not respond to this question – over 7.5% of the males and less than .5% of the females.

The picture of the "average" user of geoscience information now emerges as a highly educated, male geologist in his early thirties to forties. Although this "average" can be a useful model, it is important to consider the entire range of library users when planning effective library service.

What attitudes do the users hold toward the library? The good news is that 68% responded that they found the library to be very important to them in their present position. 23% said it is important, 8% said it is somewhat important, and 1% said it is not important.

In rating their level of satisfaction with the library, 50% said they are very satisfied, 36% said they are satisfied, 10% said they are somewhat satisfied, and 4% said they are not satisfied. In breakdowns by age/sex groups of the respondents, all groups tended to follow the same high to low pattern, with the exception of males in their 20s. This group generally tended to be less satisfied, with only 23% giving a response of very satisfied. Women of all ages tended to rank themselves more satisfied than their male counterparts, with an overall 65% of the women responding that they are very satisfied.

When asked how familiar they are with the library's system of organization, 23% of the users responding said they are very familiar, 46% said they are familiar, 27% said they are somewhat familiar, and 4% said they are unfamiliar with the system. Again, a higher percentage of women ranked themselves as very familiar/familiar, until age 50. Data for this group may be skewed due to the small number of respondents within it. Otherwise, the ranking of familiarity with the library tended to increase with age.

When asked about the ease of use of the library's catalog, 25% of the respondents said they found the catalog easy to use, 56% said it was fairly easy to use, 13% said that it was somewhat difficult to use, and 2% said it was difficult. Users in on-line environments tended to rank the ease of catalog use higher. For these users, 43% said that the catalog was easy to use, 50% found it fairly easy to use, 7% found it somewhat difficult to use, and no respondents termed it as difficult. This response may be due to increased user education in on-line environments, as well as to the efficiency and expanded capabilities of computerized systems.

In a correlation of users' rating of their familiarity with the library organization and their ease of finding what they are looking for in the card catalog, the following relationships were found. Of those users seeing themselves as very familiar with the library organization, the majority found using the card catalog easy to use. For users ranking themselves as familiar, somewhat familiar, or unfamiliar with the library organization, the majority in each category found it fairly easy to make use of the card catalog.

User response was also correlated for the relation between familiarity with the system of library organization and the rating of satisfaction with obtaining information. For users rating themselves either very familiar or familiar with the library organization, the majority responded

that they are very satisfied. For users ranking themselves somewhat familiar or unfamiliar, the majority responded that they are satisfied.

How often do the users make use of the library? When they are in the library, what do they perceive as being important access points to finding the information they are seeking?

In response to the first question, 54% of the respondents stated that they use the library more than once a week. 19% reported that they use the library once a week, 15% once every two weeks, 6% once a month, 2% once every six months, 1% seldom or never, and 3% gave an "other" response. This data may be skewed toward a more frequent response rate due to the different methods librarians used for distributing the questionnaires. While some small libraries were able to make the questionnaires available to everyone in their user community and others advertised the questionnaire on bulletin boards and in company newsletters, some libraries could only make the questionnaires available to those people who actually came into the library.

Users were asked to rank a list of information access points in order of their importance as a primary source for finding the information they need. The access points were: call numbers, subject heading in library catalog, formation name, geographic area, author(s) name, title, ask librarian, and other. The ranking system was from 1 to 8, with 1 being the most important. For all of the access points, some users felt that they are the most important, while others felt that they are the least important. Users were also given the opportunity to rank a given access point "0", meaning that it is not important to them at all. See Table 2 for a complete breakdown of responses.

In overall trends, the greatest number of "1" responses were for author name, subject heading, asking the librarian, and title, in that order. Title responses also received the greatest number of "2" responses and followed a similar high to low pattern of response to that of author rankings. The high ranking of author and title would tend to suggest that the user already knows what s/he is looking for. If this is true, this response raises the question of where this prior knowledge is obtained. Is it from conversation with colleagues? Is it from reading the scientific literature and book reviews? Or is it a familiarity with the authors and works in a particular field and a dependence on these sources for data?

Previous studies (Montague, 1967, p.96; Besant, 1982, p.160) show that one-half to one-third of all searches conducted in libraries are actually subject searches, and that this rate is even higher in an on-line environment. The high ranking of subject headings in this study (second highest number of "1" responses) shows that users are aware of the importance of subject headings in locating information sources.

The third largest "1" group was asking the librarian, which peaked again in the mid ranges. Ranking of formation name peaked at "6," and the ranking of geographic area tended to follow a similar pattern.

The data for the ranking of call number is skewed due to lack of clarity on the researcher's part, which resulted in misunderstanding on the user's part. My intention was to measure knowledge of call number systems as a primary means of obtaining information, i.e.

knowing that books about geophysics can be found in the 551 section of a Dewey library and going there to look for sources. A number of users responding to this question were actually regarding the call number as an important secondary source, i.e. using it as a guide to physically locate what they have already found by some other means. Taking this into consideration also shifts the results of the other access points.

Table 2 – User ranking of primary information access points.

| | No. of Users per Ranking Unit | | | | | | | | | |
	1	2	3	4	5	6	7	8	0	NR
Call Number	37	21	31	47	31	24	50	17	24	48
Subject Heading	71	50	51	50	39	12	17	6	12	28
Formation Name	5	5	9	21	33	70	42	14	78	58
Geographic Area	19	22	30	31	53	50	23	5	51	47
Author Name	109	78	62	37	11	2	5	2	4	25
Title	66	108	74	32	6	8	4	4	6	24
Ask Librarian	68	17	34	35	58	32	22	9	4	25
Other	21	10	3	6	8	4	4	28	70	180

Rankings are based on a scale of 1 to 8, with 1 being the most important. A ranking of 0 indicates that the user found this access point to be of no importance. NR indicates that no response was given.

Access points listed as "other" on the questionnaire included the use of printed indexes, abstracts, and bibliographies; journal names; computer searching, including several respondents who listed GeoRef specifically; and browsing.

Since librarians tended to perceive LC subject headings as not meeting their users' needs, a correlation was performed on the ranking of information access points from users of the seven libraries using LC in the "inadequate" listing of Table 1, and all other users. There were no significant differences between the rankings of any access points from these two user groups.

Conclusions and Recommendations

While librarians find LC subject headings inadequate for their users' needs, there is little indication from this survey that users are aware of this problem. This result is similar to the study by Mulvihill and Eaglesfield (in press), which reported that while 72% of the librarians surveyed felt that LC subject headings are inadequate, only 19% reported that their users complain about the headings.

Line (1983, p. 26) has said: "A person may not – and this is a critical point – always be aware of his needs." He also suggested that "to give users what they want it is sometimes necessary to ignore what they say" (ibid.).

Librarians, as information professionals, are trained to anticipate and meet the needs of their user communities. Trying to meet the users' needs is probably the main motivation behind the large number of geoscience libraries which have modified established subject heading and classification systems, and have developed specialized in-house systems.

Users, on their part, are flexible beings, adapting themselves to whatever system a library chooses to make use of. For example, in the libraries which used LC subject headings exclusively, the users still ranked formation name as high as users in libraries with other systems. Since LC does not generally recognize formation names as valid subject headings, the users must be finding information from this access point in other sources, such as indexes and bibliographies.

This study was a measurement of users' perceptions of what are important access points for finding information, and is not necessarily a reflection of what the user actually does when searching for information. Further study of users' actions is recommended, and the GeoScience Information Society is recognized as a potential medium for a cooperative study of information gathering habits in differing library environments.

Increased efforts in the areas of user education and bibliographic instruction are also recommended. An informed user tends to be a happier and more efficient user. Informed users can also help us to serve them better by making their needs known, and by supporting librarians in their efforts to improve subject access.

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