

SCREAL Report
Results of a Survey on Information Access and E-journal Usage
of Researchers and Graduate Students, 2007

I Outline of the survey

1 Survey design

1-1 Purpose of the survey

There have been three major surveys on e-journal usage in Japanese universities all titled "Survey on Current and Future Use of E-Journals at Universities: Results." The first two were conducted in 2001 and 2003 by the E-Journal Task Force of the Japan Association of National University Libraries (JANUL), and the last one in 2004 by the Private and Public University Libraries Consortium (PULC). The number of e-journals available at universities since has expanded greatly, bringing drastic changes in the environment surrounding the use of e-journals. Presumably they have come to be widely recognized within the institutions of higher education and various changes in information usage in the academia are expected for some time to come.

This study succeeds to the precedent three surveys. Some of their survey items were retained for this study, while other items were added to prompt comparison with similar survey results overseas. We aimed to clarify how researchers and graduate (doctoral) students in universities find, collect and use journal articles, and the findings from the items identical with those of "Survey on Current and Future Use of E-Journals at Universities: Results" are reported here.

1-2 Target population

With the cooperation of JANUL Committee of Scholarly Information and PULC, 24 national, public and private universities were selected. After the target departments and graduate schools were determined within these universities, request for survey participation was made to the faculty and doctoral students.

Considering our study aim, we should have had all the scholars within this country as our survey population and extracted proper samples from them. Such a method, however, was unrealistic in the face of the extreme difficulty in acquiring rosters hindering the process of cooperation requests from the outset. To navigate through this hindrance, we asked for survey participation from the universities which were included in the past surveys, premising on our plan to compare the past and present data. As Tables 1 and 2 show, all scholars were targeted at Tohoku University and Chiba University. At other 22 universities graduate schools and undergraduate departments were first selected with a care to form a good

quantitative balance among various disciplines and then all affiliated researchers were included as our study samples.

The target institutions are universities that lead academic researches in this country. Thus it is assumed that the environment for e-journal usage is somewhat more advanced than at other universities. Such environmental advantage, however, is expected to spread to other institutions over time, and setting the target institutions as a point for stationary measurement seems appropriate in our scheme to properly understand the changes and to foresee the future. Japan Atomic Energy Agency (JAEA)'s Library showed their interest in participation, and accordingly they are included in our survey subjects.

Table 1-1 Number of participation requests delivered to the member universities of JANUL

	Faculty		Graduate (Doctoral) Students	
Hokkaido University	Graduate School of Letters / Faculty of Letters	110	Graduate School of Letters	281
	Graduate School of Dental Medicine / School of Dental Medicine	92	Graduate School of Dental Medicine	131
	Graduate School of Veterinary Medicine / School of Veterinary Medicine	44	Graduate School of Veterinary Medicine	74
Tohoku University	All	2,674	All	2,740
University of Tsukuba	Graduate School of Pure and Applied Sciences	221	Graduate School of Pure and Applied Sciences	232
			Graduate School of Business Sciences	165
Chiba University	All	1,261	All	1,022
The University of Tokyo	Graduate School of Economics / Faculty of Economics	63	Graduate School of Economics	145
	Graduate School of Pharmaceutical Sciences / Faculty of Pharmaceutical Sciences	92	Graduate School of Pharmaceutical Sciences	157
	Graduate School of Agricultural and Life Sciences / Faculty of Agriculture	308	Graduate School of Agricultural and Life Sciences	556
Tokyo Institute of Technology	Graduate School of Science and Engineering	140	Graduate School of Science and Engineering	482
	Research Laboratory for Nuclear Reactors]	34		
Hitotsubashi University	Graduate School of Law / Faculty of Law	63	Graduate School of Law	66
			Graduate School of International Corporate Strategy	78
Nagoya University	Graduate School of Engineering / School of Engineering	335	Graduate School of Engineering	310
	Graduate School of Information Science	82	Graduate School of Information Science	121
Kyoto University	Graduate School of Medicine	266	Graduate School of Medicine	701
Osaka University	Graduate School of Engineering / School of Engineering	455	Graduate School of Engineering	533
Hiroshima University	Graduate School of Education	185	Graduate School of Education	216
	Graduate School of Social Sciences	79	Graduate School of Social Sciences	138
Kyushu University	Graduate School of Science	165	Graduate School of Science	153
	Graduate School of Mathematics	70	Graduate School of Mathematics	50
			Interdisciplinary Graduate School of Engineering Sciences	149

Table 1-2 Number of participation requests delivered to the member universities of PULC

	Faculty		Graduate (Doctoral) Students	
Waseda University	Graduate School of Education / School of Education	122	Graduate School of Education	149
	Graduate School of Science and Engineering / School of Engineering	264	Graduate School of Science and Engineering	256
			Graduate School of Fundamental Science and Engineering	23
			Graduate School of Creative Science and Engineering	18
Keio University	Graduate School of Economics / Faculty of Economics	133	Graduate School of Economics	53
	Graduate School of Science and Technology / Faculty of Science and Technology	263	Graduate School of Science and Technology	338
Chuo University	Faculty of Law	117	Graduate School of Law	100
	Faculty of Commerce	102	Graduate School of Commerce	48
Meiji University	School of Arts and Letters	123	Department of Arts and Letters	128
	School of Agriculture	91	Department of Agriculture	25
Hosei University	Faculty of Social sciences	63	Graduate School of Sociology	10
	Faculty of Business Administration	53	Graduate School of Business Administration	11
	Faculty of Humanity and Environment	31	Graduate School of Social Well-being Studies	18
Tokai University	School of Medicine	520	Graduate School of Medicine	82
	School of Health Sciences	55		
Yokohama City University	School of Medicine (excluding Hospital)	230	Graduate School of Medicine	212
Doshisha University	Graduate School of Theology / School of Theology	18	Graduate School of Theology	47
	Graduate School of Science and Engineering / Faculty of Science and Engineering	133	Graduate School of Science and Engineering	43
Ritsumeikan University	College of International Relations / Graduate School of International Relations	46	Graduate School of International Relations	16
	College of Policy Science / Graduate School of Policy Science	42	Graduate School of Policy Science	23
	College of Law / Graduate School of Law	64	Graduate School of Law	10
Kansai University	School of Letters	129	Graduate School of Letters	126
	School of Sociology	50	Graduate School of Sociology	41
Kwansei Gakuin University	Graduate School of Theology / School of Theology	12	Graduate School of Theology	6
	Graduate School of Humanities / School of Humanities	72	Graduate School of Humanities	69
	Graduate School of Science and Technology / Faculty of Science and Technology	58	Graduate School of Science and Technology	30
Osaka City University	Graduate School / Faculty of Science	126	Graduate School of Science	118
	Graduate School / Faculty of Human Life Science	49	Graduate School of Human Life Science	70
	Graduate School for Creative Cities	34	Graduate School for Creative Cities	73

The survey was conducted from October to November 2007.

1-3 Methodology

The survey was taken online at the website designated for this purpose (Yahoo! Hosting service was used). The requests for survey participation were delivered through internal mail, ordinary mail or e-mail with the cooperation of JANUL, PULC and libraries at individual universities. The request form contained the URL of the website for this survey, access ID and password. At some universities individual correspondence with graduate students was impossible, and when that was the case the requests were delivered via their instructors.

2 Responses

2-1 Number of respondents

2,892 (Valid response: 2,890)

2-2 Respondents by position

Breakdown of positions

Table 2-1 Respondents by position

Position	Frequency	Percent
Professor	323	11.2
Associate professor	362	12.5
Lecturer	146	5.1
Assistant professor	484	16.7
Research assistant	81	2.8
Fellow or Researcher	88	3.0
Graduate student (Doctoral program)	1,291	44.7
Graduate student (Master's program)	8	0.3
Other	107	3.7
Total	2,890	100.0

Note: Graduate students in master's program were not our survey subjects, but some responded at the universities where the requests could not be delivered individually.

2-3 Respondents by institution

Breakdown of respondents' affiliations

Table 2-2 Respondents by institution

Institution	Frequency	Percent	Valid Percent
Hokkaido University	601	20.8	21.1
Tohoku University	367	12.7	12.9
University of Tsukuba	295	10.2	10.3
Chiba University	245	8.5	8.6
University of Tokyo	165	5.7	5.8
Tokyo Institute of Technology	136	4.7	4.8
Hitotsubashi University	129	4.5	4.5
Nagoya University	109	3.8	3.8
Kyoto University	91	3.1	3.2
Osaka University	85	2.9	3.0
Hiroshima University	77	2.7	2.7
Kyushu University	75	2.6	2.6
Waseda University	73	2.5	2.6
Keio University	70	2.4	2.5
Chuo University	59	2.0	2.1
Meiji University	50	1.7	1.8
Hosei University	42	1.5	1.5
Tokai University	37	1.3	1.3
Yokohama City University	32	1.1	1.1
Doshisha University	30	1.0	1.1
Ritsumeikan University	28	1.0	1.0
Kansai University	21	0.7	0.7
Kwansei Gakuin University	18	0.6	0.6
Osaka City University	9	0.3	0.3
Japan Atomic Energy Agency	7	0.2	0.2
Valid Total	2851	98.7	100.0
System-Missing	39	1.3	
Total	2890	100.0	

2-4 Respondents by age-group

Breakdown of age groups in faculty, graduate students and other

Table 2-3 Respondents by age-group

Age Group	Faculty	Graduate student	Other	Total
20-29	115	951	18	1084
	7.7%	73.7%	15.7%	37.5%
30-39	590	275	40	905
	39.8%	21.3%	34.8%	31.3%
40-49	490	49	43	582
	33.0%	3.8%	37.4%	20.1%
50-59	230	13	13	256
	15.5%	1.0%	11.3%	8.9%
60-69	59	2	1	62
	4.0%	0.2%	0.9%	2.1%
70-79	0	1	0	1
	0.0%	0.1%	0.0%	0.0%
Total	1484	1291	115	2890

2-5 Respondents by discipline

Distribution of respondents' disciplines is shown in the table 2-4. The respondents specified their disciplines in their own words, and they were then classified according with the subject code table by the Ministry of Education, Cultures, Sports, Science and Technology (MEXT). The MEXT table is being used for the Grant-in-Aid for Scientific Research by the Japan Society for the Promotion of Science, and thus deemed appropriate. The table is available at the MEXT website (http://www.mext.go.jp/b_menu/shingi/gijyutu/gijyutu4/toushin/011220/011220a.htm). In the table below respondents' affiliations are grouped into national universities, PULC universities and JAEA.

Table 2-4 Respondents by discipline

Discipline	National	PULC	JAEA	Total
Humanities	92	69	0	161
	4.2%	13.1%	0.0%	5.6%
Social Sciences	149	80	0	229
	6.8%	15.2%	0.0%	8.0%
Mathematical & Physical Sciences	195	40	30	265
	8.9%	7.6%	22.1%	9.3%
Biology	235	37	4	276
	10.7%	7.0%	2.9%	9.7%
Chemistry	243	39	10	292
	11.1%	7.4%	7.4%	10.2%
Engineering	527	46	82	655
	24.1%	8.7%	60.3%	23.0%
Agriculture	155	9	0	164
	7.1%	1.7%	0.0%	5.8%
Medicine, Dentistry & Pharmacy	433	175	3	611
	19.8%	33.3%	2.2%	21.4%
General Fields	112	29	0	141
	5.1%	5.5%	0.0%	4.9%
Complex & New Fields	43	2	6	51
	2.0%	0.4%	4.4%	1.8%
Difficult to classify	5	0	1	6
	0.2%	0.0%	0.7%	0.2%
Total	2189	526	136	2851

According to the Ministry of Internal Affairs and Communications (MIC)'s "Survey of Research and Development 2007," within the institutions of higher education, the instructors in Humanities and Social Sciences account for 24.4% of the total. Our survey subjects, therefore, were somewhat biased away from these disciplines.

2-6 Respondents by gender

The table 2-5 shows the ratio of male and female.

Table 2-5 Respondents by gender

Gender	Faculty	Graduate student	Other	Total
Male	1,325	994	101	2,420
	89.3%	77.0%	87.8%	83.7%
Female	159	297	14	470
	10.7%	23.0%	12.2%	16.3%
Total	1,484	1,291	115	2,890

According to "School Basic Survey 2007" by the MEXT, 18.2% of university instructors and 30.6% of doctoral students are female. The subject body of this survey, therefore, was a little biased toward male. The bias in the disciplines seems to account for this. The table 2-6 shows the cross tabulation of subjects' gender and discipline.

Table 2-6 Respondents by gender and discipline

Gender	Humanities	Social Sciences	Math. & Physical Sciences	Biology	Chemistry	Engineering	Agriculture	Medicine, Dentistry & Pharmacy	General Fields	Complex & New Fields	Difficult to classify	Total
Male	106	173	258	218	269	631	118	474	125	44	4	2,420
	65.4%	73.6%	96.3%	78.7%	90.9%	94.0%	71.1%	77.2%	88.0%	83.0%	66.7%	83.7%
Female	56	62	10	59	27	40	48	140	17	9	2	470
	34.6%	26.4%	3.7%	21.3%	9.1%	6.0%	28.9%	22.8%	12.0%	17.0%	33.3%	16.3%
Total	162	235	268	277	296	671	166	614	142	53	6	2,890

The ratio of female respondents exceeds 20% in Humanities, Social Science, Biology, Agriculture and Medicine, Dentistry & Pharmacology.

II Results 1: Current Usage of Digital Information Resources

3 Usage of e-journals

3-1 Frequency of use

Q. 15-1 How often do you use online journals? Please choose one answer.

As seen in Table 3-1, 38.1% of the respondents chose "Almost everyday" and 38.5% "1-2 times a week," together composing quite a large component. Adding 14.5% who chose "1-2 times a month," indeed more than 90% of the respondents were using online journals regularly.

Table 3-1 Frequency of EJ use

	Frequency	Percentage
Almost everyday	1102	38.1
1-2 times a week	1112	38.5
1-2 times a month	418	14.5
Have used in the past but don't use now	130	4.5
Have knowledge of them but have never used one	101	3.5
Never heard	27	0.9
Total	2890	100.0

When divided into JANUL and PULC universities, 78.6% at JANUL universities used e-journals more than once a week (39.6% for "Almost everyday" and 39.0% for "1-2 times a week"). The percentage for the same remained at 71.3% at PULC universities, showing that e-journals were a little more prevalent in national universities. Even when the range was enlarged to a monthly use, the same tendency was confirmed with national universities at 92.0% and PULC universities at 86.1% (Table 3-2).

Table 3-2 Frequency of EJ use: by institution type

	JANUL	PULC	Total
Almost everyday	866	196	1,090
	39.6%	37.3%	38.2%
1-2 times a week	853	179	1,097
	39.0%	34.0%	38.5%
1-2 times a month	295	78	409
	13.5%	14.8%	14.3%
Have used in the past but don't use now	94	29	129
	4.3%	5.5%	4.5%
Have knowledge of them but have never used one	65	34	100
	3.0%	6.5%	3.5%
Never heard	16	10	26
	0.7%	1.9%	0.9%
Total	2,189	526	2,851

Seen by the age, 79.6% of the respondents in 20-29 years of age used e-journals more than once a week, followed by 76.6% in 30-39 age bracket and 73.9% in 40-49, 74.3% in 50-59, and 59.7% in 60-69, showing a decrease in the percentage as the age increased. Considering that more than 70% of those in their 20s to 50s responded that they used e-journals at least more than once a week, it can be said that the use of e-journals were quite prevalent regardless of age (Table 3-1).

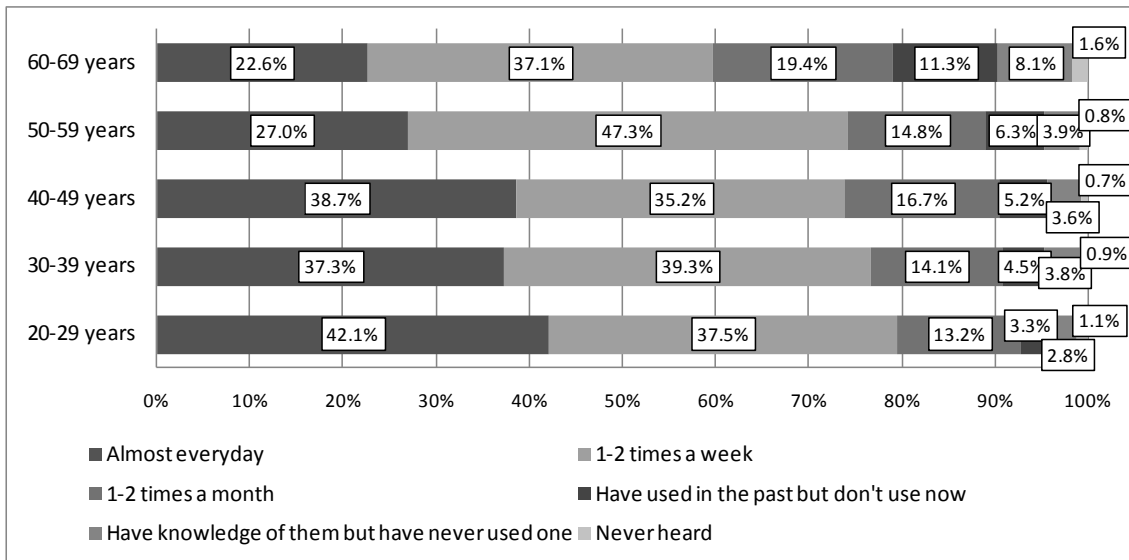


Figure 3-1 Frequency of EJ use: by the age group

Seen by the position, the frequency of e-journal use got lower as the respondents' position got higher. This tendency seems to share, to some extent, a common factor with the differences found among the age groups. Graduate students' use of e-journals, however, was less frequent than that of other positions except professors (see Table 3-3).

Table 3-3 Frequency of EJ use: by the position

	Position									Total
	Professor	Associate professor	Lecturer	Assistant professor	Research assistant	Fellow or Researcher	Graduate student (Doctoral course)	Other	Graduate student (Master course)	
Almost everyday	112 34.7%	147 40.6%	63 43.2%	201 41.5%	38 46.9%	29 33.0%	489 37.9%	20 18.7%	3 37.5%	1,102 38.1%
1-2 times a week	121 37.5%	141 39.0%	54 37.0%	201 41.5%	31 38.3%	40 45.5%	477 36.9%	44 41.1%	3 37.5%	1,112 38.5%
1-2 times a month	49 15.2%	51 14.1%	14 9.6%	57 11.8%	5 6.2%	15 17.0%	196 15.2%	30 28.0%	1 12.5%	418 14.5%
Have used in the past but don't use now	20 6.2%	11 3.0%	10 6.8%	12 2.5%	3 3.7%	3 3.4%	62 4.8%	8 7.5%	1 12.5%	130 4.5%
Have knowledge of them but have never used one	19 5.9%	11 3.0%	5 3.4%	12 2.5%	4 4.9%	0 0.0%	46 3.6%	4 3.7%	0 0.0%	101 3.5%
Never heard	2 0.6%	1 0.3%	0 0.0%	1 0.2%	0 0.0%	1 1.1%	21 1.6%	1 0.9%	0 0.0%	27 0.9%
Total	323	362	146	484	81	88	1,291	107	8	2,890

In Figure 3-2 respondents were grouped up by their discipline and listed in descending order of the rate in the "Almost everyday" choice. In Chemistry more than two thirds of the respondents (67.6%) used e-journals almost everyday, followed by Biology (59.2%) and Medicine, Dentistry & Pharmacy (51.0%). The rates of those who used e-journals more than once in a week exceeded 80% in Biology (96.0%), Chemistry (94.6%), Medicine, Dentistry & Pharmacy (88.8%), Mathematical & Physical Sciences (85.4 %) and Agriculture (83.7%). Although the frequency differed by the discipline, it shows that e-journals were in very frequent use in these fields of research. In Humanities and Social Sciences, on the other hand, those who marked "Almost everyday" stopped at 5.6% and 13.6% respectively. Over a half (Humanities at 55.6% and Social Sciences at 76.6%) used e-journals more than once a month, showing that e-journals were becoming an indispensable tool in these fields too.

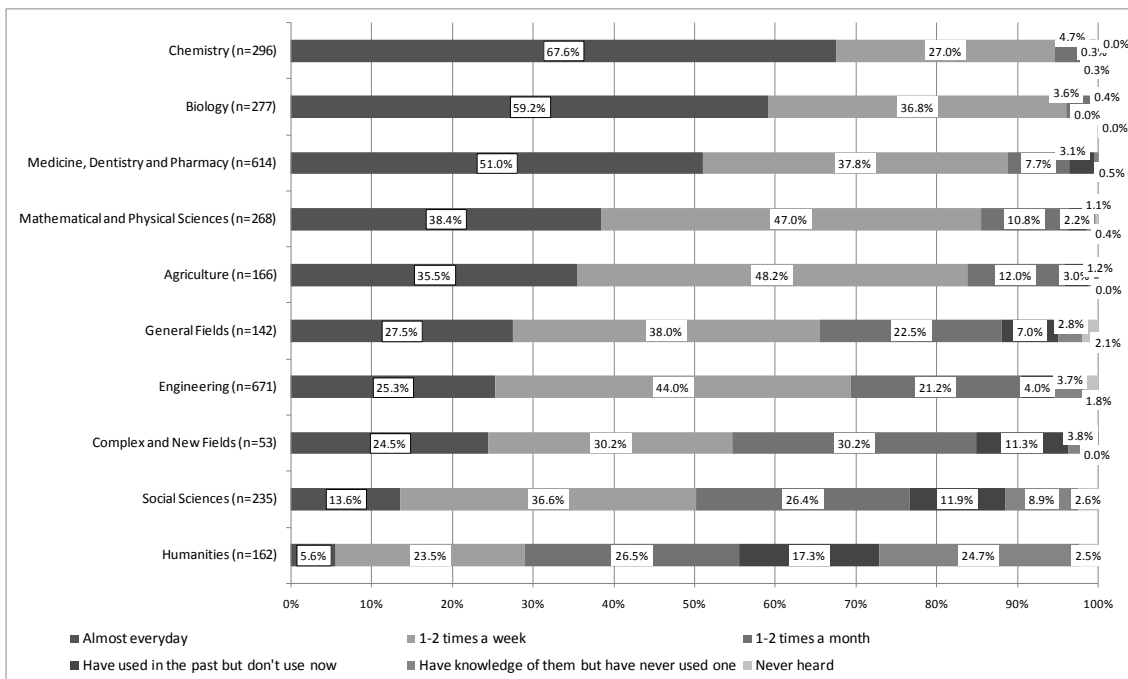


Figure 3-2 Frequency of EJ use: by the discipline

#Comparison with past surveys

In order to grasp the changes occurred over time, the above results were compared with the findings of the past three surveys: two by the Japan Association of National University Libraries (JANUL) conducted in 2003 and 2003 and one by the Private and Public University Libraries Consortium (PULC) in 2004. It needs to be added here, however, that in the past three surveys the number of samples and the ratio of response were weighted based on an estimated ratio in the distribution of survey population's disciplines. Since this survey was free of such adjustments, the acquired data were analyzed as a whole as well as by sections: affiliation (JANUL/PULC) and discipline. As stated in 2-5 of Chapter I, we observed the

subject code table of the MEXT in classifying respondents' research fields. Since the past three surveys used a different system of classification, comparison on this level was impossible. Thus, all the fields were divided into Humanities/Social Sciences and Natural Sciences, and the term discipline here refers to these two main divisions.

As a whole, more than three quarters (76.6%) of respondents turned out to use e-journals more than once a week (the aggregate of those who chose "Almost everyday" and "1-2 times a week"). This figure greatly exceeded those of the past surveys: 36.5% in JANUL 2001, 51.9% in JANUL 2003 and 25.8% in PULC 2004 (refer to Figure 3-3). Moreover, only 0.9% of respondents did not know of e-journals in this survey, showing that almost all researchers and graduate students were aware of their existence.

Data collected at JANUL and PULC universities were extracted separately to be compared with their past survey results (see Figures 3-4 and 3-5). At national universities, 78% responded that they used e-journals more than once a week, showing that the e-journal use had further prevailed since 2001 (36.5%) and 2003 (51.9%). In the case of PULC, too, the percentage of the same reached 71.3%, a noteworthy increase from 25.8% in 2004. The discrepancy between JANUL and PULC universities, quite large in the past, had diminished considerably now.

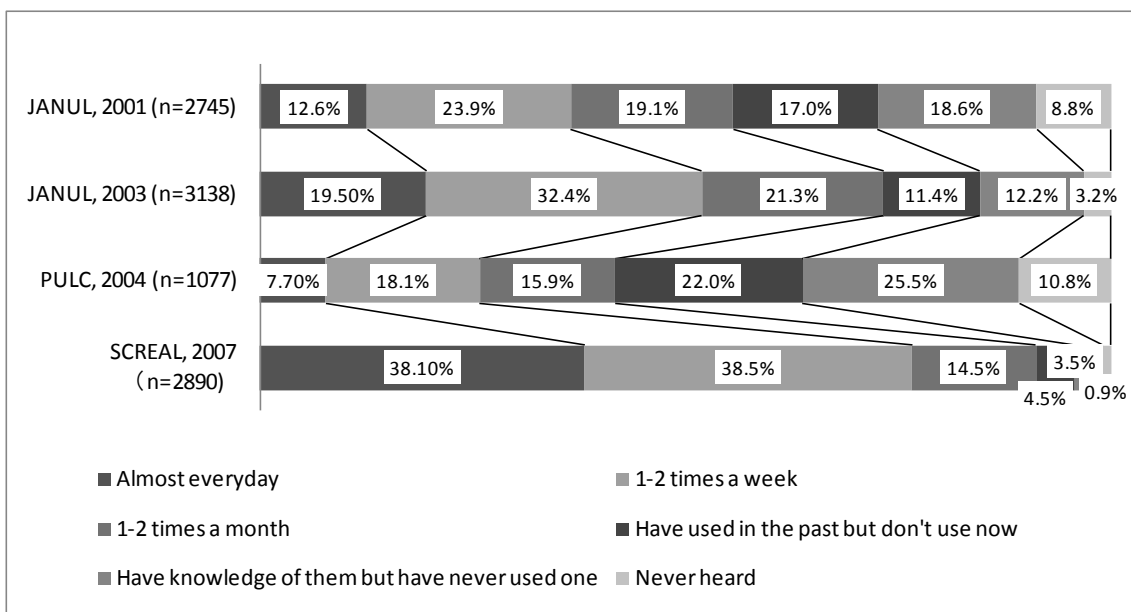


Figure 3-3 Frequency of EJ use: Comparison with past studies

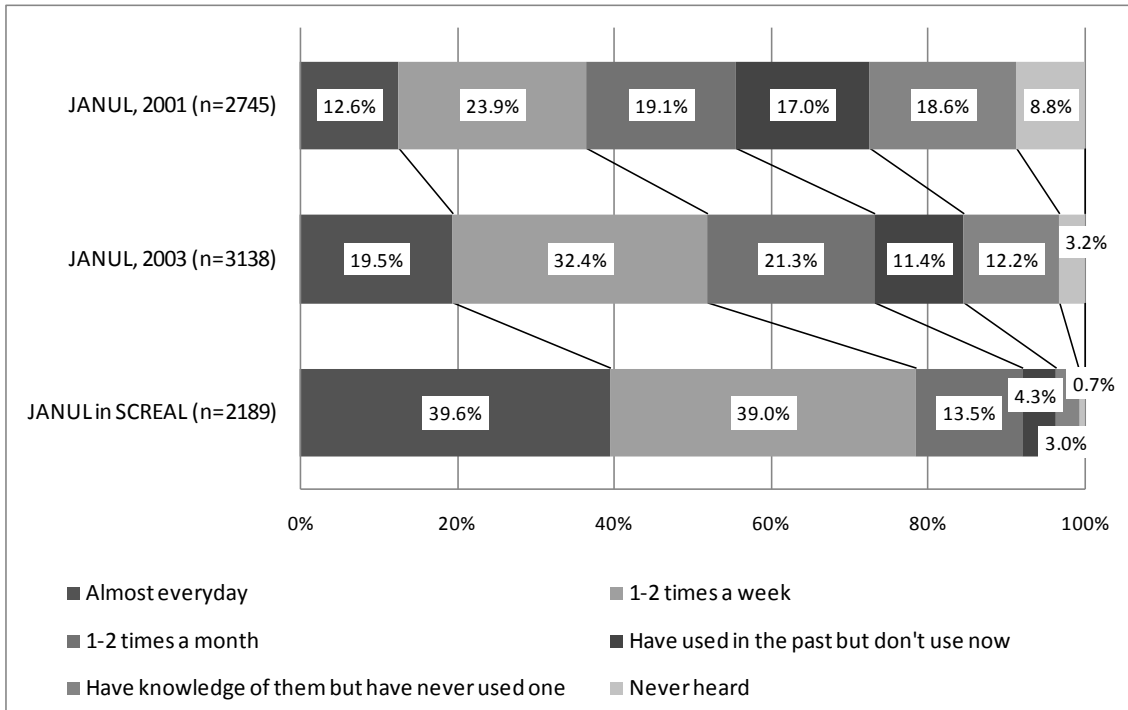


Figure 3-4 Frequency of EJ use: Comparing with past JANUL studies

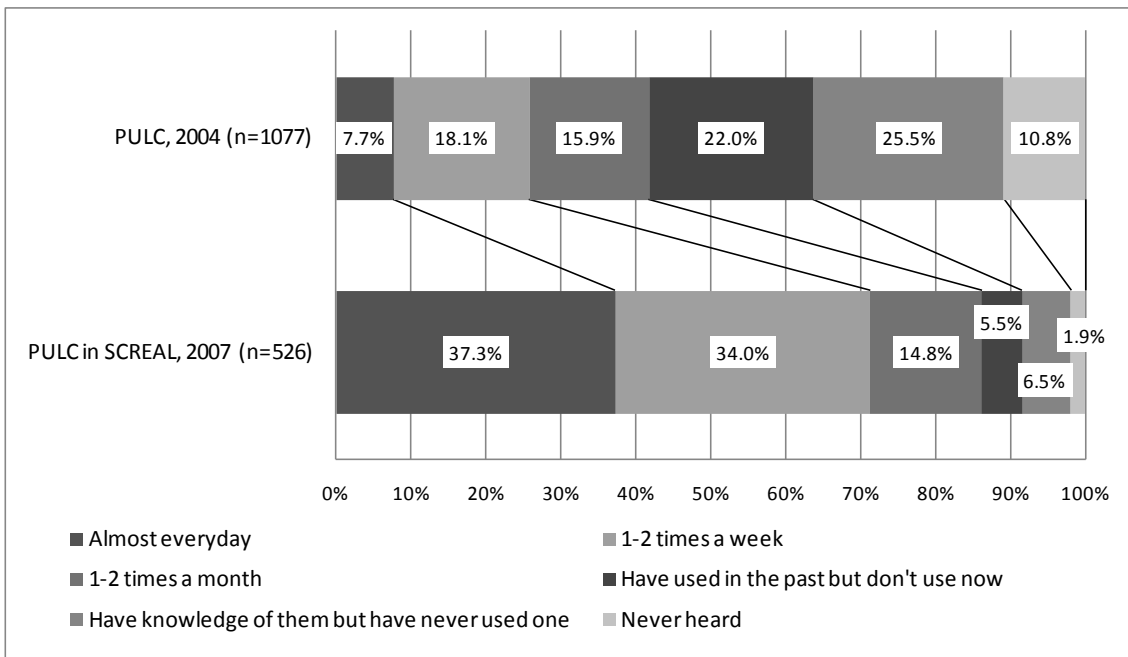


Figure 3-5 Frequency of EJ use: Comparing with past PULC study

Seen by the discipline (Figures 3-6 and 3-7), respondents in Natural Sciences who selected "Almost everyday" leapt to 42.7% from 15.7% in JANUL 2001, 24.3% in JANUL 2003 and 13.9% in PULC 2004. 84.2% responded that they used e-journals at least once a week, showing their use had spread to a wide range.

The number of users had expanded greatly also among Humanities and Social Sciences scholars. Although respondents who chose "Almost everyday" remained at 10.4% even in this survey, this figure is not necessarily low considering that scholars in these fields are generally considered less dependent on scholarly articles than those in Natural Sciences. Rather, the fact that as many as 68.2% of respondents in Humanities/Social Sciences used e-journals more than a month is noteworthy when compared with 16.5% in JANUL 2001, 36.0% in JANUL 2003 and 26.0% in PULC 2004. Only 2.5% responded that they had not known of e-journals (20.4% in JANUL 2001, 8.7% in JANUL 2003 and 14.5% in PULC 2004), testifying to the heightened visibility of e-journals in Humanities/Social Sciences, too.

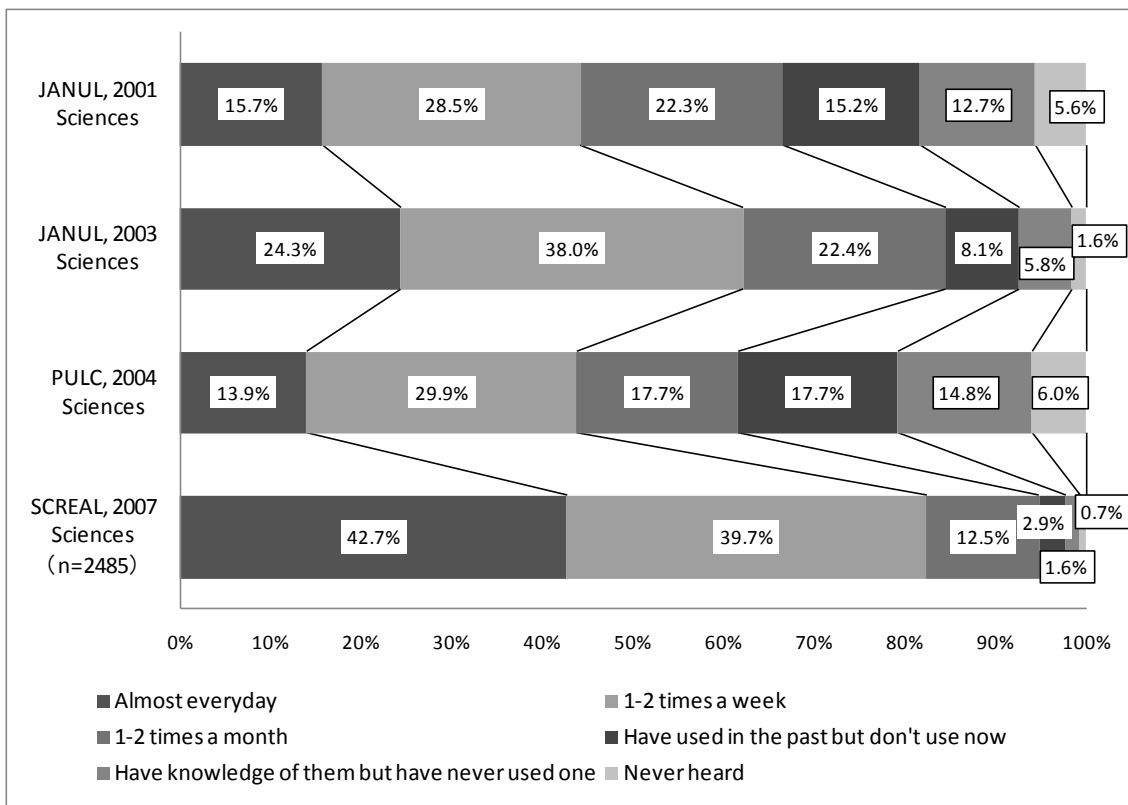


Figure 3-6 Frequency of EJ use: Comparison with past studies – Natural Sciences

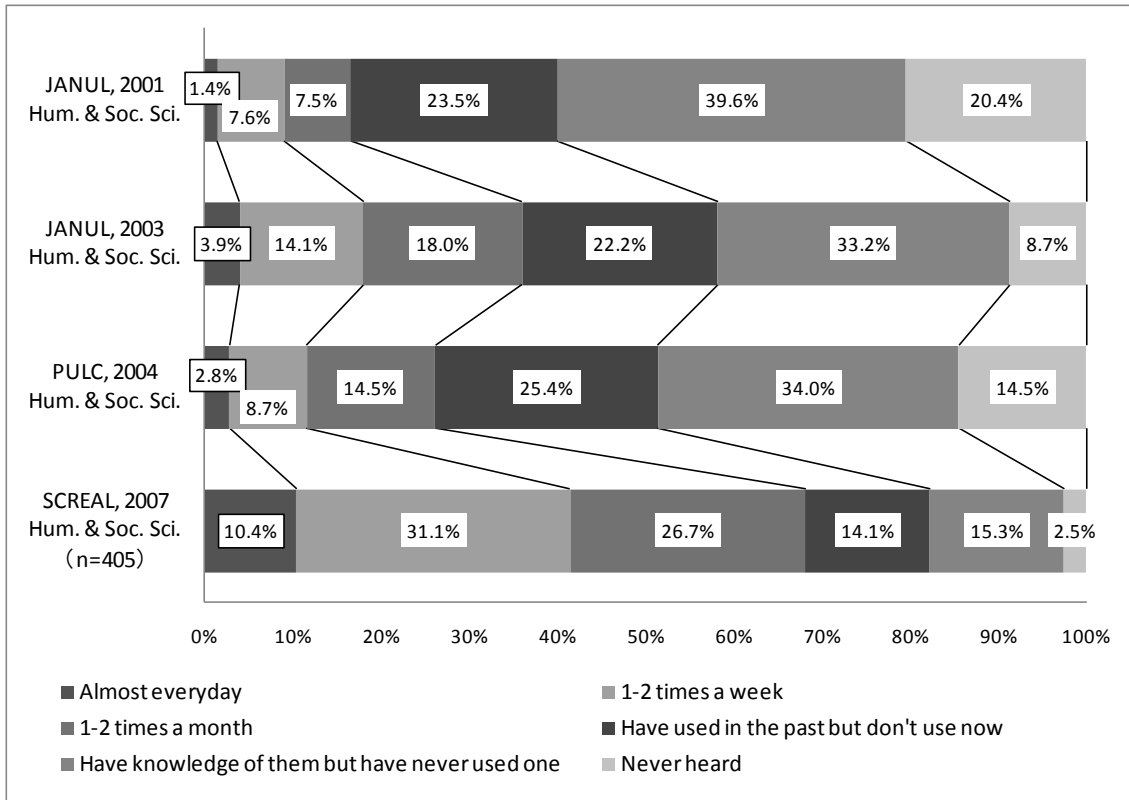


Figure 3-7 Frequency of EJ use: Comparison with past studies – Humanities & Social Sciences

3-2 Number of e-journal titles in use

Q. 15-2 How many titles of online journals do you use generally? Please specify with numbers.

Respondents were asked to specify the number of e-journal titles they generally used. Excluding the responses that bore extremely large numbers (three of them had numbers exceeding 900), the acquired data were put into analysis. As a whole, the mean value of e-journal titles was 9.61, the median 6, and the mode 10 (Table 3-4). 75th percentile was 10, showing 75% of the respondents used 10 or less titles and 25% used more than ten.

Table 3-4 has figures analyzed separately by the discipline and position as well as in total. The values of mean, median, mode and percentile showed that scholars in Natural Sciences used more titles of e-journals than those in Humanities & Social Sciences. The absolute number of titles offered in the form of e-journal within each field seems to have affected the result. Regardless of the discipline, the number of e-journal titles used by faculty was larger than that by graduate students.

Table 3-4 Number of EJ titles in use: in total, by the discipline and position

		Natural Sciences		Humanities & Social Sciences		All respondents
		Faculty	Graduate Students	Faculty	Graduate Students	
Responses	Valid	1256	996	108	162	2623
	Missing	57	68	63	65	267
Mean		10.87	9.15	8.54	5.27	9.61
Median		10	6	5	5	6
Mode		10	10	3	5	10
Std. Deviation		11.75	15.00	11.76	4.51	12.83
Minimum		1	1	3	1	1
Maximum		150	300	100	30	300
Percentile	25	5	4	3	2	4
	50	10	6	5	5	6
	75	10	10	10	6	10

Table 3-5 has the number of e-journal titles in use by the discipline. The disciplines with high frequency of e-journal use were, in the descending order of mean value, Biology (mean 12.14, median, 10, mode 10, and 75th percentile 15), Chemistry (mean 11.20, median 10, mode 10, and 75th percentile 10), Medicine, Dentistry & Pharmacy (mean 11.06, median 10, mode 10, and 75th percentile 10), and Agriculture (mean 10.98, median 8, mode 10, and 75th percentile 10). Medicine, Dentistry & Pharmacy included the subdivisions of Medicine, Dentistry, Pharmacy and Nursing Science, and when only the data in Medicine were extracted and processed, the mean, median, mode and 75th percentile were, respectively, 11.43, 10, 10, and 10. On the other hand, the disciplines with lower frequency in e-journal use were, Humanities (mean 5.86, median 3, mode 3 and 5, and 75th percentile 5), General Fields (Information Science, Neural Science, Geography, etc.: mean 7.15, median 5, mode 10, and 75th percentile 10), Complex & New Fields (environmental Science, Nano/Micro Science, Social/Safety System Science, etc.: mean 7.18, median 5, mode 5, and 75th percentile 10), and Social Sciences (mean 7.50, median 5, mode 10 and 75th percentile 10).

The number of titles in use was broken down into classes of 1-2, 3-5, 6-9, 10-14, 15-19 and 20+ by the discipline; Figure 3-8 shows the percentage of each class. The disciplines with a large percentage of those who used 6 or more titles (the sum of 6-9, 10-14, 15-19 and 20+ titles) were, in the descending order, Biology (73.9%), Chemistry (68.7%), and Medicine, Dentistry & Pharmacy (58.6%). Humanities (21.1%) and Social Sciences (38.2%), on the other hand, made up the last two.

Table 3-5 Number of EJ titles in use: by the discipline

		Humanities	Social Sciences	Mathematical & Physical Sciences	Biology	Chemistry	Engineering	Agriculture	Medicine, Dentistry & Pharmacy	General Fields	Complex & New Fields	Difficult to classify	*Medicine
Responses	Valid	90	178	255	276	294	605	159	590	123	45	6	454
	Missing	72	57	13	1	2	66	7	24	19	8	0	15
Mean		5.86	7.50	8.91	12.14	11.20	8.15	10.98	11.06	7.15	7.18	3.50	11.43
Median		3	5	5	10	10	5	8	10	5	5	4	10
Mode		3, 5	10	5	10	10	5	10	10	10	5	1, 5	10
Std. Deviation		10.92	9.71	11.30	11.40	8.97	15.82	18.25	12.59	6.47	5.80	2.17	12.94
Minimum		1	1	1	1	1	1	1	1	1	1	1	1
Maximum		100	100	100	100	60	300	200	130	50	30	6	130
Percentile	25	2	3	4	5	5	4	5	5	3	3	1	5
	50	3	5	5	10	10	5	8	10	5	5	4	10
	75	5	10	10	15	12.5	10	10	10	10	10	5.25	10

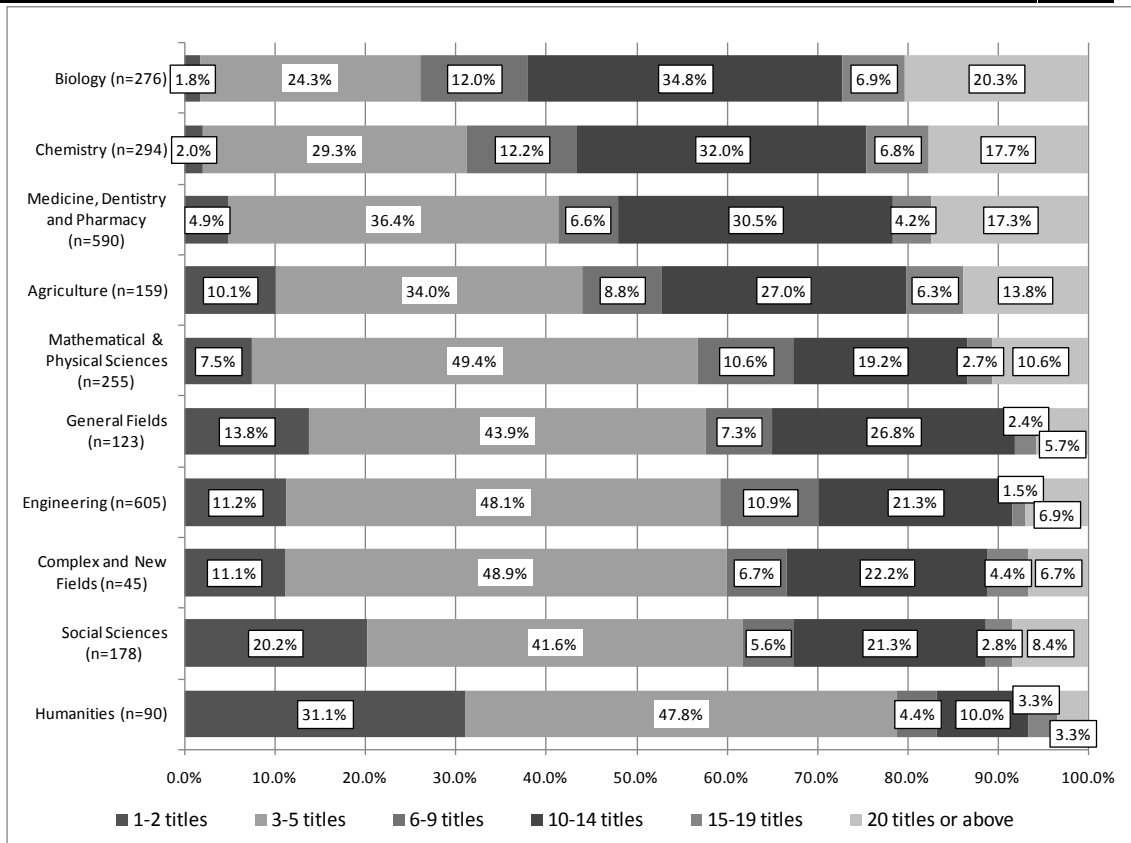


Figure 3-8 Number of EJ titles in use: distribution by the discipline

3-3 Reasons for not using e-journals

Q. 15-3 Why don't you use online journals? Please choose all answers that apply to you.

This question applied only to the respondents who answered they did not use e-journals in Q15-1. The number of respondents was 231, 8.0% of the whole respondents (2,890).

Table 3-6 shows the frequency and percentage of each reason. The most frequently chosen answer was "few titles in my field of study" (41.1%), followed by "difficult to read on a PC screen" (29.9%), "hardcopy documents are good enough" (29.4%), and "don't know how to use" (22.5%).

Table 3-6 Reasons for no-use of e-journals

	Frequency	Percentage
No titles I want to use	14	6.1
Few titles in my field of study	95	41.1
Don't know how to use	52	22.5
Hardcopy documents are good enough	68	29.4
Not enough back number volumes	25	10.8
Difficult to read on a PC screen	69	29.9
Interfaces are difficult to use	21	9.1
Takes too long time to download	19	8.2
Few titles other than in English	20	8.7
Other	34	14.7
Total	417	100.0

When faculty and graduate students were seen separately (Table 3-7), more faculty members chose "few titles in my field of study" (faculty 49.1%, graduate students 36.1%) and "hardcopy documents are good enough" (faculty 38.2%, graduate students 20.4%) and more graduate students selected "don't know how to use" (faculty 20.0%, graduate students 25.9%) and "difficult to read on a PC screen" (faculty 27.3%, graduate students 32.4%).

Table 3-7 Reasons for not using e-journals: by the position

	Faculty	Graduate Students	Other	Total
No titles I want to use	4 3.6%	9 8.3%	1 7.7%	14
Few titles in my field of study	54 49.1%	39 36.1%	2 15.4%	95
Don't know how to use	22 20.0%	28 25.9%	2 15.4%	52
Hardcopy documents are good enough	42 38.2%	22 20.4%	4 30.8%	68
Not enough back number volumes	11 10.0%	13 12.0%	1 7.7%	25
Difficult to read on a PC screen	30 27.3%	35 32.4%	4 30.8%	69
Interfaces are difficult to use	12 10.9%	8 7.4%	1 7.7%	21
Takes too long time to download	10 9.1%	9 8.3%	0 0.0%	19
Few titles other than in English	12 10.9%	8 7.4%	0 0.0%	20
Other	16 14.5%	16 14.8%	2 15.4%	34
Total	110	108	13	231

The analysis by the age (Table 3-8) suggests that reasons like "few titles in my field of study," "difficult to read on a PC screen," and "hardcopy documents are good enough" are commonly chosen in all age brackets.

Table 3-8 Reasons for not using e-journals: by the age

	Age Group						Total
	20-29	30-39	40-49	50-59	60-69	70-	
No titles I want to use	8 12.1%	3 4.0%	3 5.9%	0 0.0%	0 0.0%	0 0.0%	14
Few titles in my field of study	24 36.4%	34 45.3%	22 43.1%	12 46.2%	3 25.0%	0 0.0%	95
Don't know how to use	15 22.7%	19 25.3%	9 17.6%	7 26.9%	2 16.7%	0 0.0%	52
Hardcopy documents are good enough	19 28.8%	20 26.7%	13 25.5%	7 26.9%	8 66.7%	1 100.0%	68
Not enough back number volumes	6 9.1%	7 9.3%	6 11.8%	4 15.4%	2 16.7%	0 0.0%	25
Difficult to read on a PC screen	20 30.3%	20 26.7%	14 27.5%	11 42.3%	3 25.0%	1 100.0%	69
Interfaces are difficult to use	5 7.6%	7 9.3%	3 5.9%	5 19.2%	1 8.3%	0 0.0%	21
Takes too long time to download	3 4.5%	6 8.0%	5 9.8%	4 15.4%	1 8.3%	0 0.0%	19
Few titles other than in English	3 4.5%	4 5.3%	6 11.8%	7 26.9%	0 0.0%	0 0.0%	20
Other	7 10.6%	9 12.0%	8 15.7%	6 23.1%	3 25.0%	1 100.0%	34
Total	66	75	51	26	12	1	231

When analyzed by the discipline (Table 3-9), "few titles in my field of study" was the major reason in Humanities at 69.1% (47) and Social Sciences at 40.8% (20). In Humanities and Social Sciences, "hardcopy documents are good enough" and "difficult to read on a PC screen" were also frequently chosen. In the time coming, enhancement in the e-journal collection, improvement of interfaces, and holding instruction sessions on the use will be desired.

Table 3-9 Reasons for not using e-journals: by the discipline

	Humanities	Social Sciences	Mathematical & Physical Sciences	Biology	Chemistry	Engineering
no titles I want to use	2 2.9%	4 8.2%	0 0.0%	0 0.0%	0 0.0%	3 5.8%
few titles in my field of study	47 69.1%	20 40.8%	1 11.1%	0 0.0%	0 0.0%	14 26.9%
don't know how to use	13 19.1%	12 24.5%	2 22.2%	1 100.0%	0 0.0%	13 25.0%
hardcopy documents are good enough	21 30.9%	16 32.7%	3 33.3%	0 0.0%	0 0.0%	12 23.1%
not enough back number volumes	5 7.4%	8 16.3%	1 11.1%	0 0.0%	0 0.0%	6 11.5%
difficult to read on a PC screen	20 29.4%	18 36.7%	1 11.1%	0 0.0%	0 0.0%	12 23.1%
interfaces are difficult to use	4 5.9%	7 14.3%	0 0.0%	0 0.0%	1 100.0%	5 9.6%
takes too long time to download	5 7.4%	9 18.4%	0 0.0%	0 0.0%	0 0.0%	1 1.9%
few titles other than in English	8 11.8%	4 8.2%	0 0.0%	0 0.0%	0 0.0%	3 5.8%
Other	7 10.3%	3 6.1%	5 55.6%	0 0.0%	0 0.0%	13 25.0%
Number of respondents to this item	68	49	9	1	1	52
Number of all respondents	162	235	268	277	296	671
Percentage of respondents to this item	42.0%	20.9%	3.4%	0.4%	0.3%	7.7%

	Agriculture	Medicine, Dentistry and Pharmacy	General Fields	Complex and New Fields	Difficult to classify	Total	*Medicine
no titles I want to use	1 14.3%	0 0.0%	3 21.4%	1 12.5%	0 0.0%	14 0.1%	0 0.0%
few titles in my field of study	3 42.9%	3 13.6%	2 14.3%	5 62.5%	0 0.0%	95 0.4%	0 0.0%
don't know how to use	3 42.9%	4 18.2%	3 21.4%	1 12.5%	0 0.0%	52 0.2%	3 21.4%
hardcopy documents are good enough	1 14.3%	9 40.9%	6 42.9%	0 0.0%	0 0.0%	68 0.3%	6 42.9%
not enough back number volumes	1 14.3%	2 9.1%	2 14.3%	0 0.0%	0 0.0%	25 0.1%	0 0.0%
difficult to read on a PC screen	3 42.9%	9 40.9%	5 35.7%	1 12.5%	0 0.0%	69 0.3%	7 50.0%
interfaces are difficult to use	1 14.3%	2 9.1%	1 7.1%	0 0.0%	0 0.0%	21 0.1%	0 0.0%
takes too long time to download	0 0.0%	3 13.6%	1 7.1%	0 0.0%	0 0.0%	19 0.1%	2 14.3%
few titles other than in English	1 14.3%	2 9.1%	0 0.0%	2 25.0%	0 0.0%	20 0.1%	0 0.0%
Other	0 0.0%	5 22.7%	1 7.1%	0 0.0%	0 0.0%	34 0.1%	2 14.3%
Number of respondents to this item	7	22	14	8	0	231	20
Number of all respondents	166	614	142	53	6	2890	469
Percentage of respondents to this item	4.2%	3.6%	9.9%	15.1%	0.0%	8.0%	4.3%

3-4 Impressions of e-journals

Q. 16 What kind of impressions do you have of e-journals? Please choose from "agree," "disagree" and "no opinion" for each of the following twelve questions.

The feature of e-journals that acquired the most agreement was "has a superior search function" (75.5%), followed by "has extensive data" (74.8%). More than half agreed that e-journals were "easy-to-use as a whole" (70.9%), "accessible at anytime" (65.1%), "prompt with entry of data on literature/documents" (63.5), and "has extensive links" (56.3%). "Equipped with an alert function" (20.3%) had the least agreement, which was followed by "customizable for easier use" (25.5%), "easy to open pages on the screen" (31.0%) and "accessible from anywhere" (34.1%).

There were no discernable differences by the position or the age. However, there were some differences among the faculty of different fields of research. Humanities scholars who thought e-journals were "prompt with entry of data on literature/documents" remained notably few at 27.8%, and the same tendency was again observed among Social Sciences scholars (40.4%). Furthermore, faculty in Humanities tended to choose "no opinion" in all questions.

#Comparison with past surveys

Although there were slight differences in the items between the PULC 2004 and the present surveys, comparison was made extracting the common items. Two items, "has a superior search function" and "has extensive data," acquired relatively high ratio of affirmative answer in both surveys, showing that these impressions of e-journals had been quite established. Although the item "quality of images in articles is high" gained the most agreement responses in PULC 2004, this time only 37.6% of respondents supported it. "Equipped with an alert function" remained at the lowest both in PULC 2004 and this survey, showing that the alert function was registered quite low among the impressions of e-journals.

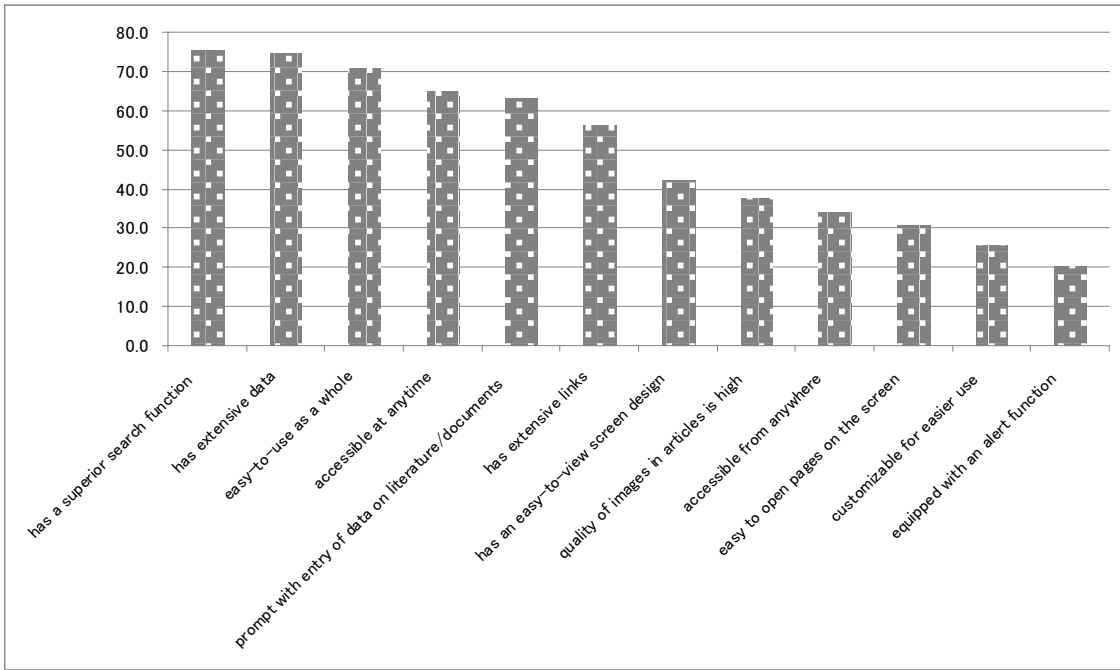


Figure 3-9 Features that provide ease of use for EJ: number of agreed respondents

4 Usage of other information services than e-journals

4-1 Frequency of use

Q. 17: How often do you use the following services of electronic indexing, abstract and/or contents magazines?

Figure 4-1 shows the ratio of the respondents who chose "frequently used" for each electronic indexing, abstract and contents magazine. "PubMed" had the highest at 34.9%, and "Web of Knowledge" (28.1%), "CiNii" (18.3), "Google Scholar" (18.0%), "Medline" (14.5%), "Zasshi Kiji Sakuin (Japanese periodicals index)" (13.3%), and SciFinder Scholar" (11.4%) followed. "Medline" here signifies the services provided by OVID, SilverPlatter, JDreamII etc. other than PubMed.

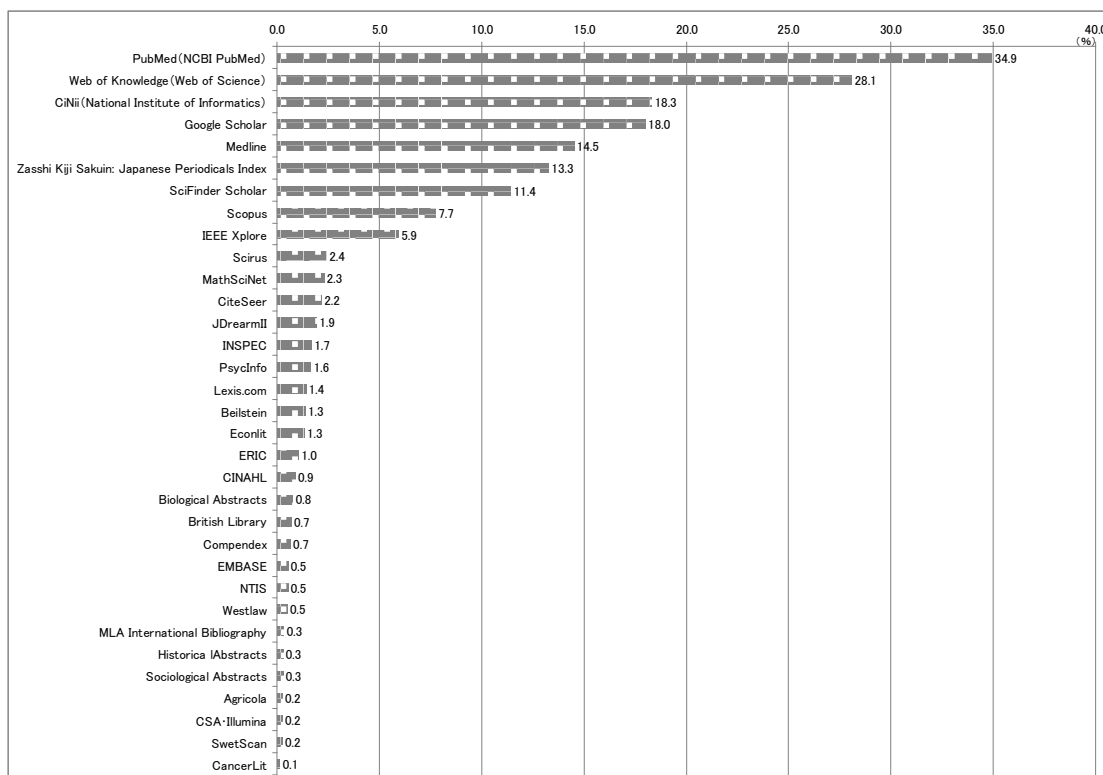


Figure 4-1 "Frequently Used" Secondary Information Services

Respondents were divided into two discipline groups of Humanities/Social Sciences and Natural Sciences and further into faculty and graduate students; Table 4-1 shows the result. In Humanities/Social Sciences, both among faculty and graduate students, "CiNii" came at the top (faculty 40.4%, graduate students 46.7%), followed by "Zasshi Kiji Sakuin" (38.6% and 41.9%, in the same order) and "Google Scholar" (12.3% and 18.9%). The fact that the first two services dealt with domestic journals showed a high demand for Japanese articles in these research fields. "Web of Knowledge," which ranked second in the total, came very low among the

scholars of Humanities/Social Sciences (faculty 9.9%, graduate students 7.5%). A relative low demand for overseas articles and the number of Humanities/Social Sciences titles collected at this service seem to have affected the result.

In Natural Sciences, "PubMed" (faculty 42.7%, graduate students 39.1%) and "Web of Knowledge" (35.9% and 27.3%, in the same order) came first and second respectively, both among faculty and graduate students. It showed the significance of overseas articles in these fields. "Medline" came third among faculty (20.6%) but was placed at 6th among graduate students (12.6%), showing a big drop. "Google Scholar," on the other hand, ranked 4th among faculty (13.0%) and 3rd among graduate students (25.6%). "CiNii" came 6th among faculty (10.8%) but 4th among graduate students (19.0%). It can be said that faculty tended to use more established services with solid reputation in the academy while graduate students tended to seek newer services and articles written in Japanese.

Table 4-2 shows the ranking of "frequently used" secondary information services by the discipline. "PubMed" was the major information source for scholars in Medicine, Dentistry & Pharmacy (89.1%), Biology (79.8%) and Agriculture (53.6%), and seemed to be expanding its users in adjacent research fields like General Fields (29.6%), Chemistry (13.9%) and Engineering (5.5%). Although the use of "Web of Knowledge" was prevalent in all disciplines, its usage rates were especially high in Chemistry (50.3%), Agriculture (47.0%) and Biology (40.4%). The percentage of "SciFinder Scholar" in Chemistry was extremely high at 74.7%. The rates of "MathSciNet" in Mathematical & Physical Sciences (19.4%) and "IEEE Explore" in Engineering and General Fields (24.6%) appeared rather small, but they were evidently the major information sources in Mathematics and Communication/Electronic/Information Engineering, the representative fields within these categories.

As stated earlier, "Zasshi Kiji Sakuin" and "CiNii" were the most frequently used services in Humanities and Social Sciences, but interestingly the former was dominant in Humanities and the latter in Social Sciences.

Table 4-1 "Frequently Used" Secondary Information Services:
in total, by the discipline and position

<Humanities & Social Sciences: Faculty>				<Humanities & Social Sciences: Graduate Students>			
		n=171				n=227	
	Service name	Frequency	Percentage		Service name	Frequency	Percentage
1	CiNii(National Institute of Informatics)	69	40.4	1	CiNii(National Institute of Informatics)	106	46.7
2	Zasshi Kiji Sakuin: Japanese Periodicals Index	66	38.6	2	Zasshi Kiji Sakuin: Japanese Periodicals Index	95	41.9
3	Google Scholar	21	12.3	3	Google Scholar	43	18.9
4	Econlit	17	9.9	4	PsycInfo	23	10.1
5	Web of Knowledge (Web of Science)	17	9.9	5	ERIC	21	9.3
6	Lexis.com	16	9.4	6	Lexis.com	20	8.8
7	PsycInfo	13	7.6	7	Web of Knowledge (Web of Science)	17	7.5
8	PubMed (NCBI PubMed)	7	4.1	8	Econlit	16	7.0
9	ERIC	6	3.5	9	PubMed (NCBI PubMed)	12	5.3
10	MLA International Bibliography	5	2.9	10	Westlaw	8	3.5
10	Westlaw	5	2.9				

< Natural Sciences: Faculty > n=1313

	Service name	Frequency	Percentage
1	PubMed (NCBI PubMed)	561	42.7
2	Web of Knowledge (Web of Science)	471	35.9
3	Medline	270	20.6
4	Google Scholar	171	13.0
5	SciFinderScholar	164	12.5
6	CiNii (National Institute of Informatics)	142	10.8
7	Scopus	126	9.6
8	Zasshi Kiji Sakuin: Japanese Periodicals Index	101	7.7
9	IEEE Xplore	78	5.9
10	MathSciNet	46	3.5

< Natural Sciences: Graduate Students > n=1064

	Service name	Frequency	Percentage
1	PubMed (NCBI PubMed)	416	39.1
2	Web of Knowledge (Web of Science)	290	27.3
3	Google Scholar	272	25.6
4	CiNii (National Institute of Informatics)	202	19.0
5	SciFinderScholar	160	15.0
6	Medline	134	12.6
7	Zasshi Kiji Sakuin: Japanese Periodicals Index	109	10.2
8	IEEE Xplore	87	8.2
9	Scopus	80	7.5
10	CiteSeer	35	3.3

Table 4-2 "Frequently Used" Secondary Information Services: by the discipline

< Humanities > n=162

	Service name	Frequency	Percentage
1	Zasshi Kiji Sakuin: Japanese Periodicals Index	75	46.3
2	CiNii (National Institute of Informatics)	70	43.2
3	Google Scholar	21	13.0
4	Web of Knowledge (Web of Science)	10	6.2
5	Historica lAbstracts	8	4.9
6	MLA International Bibliography	7	4.3
7	British Library	6	3.7
8	ERIC	4	2.5
9	Lexis.com	3	1.9
10	Biological Abstracts	2	1.2
10	CiteSeer	2	1.2
10	NTIS	2	1.2
10	Scopus	2	1.2

< Social Sciences > n=235

	Service name	Frequency	Percentage
1	CiNii (National Institute of Informatics)	108	46.0
2	Zasshi Kiji Sakuin: Japanese Periodicals Index	88	37.4
3	Google Scholar	44	18.7
4	Lexis.com	34	14.5
5	Econlit	32	13.6
6	PsycInfo	31	13.2
7	ERIC	23	9.8
8	Web of Knowledge (Web of Science)	22	9.4
9	PubMed (NCBI PubMed)	16	6.8
10	Westlaw	13	5.5

< Mathematical & Physical Sciences > n=268

	Service name	Frequency	Percentage
1	Web of Knowledge (Web of Science)	93	34.7
2	Google Scholar	56	20.9
3	MathSciNet	52	19.4
4	CiNii (National Institute of Informatics)	27	10.1
5	Zasshi Kiji Sakuin: Japanese Periodicals Index	21	7.8
6	Scopus	20	7.5
7	IEEE Xplore	11	4.1
8	Scirus	11	4.1
9	INSPEC	10	3.7
10	SciFinder Scholar	8	3.0

< Biology > n=277

	Service name	Frequency	Percentage
1	PubMed (NCBI PubMed)	221	79.8
2	Web of Knowledge (Web of Science)	112	40.4
3	Medline	80	28.9
4	Google Scholar	55	19.9
5	CiNii (National Institute of Informatics)	23	8.3
6	Scopus	14	5.1
7	SciFinder Scholar	14	5.1
8	Zasshi Kiji Sakuin: Japanese Periodicals Index	9	3.2
9	Scirus	7	2.5
10	Biological Abstracts	5	1.8

< Chemistry > n=296

	Service name	Frequency	Percentage
1	SciFinder Scholar	221	74.7
2	Web of Knowledge (Web of Science)	149	50.3
3	PubMed (NCBI PubMed)	41	13.9
4	Scopus	41	13.9
5	Google Scholar	37	12.5
6	Beilstein	37	12.5
7	Medline	21	7.1
8	Zasshi Kiji Sakuin: Japanese Periodicals Index	21	7.1
9	CiNii (National Institute of Informatics)	17	5.7
10	Scirus	12	4.1

< Engineering > n=671

	Service name	Frequency	Percentage
1	Web of Knowledge (Web of Science)	209	31.1
2	Google Scholar	150	22.4
3	CiNii (National Institute of Informatics)	138	20.6
4	IEEE Xplore	113	16.8
5	Scopus	83	12.4
6	Zasshi Kiji Sakuin: Japanese Periodicals Index	77	11.5
7	SciFinder Scholar	44	6.6
8	PubMed (NCBI PubMed)	37	5.5
9	INSPEC	32	4.8
10	Scirus	30	4.5
10	JDreamII	30	4.5

<Agriculture>				<Medicine, Dentistry & Pharmacy>			
n=166				n=614			
	Service name	Frequency	Percentage		Service name	Frequency	Percentage
1	PubMed (NCBI PubMed)	89	53.6	1	PubMed (NCBI PubMed)	547	89.1
2	Web of Knowledge (Web of Science)	78	47.0	2	Medline	246	40.1
3	CiNii (National Institute of Informatics)	40	24.1	3	Web of Knowledge (Web of Science)	98	16.0
4	Medline	30	18.1	4	Google Scholar	67	10.9
5	Google Scholar	28	16.9	5	Zasshi Kiji Sakuin: Japanese Periodicals Index	44	7.2
6	Zasshi Kiji Sakuin: Japanese Periodicals Index	19	11.4	6	CiNii (National Institute of Informatics)	43	7.0
7	Scopus	8	4.8	7	Scopus	43	7.0
8	SciFinder Scholar	8	4.8	8	SciFinder Scholar	27	4.4
9	Biological Abstracts	7	4.2	9	CINAHL	22	3.6
10	NTIS	4	2.4	10	EMBASE	11	1.8
10	Agricola	4	2.4				

<General Fields>				<Complex & New Fields>			
n=142				n=53			
	Service name	Frequency	Percentage		Service name	Frequency	Percentage
1	Google Scholar	48	33.8	1	CiNii (National Institute of Informatics)	19	35.8
2	PubMed (NCBI PubMed)	42	29.6	2	Web of Knowledge (Web of Science)	14	26.4
3	CiNii (National Institute of Informatics)	41	28.9	3	Google Scholar	12	22.6
4	IEEE Xplore	35	24.6	4	PubMed (NCBI PubMed)	10	18.9
5	CiteSeer	28	19.7	5	Zasshi Kiji Sakuin: Japanese Periodicals Index	9	17.0
6	Web of Knowledge (Web of Science)	26	18.3	6	Scopus	4	7.5
7	Zasshi Kiji Sakuin: Japanese Periodicals Index	19	13.4	7	SciFinder Scholar	4	7.5
8	Medline	15	10.6	8	INSPEC	4	7.5
9	PsycInfo	6	4.2	9	Medline	2	3.8
10	Scopus	5	3.5	10	JDreamII	2	3.8
10	MathSciNet	5	3.5	10	NTIS	2	3.8

The respondents were also asked to write up to three additional services of their use if they were not included in the listed 33. The top three were "ScienceDirect" (90), "*ichushi web*" (35) and "JSTOR" (15). Strictly speaking, "ScienceDirect" is not a secondary information database service. The fact that as many as 90 respondents wrote this name suggests that the users do not recognize the difference between traditional index/abstract databases and a service like "ScienceDirect" that has search functions for a great volume of articles backed by more than 1,800 titles of e-journals.

#Comparison with past surveys

The past surveys by JANUL (Japan Association of National University Libraries) in 2003 and PULC (Private and Public University Libraries Consortium) in 2004 also had questions for the usage of secondary information services, but there was a large difference in the surveyed services between the past and the present surveys. JANUL 2003 included only the databases created overseas, while PULC 2004 added Japanese ones, such as "Aasahi DNA *Kikuzo*" and "Nikkei Telecom 21." The present study, on the other hand, limited its survey range to the means to find academic articles, excluding the services for newspaper articles.

The findings of this survey generally coincided with the past findings in that "Medline," "Web of Science," "SciFinder Scholar," etc. ranked high among the scholars of Natural Sciences. One exception was "Google Scholar," whose beta version was launched in November 2004 (still in that version in November 2008), and it had come to be used in a wide sphere. By the same token, it was notable that the use of "CiNii" (officially launched in April 2005) had dramatically inflated in Humanities and Social Sciences.

4-1-2 Most "frequently used" electronic secondary information services

Q. 17-2: Of the services for which you chose "frequently used" in Question 17, which three do you use the most?

The most "frequently used" were "PubMed" (28.1%, 811 respondents), "Web of Knowledge" (13.0%, 375), "SciFinder Scholar" (7.9%, 229), "Google Scholar" (6.3%, 183) and "CiNii" (6.2%, 179) followed (2,503 valid responses; percentages are against the total 2,890 respondents). As for the second most "frequently used" services, in descending order, "Web of Knowledge" (10.3%, 299), "Medline" (7.3%, 211) and "Google Scholar" (6.7%, 193). 312 (35.8%) of the respondents who answered that they used "PubMed" most frequently indicated only this service, while 254 (31.2%) and 169 (20.8%) picked, respectively, "Medline" and "Web of Knowledge" for their second or third most frequent use.

4-1-3 Impressions/images of electronic secondary information services

Q. 17-3: Which of the following impressions/images apply to the services you chose in Question 17-2?

Figure 4-2 shows the services with 60 or more responses and those with less are shown in Table 4-3.



Figure 4-2 Impressions/images of electronic secondary information services:
60 or more responses

Table 4-3 Impressions/images of electronic secondary information services:
less than 60 responses

	Has extensive data	Has a superior search function	Its contents are of high quality	Highly rated by the academic community	Has links to e-journals	Prompt with entry of data on literature /documents	Equipped with an alert function	Has a search function for cited reference	Easy to use in general	Other	Total
CiteSeer	43 75.4%	27 47.4%	11 19.3%	5 8.8%	15 26.3%	3 5.3%	1 1.8%	31 54.4%	22 38.6%	4 7.0%	57
Scirus	43 75.4%	33 57.9%	13 22.8%	3 5.3%	29 50.9%	13 22.8%	1 1.8%	14 24.6%	26 45.6%	5 8.8%	57
INSPEC	35 81.4%	23 53.5%	10 23.3%	7 16.3%	10 23.3%	4 9.3%	0 0.0%	11 25.6%	16 37.2%	4 9.3%	43
JDreamII	27 65.9%	17 41.5%	10 24.4%	2 4.9%	5 12.2%	4 9.8%	2 4.9%	2 4.9%	17 41.5%	5 12.2%	41
PsycInfo	31 81.6%	22 57.9%	16 42.1%	21 55.3%	16 42.1%	10 26.3%	4 10.5%	11 28.9%	25 65.8%	2 5.3%	38
Beilstein	32 88.9%	25 69.4%	19 52.8%	10 27.8%	11 30.6%	2 5.6%	2 5.6%	10 27.8%	20 55.6%	2 5.6%	36
Econlit	28 77.8%	19 52.8%	16 44.4%	14 38.9%	18 50.0%	9 25.0%	3 8.3%	3 8.3%	22 61.1%	1 2.8%	36
Lexis.com	31 86.1%	24 66.7%	11 30.6%	10 27.8%	8 22.2%	8 22.2%	4 11.1%	15 41.7%	19 52.8%	0 0.0%	36
Ichushi web	28 80.0%	19 54.3%	16 45.7%	9 25.7%	24 68.6%	13 37.1%	3 8.6%	11 31.4%	17 48.6%	0 0.0%	35
ERIC	19 70.4%	14 51.9%	7 25.9%	4 14.8%	10 37.0%	3 11.1%	1 3.7%	3 11.1%	13 48.1%	1 3.7%	27
CINAHL	12 57.1%	4 19.0%	1 4.8%	6 28.6%	5 23.8%	2 9.5%	0 0.0%	3 14.3%	7 33.3%	3 14.3%	21
Biological Abstracts	14 87.5%	7 43.8%	4 25.0%	2 12.5%	5 31.3%	2 12.5%	1 6.3%	4 25.0%	7 43.8%	3 18.8%	16
Compendex	14 93.3%	7 46.7%	7 46.7%	1 6.7%	6 40.0%	2 13.3%	1 6.7%	1 6.7%	5 33.3%	0 0.0%	15
British Library	10 76.9%	4 30.8%	1 7.7%	3 23.1%	0 0.0%	0 0.0%	2 15.4%	1 7.7%	4 30.8%	1 7.7%	13
EMBASE	6 50.0%	4 33.3%	4 33.3%	2 16.7%	5 41.7%	0 0.0%	3 25.0%	5 41.7%	3 25.0%	0 0.0%	12
Westlaw	11 91.7%	8 66.7%	7 58.3%	5 41.7%	3 25.0%	2 16.7%	1 8.3%	6 50.0%	7 58.3%	0 0.0%	12
NTIS	6 60.0%	3 30.0%	1 10.0%	2 20.0%	1 10.0%	1 10.0%	0 0.0%	2 20.0%	4 40.0%	2 20.0%	10
MLA International Bibliography	5 71.4%	4 57.1%	1 14.3%	3 42.9%	1 14.3%	4 57.1%	0 0.0%	1 14.3%	2 28.6%	0 0.0%	7
SwetScan	5 71.4%	2 28.6%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	5 71.4%	0 0.0%	7
Agricola	1 25.0%	3 75.0%	0 0.0%	1 25.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	4
CSA· Illumina	3 75.0%	1 25.0%	1 25.0%	0 0.0%	2 50.0%	1 25.0%	1 25.0%	2 50.0%	2 50.0%	0 0.0%	4
Historical Abstracts	2 50.0%	2 50.0%	1 25.0%	2 50.0%	0 0.0%	1 25.0%	0 0.0%	0 0.0%	0 0.0%	1 25.0%	4
Sociological Abstracts	2 66.7%	2 66.7%	0 0.0%	0 0.0%	2 66.7%	0 0.0%	0 0.0%	1 33.3%	1 33.3%	0 0.0%	3
CancerLit	0 0.0%	0 0.0%	1 100.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	1

4-2 Necessity of printed journals

Q. 18: What do you think is the significance of printed journals in the time of e-journals? Please choose one from the options.

Figure 4-3 shows the ratio of each option by the discipline and position as well as in total. As a whole, 38.0% chose "printed journals are unnecessary when e-journals are accessible" and 55.7% selected "both printed and e-journals are necessary." 45.4% of the faculty in Natural Sciences thought printed journals were unnecessary, the highest percentage, almost on a par with those who thought both were necessary (46.9%). The percentage of respondents who thought both were needed was higher in Humanities and Social Sciences than Natural Sciences, and also among graduate students than faculty. It needs to be mentioned here that 6.4% of Humanities and Social Sciences faculty chose "only printed journals are necessary."

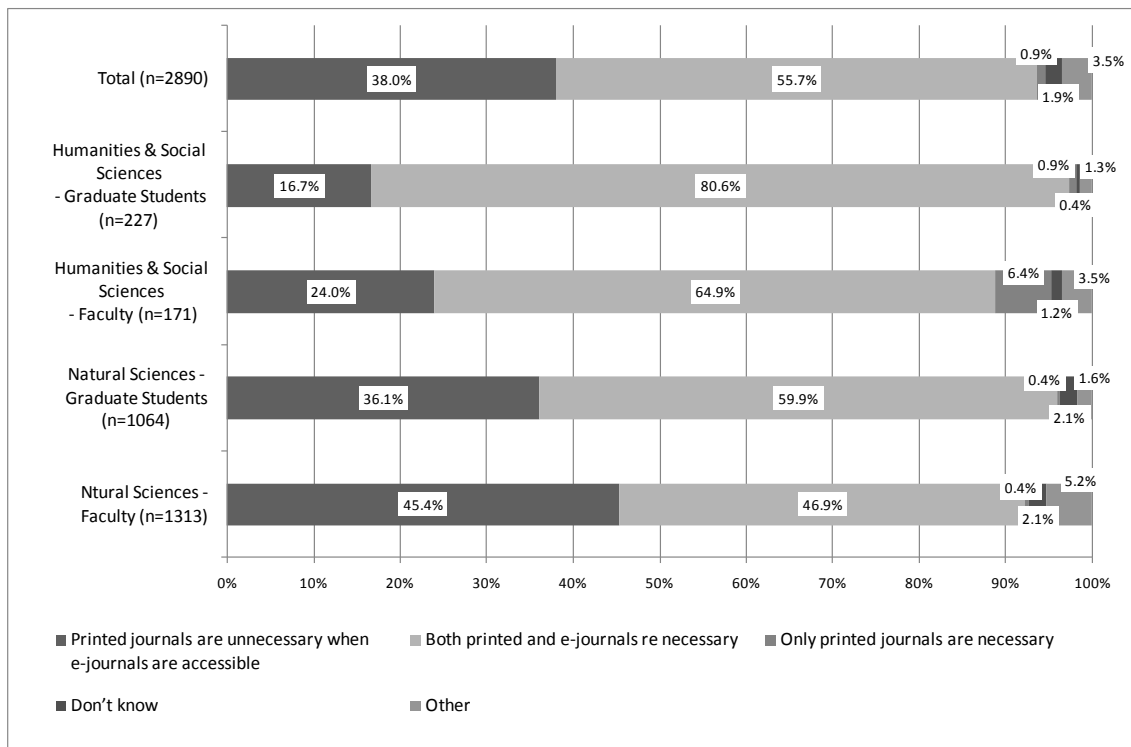
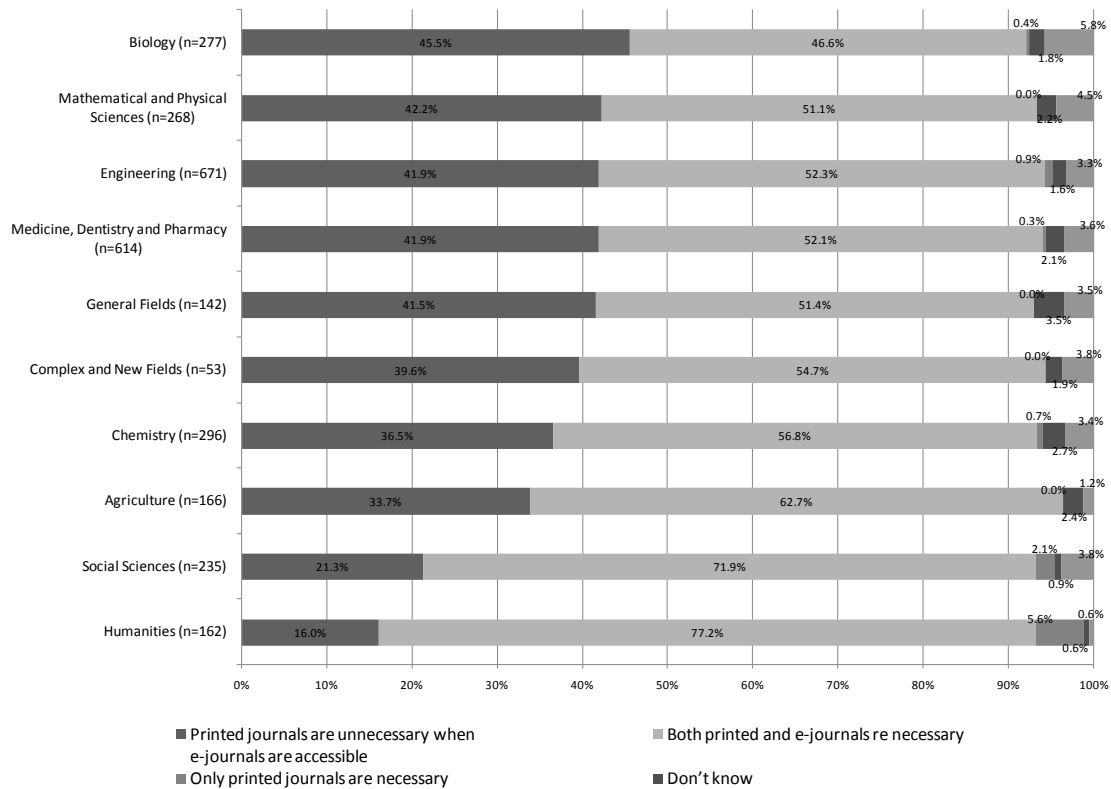


Figure 4-3 Necessity of printed journals

Looking at the data by the discipline (Figure 4-4), the percentage of respondents who thought both types of journals were necessary was high in Humanities and Social Sciences, and more Humanities scholars deemed only printed journals necessary than the respondents in any other discipline.

In Biology and Mathematical & Physical Sciences, the percentage of those who thought paper journals were unnecessary if e-journals were accessible was relatively high. Although

Chemistry shared a high frequency and width of e-journal use and titles (see “3-1 Frequency of use”) with these disciplines, the percentage of those who thought printed journals were unnecessary remained quite low at 36.5%. It showed that high frequency of e-journal use did not necessarily lead to a low regard for printed journals.



*Disciplines are placed according to the ratio of "printed journals are unnecessary when e-journals are accessible"

Figure 4-4 Necessity of printed journals: distribution by the discipline

#Comparison with past surveys

Figure 4-5 shows the percentage of each opinion about paper journals divided into JANUL and PULC universities. 55.0% at national universities and 59.3% at PULC answered that "both printed and e-journals are necessary."

JANUL (2001 and 2003) and PULC (2004) surveys had a question that asked whether they wanted to use paper journals even if there are e-journals, which was to be answered from "strongly agree," "somewhat agree," "somewhat disagree" and "strongly disagree." Strictly speaking, the question in the past surveys only asked about the respondents' present intentions, while the questions in this survey, namely "both printed and e-journals are necessary" and "only printed journals are necessary," also asked about the possibility of future use that was closely linked with preservation. That is to say, the questions in the present survey were more

open.

As shown in figure 4-6, in JANUL 2003, 67.7% wanted to use print journals even if there were e-journals (strongly agree 38%, somewhat agree 36.9%). In this survey, on the other hand, the percentage sum of the respondents at national universities who thought either both or only paper format necessary was 55.8%, showing a decrease in the ratio of those who deemed paper journals indispensable. The same tendency was confirmed in the comparison with PULC 2004, with 79.1% (strongly agree 48.1%, somewhat agree 38.0%) decreasing to 60.6% in this survey. Recognition for the need of printed journals had obviously changed in the meantime.

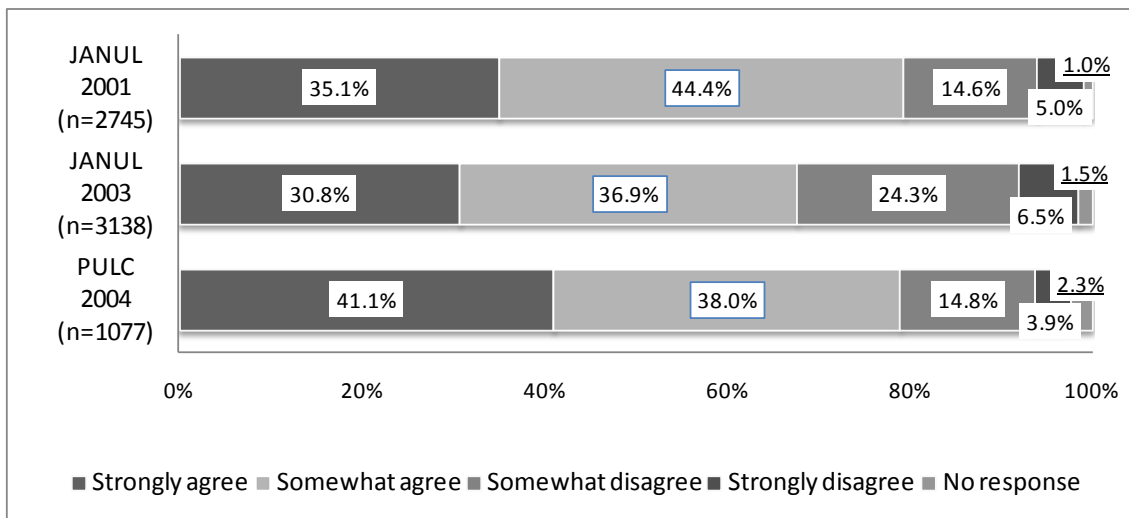


Figure 4-5 Necessity of printed journals: by institution type

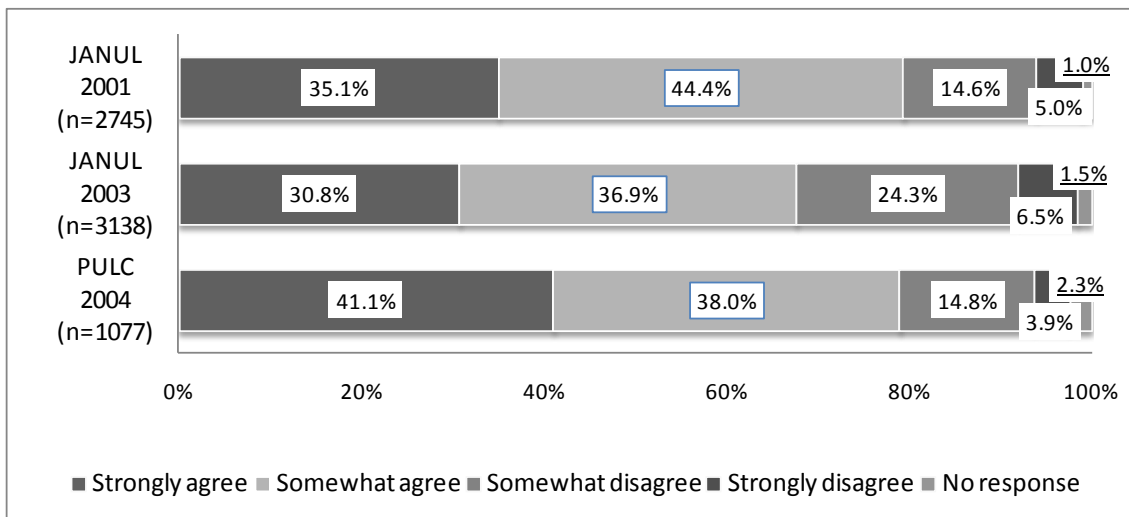


Figure 4-6 Necessity of printed journals: results of past surveys

4-3 Acquisition of articles from other sources than online and printed journals

Q. 19: What do you do when needed articles are available neither in e-journals nor printed journals?
(Multiple answers allowed)

This was a question that asked about the respondents' alternative behavior in a situation where needed articles were not to be obtained instantly, and 82.8% answered "request ILL to the library" (Table 4-4), showing a high visibility of this service among them. The percentages for other alternatives remained quite low: "search institutional repositories or author's web-site" at 18.3%, "ask the author via e-mail etc. to send offprint" at 11.9%, and "from the web-sites of publishers etc. on the Internet (credit-card transaction)" at 9.3%.

Looking at the data by the discipline, however, large differences surfaced (Table 4-5). While more than 90% in Humanities, Agriculture and Complex & New Fields chose the ILL service, only 67.2% in Mathematical & Physical Sciences and 71.8% in General Fields (Information Science, Neural Science, Geography, etc.) selected it. Moreover, while 36.9% in Mathematical & Physical Sciences and 43.0% in General Fields answered that they would resort to the institutional repositories and authors' cites on the Internet, the percentage of this behavior remained very low in other disciplines, particularly in Medicine, Dentistry & Pharmacy at 7.0%. Apart from General Fields, the custom of preprints exchanges among the scholars of Mathematical & Physical Sciences seems to have affected the result.

Table 4-4 Acquisition of articles from other sources than online and printed journals

	Faculty	Graduate Students	Others	Total
Request ILL to the library	1,244	1,054	94	2,392
	83.8%	81.6%	81.7%	82.8%
From the Web-sites of publishers etc. on the Internet (Credit-card transaction)	163	97	9	269
	11.0%	7.5%	7.8%	9.3%
Ask the author via e-mail etc. to send offprint	239	86	20	345
	16.1%	6.7%	17.4%	11.9%
Search Institutional Repositories or author's Web-site	259	251	19	529
	17.5%	19.4%	16.5%	18.3%
Other	92	104	15	211
	6.2%	8.1%	13.0%	7.3%
Total	1,484	1,291	115	2,890

Table 4-5 Acquisition of articles from other sources than online and printed journals
:by the discipline

	Humanities	Social Sciences	Mathematical & Physical Sciences	Biology	Chemistry	Engineering
Request ILL to the library	147 90.7%	185 78.7%	180 67.2%	236 85.2%	260 87.8%	550 82.0%
From the Web-sites of publishers etc. on the Internet (Credit-card transaction)	25 15.4%	34 14.5%	25 9.3%	20 7.2%	11 3.7%	49 7.3%
Ask the author via e-mail etc. to send offprint	13 8.0%	24 10.2%	54 20.1%	47 17.0%	28 9.5%	81 12.1%
Search Institutional Repositories or author's Web-site	25 15.4%	65 27.7%	99 36.9%	29 10.5%	27 9.1%	145 21.6%
Other	162	235	268	277	296	671

	Agriculture	Medicine, Dentistry & Pharmacy	General Fields	Complex & New Fields	Difficult to classify	Total	*Medicine
Request ILL to the library	150 90.4%	530 86.3%	102 71.8%	48 90.6%	4 66.7%	2392 82.8%	405 86.4%
From the Web-sites of publishers etc. on the Internet (Credit-card transaction)	7 4.2%	71 11.6%	18 12.7%	6 11.3%	3 50.0%	269 9.3%	63 13.4%
Ask the author via e-mail etc. to send offprint	13 7.8%	58 9.4%	16 11.3%	11 20.8%	0 0.0%	345 11.9%	45 9.6%
Search Institutional Repositories or author's Web-site	23 13.9%	43 7.0%	61 43.0%	12 22.6%	0 0.0%	529 18.3%	30 6.4%
Other	166	614	142	53	6	2890	469

Comparison with past surveys

Due to the lack of equivalent questions in the past surveys, comparison was impossible.

4-4 Online access to publications other than journals

Q. 20: *Have you ever used online publications other than journals? Please choose one that applies to you concerning the online, credit card purchases of PDF reports and books.*

As Table 4-6 shows, of the total 2,890 respondents, 73 (2.5%) chose "frequently used," 502 (17.4%) "have used," and 2,315 (80.1%) "never used," showing the use was very much limited.

Table 4-6 Online access to other publications than journals

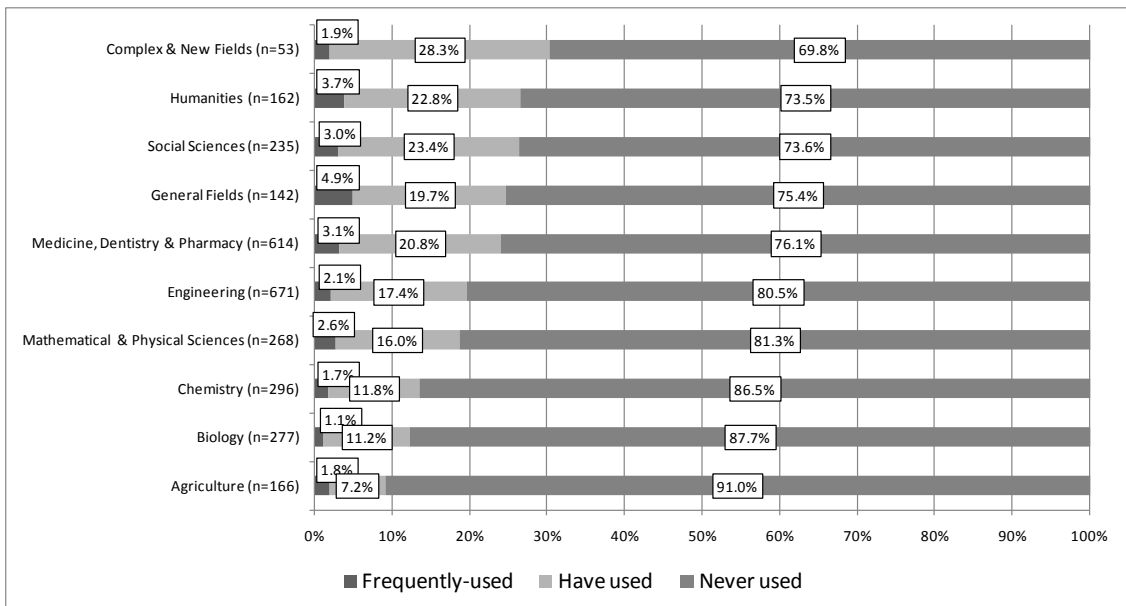
	Frequency	Percent
Frequently used	73	2.5
Have used	502	17.4
Never used	2,315	80.1
Total	2,890	100.0

The percentage of the respondents who had purchase experience (the sum of "frequently used" and "have used") was larger in Humanities and Social Sciences than in Natural Sciences, and also among faculty than among graduate students (Table 4-7).

Table 4-7 Online access to other publications than journals:
in total, by the discipline and position

	Natural Sciences		Humanities & Social Sciences		Total
	Faculty	Graduate Students	Faculty	Graduate Students	
Frequently used	32 2.4%	27 2.5%	4 2.3%	9 4.0%	72 2.6%
Have used	251 19.1%	136 12.8%	52 30.4%	38 16.7%	477 17.2%
Never used	1,030 78.4%	901 84.7%	115 67.3%	180 79.3%	2,226 80.2%
Total	1,313	1,064	171	227	2,775

Analyzed by the discipline, the percentages of those with purchase experience were relatively high in Complex & New Fields (30.2%), Humanities (26.5%), Social Sciences (26.4%), Medicine, Dentistry & Pharmacy (23.9%; 26.2% in Medicine alone), and General Fields (26.4%), while low in Agriculture (9.0%), Biology (12.3%) and Chemistry (13.5%). Even when only the “frequently used” responses were analyzed, the same tendency was found except in General Fields (Figure 4-6).



*Sorted according to the ratio of "never used."

Figure 4-7 Online access to other publications than journals: by the discipline

4-5 Frequency of and awareness for e-book use

Q. 21-1: How often do you use the following e-book platforms (services to provide PDF versions of published books on the Internet)? Please choose from the selections that apply to each platform. (Please choose one for each e-book site.)

Figure 4-8 shows the usage and recognition rate of each e-book cite. What was conspicuous at the first sight was the lack of publicity of e-book cites in general. Especially for the aggregate services like ebrary, NetLibrary and Safari (Safari Tech Books Online), the percentages of the respondents who chose "never heard" ranged from 88.1% to 94.8%. Even the Internet sites of major publishers, such as Cavendish Publishing (now Routledge-Cavendish offered at Taylor & Francis eBookstore) and Taylor & Francis, suffered the same anonymity, with the percentages of the same answer at 93.6% and 86.3% respectively. Some like ScienceDirect and SpringerLink, however, had relatively low percentages in this choice at 38.7% and 50.5%.

As for the usage, e-book sites of publishers were more likely to be utilized. Especially graduate students and faculty in Natural Sciences used the major publishers like ScienceDirect, SpringerLink at significant frequency. The percentages of the respondents in Natural Sciences who used ScienceDirect more than once a month were 40.2% with graduate students and 27.9% with faculty. For SpringerLink the percentages were, in the order of graduate students and faculty, 24.8% and 14.4%, and for Wiley InterScience, 14.0% and 8.4%. In Natural Sciences, more graduate students than faculty seemed to use these sites.

The usage rate in Humanities and Social Sciences was much smaller than that in Natural Sciences, but 6.5% of faculty and 5.7% of graduate students used ScienceDirect more than once a month. They were, in the order of faculty and graduate students, 3.5% and 4.4% for SpringerLink, 4.7% and 3.0% for Oxford Univ. Press and 3.5% and 2.6% for Cambridge Univ. Press (Table 4-8).

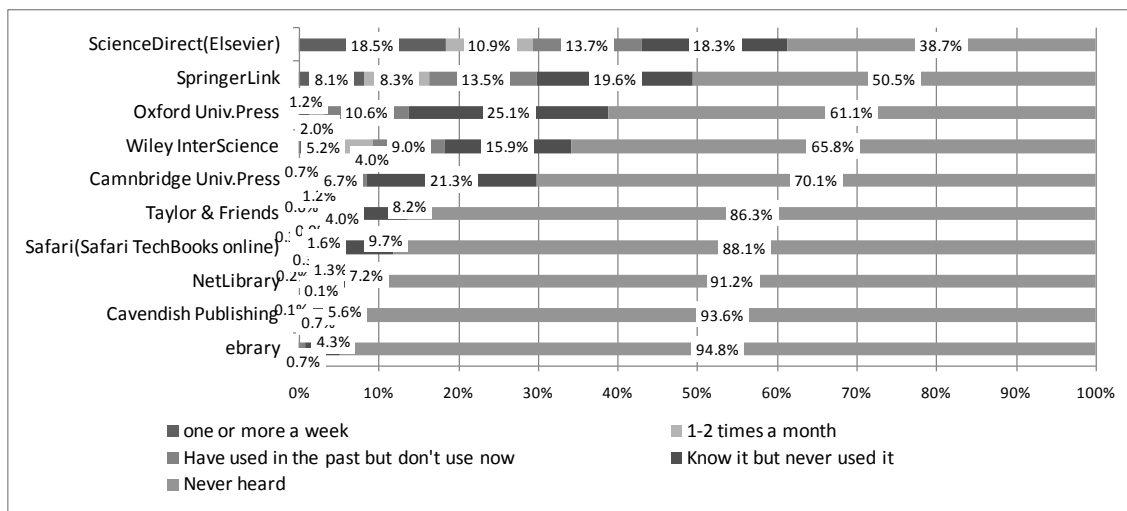


Figure 4-8 Frequency of e-books use and awareness

Table 4-8 Frequency of e-books use and awareness

NetLibrary	once or more a week	1-2 times a month	Have used in the past but don't use now	Know it but never used it	Never heard
Hum & SS - Faculty (n=171)	0.0%	0.0%	1.2%	12.3%	86.5%
Hum & SS - GS (n=227)	0.0%	0.0%	2.2%	7.5%	90.3%
Natural Sciences - Faculty (n=1313)	0.1%	0.0%	1.2%	7.2%	91.5%
Natural Sciences - GS (n=1064)	0.4%	0.3%	1.4%	6.5%	91.4%

Cambridge Univ. Press	once or more a week	1-2 times a month	Have used in the past but don't use now	Know it but never used it	Never heard
Hum & SS - Faculty (n=171)	1.2%	2.3%	6.4%	29.2%	60.8%
Hum & SS - GS (n=227)	0.4%	2.2%	8.4%	21.6%	67.4%
Natural Sciences - Faculty (n=1313)	0.8%	0.8%	6.6%	23.5%	68.3%
Natural Sciences - GS (n=1064)	0.5%	1.4%	6.8%	17.6%	73.8%

Ebrary	once or more a week	1-2 times a month	Have used in the past but don't use now	Know it but never used it	Never heard
Hum & SS - Faculty (n=171)	0.0%	0.0%	0.6%	6.4%	93.0%
Hum & SS - GS (n=227)	0.0%	0.0%	0.9%	4.0%	95.2%
Natural Sciences - Faculty (n=1313)	0.0%	0.1%	0.7%	4.6%	94.6%
Natural Sciences - GS (n=1064)	0.1%	0.2%	0.8%	4.0%	94.8%

Oxford Univ. Press	once or more a week	1-2 times a month	Have used in the past but don't use now	Know it but never used it	Never heard
Hum & SS - Faculty (n=171)	1.2%	3.5%	9.4%	27.5%	58.5%
Hum & SS - GS (n=227)	0.4%	2.6%	10.1%	26.0%	60.8%
Natural Sciences - Faculty (n=1313)	1.3%	1.7%	11.0%	26.3%	59.7%
Natural Sciences - GS (n=1064)	1.5%	2.3%	10.8%	22.8%	62.6%

Safari(Safari Tech Books Online)	once or more a week	1-2 times a month	Have used in the past but don't use now	Know it but never used it	Never heard
Hum & SS - Faculty (n=171)	0.0%	0.6%	2.3%	8.2%	88.9%
Hum & SS - GS (n=227)	0.9%	0.4%	2.6%	9.7%	86.3%
Natural Sciences - Faculty (n=1313)	0.5%	0.8%	4.6%	8.8%	85.4%
Natural Sciences - GS (n=1064)	0.8%	1.2%	4.1%	7.0%	86.9%

Wiley InterScience	once or more a week	1-2 times a month	Have used in the past but don't use now	Know it but never used it	Never heard
Hum & SS - Faculty (n=171)	0.6%	0.0%	6.4%	7.6%	85.4%
Hum & SS - GS (n=227)	0.4%	0.9%	2.6%	9.7%	86.3%
Natural Sciences - Faculty (n=1313)	4.5%	3.9%	11.1%	20.2%	60.3%
Natural Sciences - GS (n=1064)	8.2%	5.8%	8.5%	13.2%	64.4%

Taylor & Friends	once or more a week	1-2 times a month	Have used in the past but don't use now	Know it but never used it	Never heard
Hum & SS - Faculty (n=171)	0.0%	0.6%	2.9%	8.2%	88.3%
Hum & SS - GS (n=227)	0.0%	0.0%	0.9%	4.8%	94.3%
Natural Sciences - Faculty (n=1313)	0.5%	0.2%	1.3%	9.5%	88.5%
Natural Sciences - GS (n=1064)	0.3%	0.5%	2.0%	10.4%	86.8%

SpringerLink	once or more a week	1-2 times a month	Have used in the past but don't use now	Know it but never used it	Never heard
Hum & SS - Faculty (n=171)	1.2%	2.3%	5.3%	12.3%	78.9%
Hum & SS - GS (n=227)	3.1%	1.3%	4.0%	11.0%	80.6%
Natural Sciences - Faculty (n=1313)	6.3%	8.1%	15.8%	24.4%	45.4%
Natural Sciences - GS (n=1064)	13.2%	11.6%	14.8%	16.2%	44.4%

Cavendish Publishing	once or more a week	1-2 times a month	Have used in the past but don't use now	Know it but never used it	Never heard
Hum & SS - Faculty (n=171)	0.0%	0.0%	0.6%	5.3%	94.2%
Hum & SS - GS (n=227)	0.0%	0.0%	1.3%	10.1%	88.5%
Natural Sciences - Faculty (n=1313)	0.0%	0.1%	0.6%	6.1%	93.2%
Natural Sciences - GS (n=1064)	0.0%	0.3%	0.8%	5.2%	93.7%

ScienceDirect(Elsevier)	once or more a week	1-2 times a month	Have used in the past but don't use now	Know it but never used it	Never heard
Hum & SS - Faculty (n=171)	5.3%	1.2%	7.6%	12.9%	73.1%
Hum & SS - GS (n=227)	3.1%	2.6%	6.2%	10.1%	78.0%
Natural Sciences - Faculty (n=1313)	16.6%	11.3%	16.0%	22.2%	33.9%
Natural Sciences - GS (n=1064)	26.9%	13.3%	13.3%	16.1%	30.5%

4-6 Willingness to use e-books

Q21-2: *Would you like to try e-books in future or from now on? Please choose one that applies to you.*

60.1% of the whole respondents, 26.8% for "definitely want to use" and 33.3% for "generally want to use," showed their interest in trying e-books. Those who chose "don't want to use" were rather few at 5.9% (Table 4-9).

Table 4-9 Willingness to use e-books

	Frequency	Percentage
Definitely want to use	774	26.8
Generally want to use	962	33.3
Don't want to use	170	5.9
Don't know	984	34.0
Total	2890	100.0

By the age group, "definitely want to use" was the most frequent answer among those in their twenties, and the percentage decreased as the respondents' age increased. Conversely, the rates for "don't want to use" and "don't know" were higher according with the respondents' age (Table 4-10).

Table 4-10 Willingness to use e-books: by the age group

	Age Groups						Total
	20-29	30-39	40-49	50-59	60-69	70-	
Definitely want to use	354 32.7%	230 25.4%	146 25.1%	36 14.1%	8 12.9%	0 0.0%	774 26.8%
Generally want to use	347 32.0%	316 34.9%	174 29.9%	101 39.5%	24 38.7%	0 0.0%	962 33.3%
Don't want to use	41 3.8%	61 6.7%	40 6.9%	20 7.8%	7 11.3%	1 100.0%	170 5.9%
Don't know	342 31.5%	298 32.9%	222 38.1%	99 38.7%	23 37.1%	0 0.0%	984 34.0%
Total	1084	905	582	256	62	1	2890

Table 4-11 shows the respondents' willingness to use e-books, divided by the discipline (Natural Sciences and Humanities/Social Sciences) and by the position (faculty and graduate students). All disciplines and positions had more than 50% of affirmative response, the sum of "definitely want to use" and "generally want to use," although the percentage for "don't know" was also high about 30 to 40%.

Respondents in Natural Sciences showed more willingness to use e-books than those in Humanities and Social Sciences. Graduate students in Natural Sciences had an especially high percentage in choosing "definitely want to use." Humanities and Social Sciences graduate students had a high percentage in "generally want to use" but only a few chose "don't want to use." Among Humanities and Social Sciences faculty, on the other hand, the percentage of "don't want to use" amounted close to 15%.

Table 4-11 Willingness to use e-books: in total, by the discipline and position

	Natural Sciences		Humanities & Social Sciences		Total
	Faculty	Graduate Students	Faculty	Graduate Students	
Definitely want to use	307	385	23	30	745
	23.4%	36.2%	13.5%	13.2%	26.8%
Generally want to use	429	324	66	100	919
	32.7%	30.5%	38.6%	44.1%	33.1%
Don't want to use	85	50	25	7	167
	6.5%	4.7%	14.6%	3.1%	6.0%
Don't know	492	305	57	90	944
	37.5%	28.7%	33.3%	39.6%	34.0%
Total	1313	1064	171	227	2775

By the discipline, the percentage of "definitely want to use" exceed 30% in Chemistry, Agriculture, General Fields and Complex & New Fields. The same was true when Medicine alone was extracted from the field of Medicine, Dentistry & Pharmacy. More respondents chose "definitely want to use" than "generally want to use" in these research fields.

On the other hand, in Humanities, Social Sciences and Mathematical & Physical Sciences, the percentages for "definitely want to use" remained at, respectively, 9.9%, 15.7% and 22.4%.

Table 4-12 Willingness to use e-books: by the discipline

	Humanities	Social Sciences	Mathematical and Physical Sciences	Biology	Chemistry	Engineering	Agriculture	Medicine, Dentistry and Pharmacy	General Fields	Complex and New Fields	Difficult to classify	Total	* Medicine
Definitely want to use	16	37	60	74	97	184	54	175	54	19	4	774	144
	9.9%	15.7%	22.4%	26.7%	32.8%	27.4%	32.5%	28.5%	38.0%	35.8%	66.7%	26.8%	30.7%
Generally want to use	67	99	93	85	82	224	52	199	45	15	1	962	143
	41.4%	42.1%	34.7%	30.7%	27.7%	33.4%	31.3%	32.4%	31.7%	28.3%	16.7%	33.3%	30.5%
Don't want to use	16	16	11	11	16	42	11	37	7	3	0	170	35
	9.9%	6.8%	4.1%	4.0%	5.4%	6.3%	6.6%	6.0%	4.9%	5.7%	0.0%	5.9%	7.5%
Don't know	63	83	104	107	101	221	49	203	36	16	1	984	147
	38.9%	35.3%	38.8%	38.6%	34.1%	32.9%	29.5%	33.1%	25.4%	30.2%	16.7%	34.0%	31.3%
Total	162	235	268	277	296	671	166	614	142	53	6	2890	469

Table 4-13 is a cross tabulation of present usage and intention for future use of e-books. The respondents were grouped into three groups: "current users" refers to those who chose either "once or more a week" or "1-2 times a month" for any of the ten listed (Figure 4-8) or other e-book sites, "past users" are those who chose "used in the past but don't use now," and "non-users" corresponds to those who chose either " know it but never used it " or "never heard."

The result showed that about 90% of current users (63.6% for "definitely want to use" and 25.8% for "generally want to use") showed their intention to use e-books. In the non-user group, about a half (51.5%) responded they didn't know. Since they were non-users, the choice of "don't know" was a natural response. It was noteworthy that the percentage of adverse reaction, the choice of "don't want to use," was 9.0% even among the non-users who had the largest ratio of this selection. In a time when e-journals are quite prevalent in every

research field, e-books seem to await as large a welcome.

Table 4-13 Frequency of e-books use vs. Willingness to use e-books

		Willingness to use e-books				Total
		Definitely want to use	Generally want to use	Don't want to use	Don't know	
Frequency of e-books use	Current users	574	233	9	87	903
		63.6%	25.8%	1.0%	9.6%	100.0%
	Past users	108	227	26	122	483
		22.4%	47.0%	5.4%	25.3%	100.0%
	Non-users	92	502	135	775	1,504
		6.1%	33.4%	9.0%	51.5%	100.0%
	Total	774	962	170	984	2,890

III Result 2: Reading of academic journal articles

5 Patterns in academic article reading and information seeking

5-1 Amount of reading

Q1: In the last 4 weeks, approximately how many scholarly articles have you read? Articles can include those found in journal issues, Web sites, or separate copies such as preprints, reprints, and other electronic or paper copies. Reading is defined as going beyond the table of contents, title, and abstract to the body of the article.

The mean number of scholarly articles read in the past four weeks was 13.15 (n=2,840). The average value was slightly higher among faculty (14.63, n=1484) than among graduate students (11.85, n=1,291). According to a recent survey by Tenopir, King, etc, the amount of reading varies with the field of study. In this survey, faculty and graduate students in Chemistry read the most (mean number is 21.39), followed by those in Medicine, Dentistry & Pharmacy, and Biology (Table 5-1).

Table 5-1 Amount of reading by the discipline

	Humanities	Social Sciences	Mathematical & Physical Sciences	Biology	Chemistry	Engineering	Agriculture	Medicine, Dentistry & Pharmacy	General Fields	Complex & New Fields
Respondents	162	235	268	277	296	671	166	614	142	53
Mean	12.41	11.24	9.92	14.57	21.39	10.49	12.43	15.21	9.75	9.13
Median	10	10	8	10	15	10	10	10	8	5
Mode	10	10	10	10	10	10	10	10	10	5

5-2 Format and source of the article read most recently

Q9: In what form was the article when last read? (Choose only the one best answer.)

**Journal in paper form*

**Photocopy of journal in paper form*

**Online computer screen*

**Previously downloaded/saved and read, on computer screen*

**Downloaded and printed PDF etc.*

**Other (Please specify: _____)*

In the following sections, we examine the results obtained concerning the article read by each of the survey participants most recently. Table 5-2 shows the format and source of such articles. Nearly 70% of the articles were from electronic sources, and most of them were “printed out articles in e-journals.” About 20% of articles were still from printed journals (including both personal and institutional subscriptions). The sources of articles read by faculty and graduate students were quite similar.

Table 5-2 Format of the article read most recently: by the position

	Faculty	Graduate Student	Others	Total
Journal in paper form	288	235	35	558
	19.7%	18.5%	31.8%	19.6%
Photocopy of journal in paper form	80	115	10	205
	5.5%	9.1%	9.1%	7.2%
Online computer screen	81	41	5	127
	5.5%	3.2%	4.5%	4.5%
Previously downloaded/saved and read, on computer screen	56	23	4	83
	3.8%	1.8%	3.6%	2.9%
Downloaded and printed PDF etc.	928	841	52	1,821
	63.6%	66.2%	47.3%	64.1%
Other	27	15	4	46
	1.8%	1.2%	3.6%	1.6%
Total	1,460	1,270	110	2,840

The sources differed by the discipline (Table 5-3). Faculty and graduate students in Humanities still heavily relied on printed journals (60.5%), while nearly 90 % of those in Biology acquired the articles from electronic sources.

Table 5-3 Format of the article read most recently: by the discipline

	Disciplines											Total
	Humanities	Social Sciences	Mathematical & Physical Sciences	Biology	Chemistry	Engineering	Agriculture	Medicine, Dentistry & Pharmacy	General Fields	Complex & New Fields	Difficult to classify	
Journal in paper form	95	99	34	19	18	128	26	99	25	13	2	558
	60.5%	42.7%	13.0%	6.9%	6.1%	19.5%	15.8%	16.4%	18.2%	25.5%	33.3%	19.6%
Photocopy of journal in paper form	29	37	18	10	11	45	11	26	12	6	0	205
	18.5%	15.9%	6.9%	3.6%	3.7%	6.8%	6.7%	4.3%	8.8%	11.8%	0.0%	7.2%
Online computer screen	4	5	6	8	24	22	9	40	6	3	0	127
	2.5%	2.2%	2.3%	2.9%	8.2%	3.3%	5.5%	6.6%	4.4%	5.9%	0.0%	4.5%
Previously downloaded/saved and read, on computer screen	0	3	8	4	12	22	7	22	5	0	0	83
	0.0%	1.3%	3.1%	1.4%	4.1%	3.3%	4.2%	3.6%	3.6%	0.0%	0.0%	2.9%
Downloaded and printed PDF etc.	22	79	189	230	228	429	112	412	89	27	4	1,821
	14.0%	34.1%	72.4%	83.3%	77.6%	65.2%	67.9%	68.3%	65.0%	52.9%	66.7%	64.1%
Other	7	9	6	5	1	12	0	4	0	2	0	46
	4.5%	3.9%	2.3%	1.8%	0.3%	1.8%	0.0%	0.7%	0.0%	3.9%	0.0%	1.6%
Total	157	232	261	276	294	658	165	603	137	51	6	2,840

5-3 Method taken to find the article most recently read (Information seeking behavior)

Q8: How did you initially find out about this last article you read? Choose only the one best answer.

Information seeking patterns, or how researchers learned about the articles they read most recently, are shown in Table 5-4. Patterns in article searching were classified into three groups. The first group obtained the articles in the course of browsing. The second group searched in the secondary information resources. The third group found the articles in other ways such as alert services of electronic journals, citations in publications, personal informers, etc. Browsing and online search each comprised about 40% of article searching behavior, while other methods stayed at about 20%.

Table5-4 Method taken to find the article read most recently: by the position

		Faculty	Graduate Student	Others	Total
Browsing	Browsing a personal print subscription	139	65	6	210
		9.5%	5.1%	5.5%	7.4%
	Browsing a personal electronic subscription	26	13	3	42
		1.8%	1.0%	2.7%	1.5%
	Browsing a library print subscription	58	37	15	110
		4.0%	2.9%	13.6%	3.9%
	Browsing a library electronic subscription	389	250	27	666
	26.6%	19.7%	24.5%	23.5%	
Browsing a print subscription copy in a school, department, unit, etc. collection		34	38	3	75
		2.3%	3.0%	2.7%	2.6%
Browsing other electronic collection		19	12	1	32
		1.3%	0.9%	0.9%	1.1%
Online Search	Searching an indexing/abstracting database	374	393	13	780
		25.6%	30.9%	11.8%	27.5%
	Searching Web search engine	76	105	4	185
		5.2%	8.3%	3.6%	6.5%
Searching Online journal collections through web sites of publishers		69	81	11	161
		4.7%	6.4%	10.0%	5.7%
Others	Sent to me as a part of an alerting service	42	13	2	57
		2.9%	1.0%	1.8%	2.0%
	Received from a listserv or news group	17	4	0	21
		1.2%	0.3%	0.0%	0.7%
	Cited in another publication	73	96	9	178
		5.0%	7.6%	8.2%	6.3%
	Another person (e.g., a colleague) told me about it	100	50	12	162
	6.8%	3.9%	10.9%	5.7%	
Academic supervisor told me (as for Graduate students)		2	86	1	89
		0.1%	6.8%	0.9%	3.1%
Don't know or other		42	27	3	72
		2.9%	2.1%	2.7%	2.5%
Total		1460	1270	110	2840

Information seeking patterns also differed by the discipline (Table 5-5). Online searches in the A & I databases retrieved about 40-50% of the articles in Medicine, Dentistry & Pharmacy, Biology and Agriculture, while the rate remained at 15-20% in other fields.

Table 5-5 Method taken to find the article read most recently: by the discipline

		Discipline											Total
		Humanities	Social Sciences	Mathematical & Physical Sciences	Biology	Chemistry	Engineering	Agriculture	Medicine, Dentistry & Pharmacy	General Fields	Complex & New Fields	Difficult to classify	
Browsing	Browsing a personal print subscription	40	39	5	6	6	46	11	43	11	3	0	210
		25.5%	16.8%	1.9%	2.2%	2.0%	7.0%	6.7%	7.1%	8.0%	5.9%	0.0%	7.4%
	Browsing a personal electronic subscription	0	3	6	1	7	12	1	8	4	0	0	42
		0.0%	1.3%	2.3%	0.4%	2.4%	1.8%	0.6%	1.3%	2.9%	0.0%	0.0%	1.5%
	Browsing a library print subscription	11	25	11	3	6	24	2	18	6	3	1	110
		7.0%	10.8%	4.2%	1.1%	2.0%	3.6%	1.2%	3.0%	4.4%	5.9%	16.7%	3.9%
	Browsing a library electronic subscription	11	24	74	70	137	160	35	123	20	10	2	666
	7.0%	10.3%	28.4%	25.4%	46.6%	24.3%	21.2%	20.4%	14.6%	19.6%	33.3%	23.5%	
Browsing a print subscription copy in a school, department, unit, etc. collection		14	16	7	2	1	23	2	7	1	1	1	75
		8.9%	6.9%	2.7%	0.7%	0.3%	3.5%	1.2%	1.2%	0.7%	2.0%	16.7%	2.6%
Browsing other electronic collection		4	3	10	0	1	8	1	4	1	0	0	32
		2.5%	1.3%	3.8%	0.0%	0.3%	1.2%	0.6%	0.7%	0.7%	0.0%	0.0%	1.1%
Online Search	Searching an indexing/abstracting database	21	40	44	126	59	115	66	280	21	8	0	780
		13.4%	17.2%	16.9%	45.7%	20.1%	17.5%	40.0%	46.4%	15.3%	15.7%	0.0%	27.5%
	Searching Web search engine	8	15	23	15	8	58	7	16	31	3	1	185
		5.1%	6.5%	8.8%	5.4%	2.7%	8.8%	4.2%	2.7%	22.6%	5.9%	16.7%	6.5%
Searching Online journal collections through web sites of publishers		1	8	9	10	30	72	9	9	7	6	0	161
		0.6%	3.4%	3.4%	3.6%	10.2%	10.9%	5.5%	1.5%	5.1%	11.8%	0.0%	5.7%
Others	Sent to me as a part of an alerting service	1	1	3	13	10	9	2	16	1	1	0	57
		0.6%	0.4%	1.1%	4.7%	3.4%	1.4%	1.2%	2.7%	0.7%	2.0%	0.0%	2.0%
	Received from a listserv or news group	2	2	3	3	0	2	1	5	1	2	0	21
		1.3%	0.9%	1.1%	1.1%	0.0%	0.3%	0.6%	0.8%	0.7%	3.9%	0.0%	0.7%
	Cited in another publication	14	22	24	9	11	49	14	23	8	3	1	178
		8.9%	9.5%	9.2%	3.3%	3.7%	7.4%	8.5%	3.8%	5.8%	5.9%	16.7%	6.3%
	Another person (e.g., a colleague) told me about it	14	15	22	11	7	39	7	30	12	5	0	162
	8.9%	6.5%	8.4%	4.0%	2.4%	5.9%	4.2%	5.0%	8.8%	9.8%	0.0%	5.7%	
Academic supervisor told me (as for Graduate students)		8	10	11	4	7	20	5	12	6	6	0	89
		5.1%	4.3%	4.2%	1.4%	2.4%	3.0%	3.0%	2.0%	4.4%	11.8%	0.0%	3.1%
Don't know or other		8	9	9	3	4	21	2	9	7	0	0	72
		5.1%	3.9%	3.4%	1.1%	1.4%	3.2%	1.2%	1.5%	5.1%	0.0%	0.0%	2.5%
Total		157	232	261	276	294	658	165	603	137	51	6	2840

5-4 Age of the article read most recently

Q3: *Approximately what year was this article published/posted?*

Distribution of the age of articles is shown in Table 5-6. Articles published within a year accounted for about a half of the total (46.8%), and those from 2 to 5 years old (28.9%) followed.

Table 5-6 Age of the article read most recently

	Frequency	Percentage
Over 15 years (1846~1992)	222	7.8
11 years - 15 years (1993~1997)	115	4.1
6 years - 10 years (1998~2002)	353	12.4
2 years - 5 years (2003~2006)	820	28.9
1st year(2007 -)	1,326	46.8
Total	2,836	100.0

Distribution of the age of articles also differed by the discipline (Table 5-7). In Biology, Chemistry, and Medicine, Dentistry & Pharmacy, articles published within a year took up nearly 60%. The percentages for Humanities and Social Sciences, however, were not small either (36.9% and 32.3%).

Table 5-7 Age of the article read most recently: by the discipline

	Humanities	Social Sciences	Mathematical & Physical Sciences	Biology	Chemistry	Engineering	Agriculture	Medicine, Dentistry & Pharmacy	General Fields	Complex & New Fields	Difficult to classify	Total
Over 15 years (1846~1992)	28 17.8%	30 12.9%	39 15.0%	9 3.3%	15 5.1%	63 9.6%	11 6.7%	14 2.3%	8 5.8%	3 5.9%	2 33.3%	222 7.8%
11 years - 15 years (1993~1997)	8 5.1%	11 4.7%	22 8.5%	7 2.5%	9 3.1%	30 4.6%	9 5.5%	7 1.2%	9 6.6%	2 3.9%	1 16.7%	115 4.1%
6 years - 10 years (1998~2002)	26 16.6%	40 17.2%	41 15.8%	22 8.0%	20 6.8%	103 15.7%	22 13.3%	48 8.0%	22 16.1%	8 15.7%	1 16.7%	353 12.4%
2 years - 5 years (2003~2006)	37 23.6%	76 32.8%	67 25.8%	71 25.7%	75 25.6%	218 33.2%	47 28.5%	161 26.7%	47 34.3%	20 39.2%	1 16.7%	820 28.9%
1st year (2007 -)	58 36.9%	75 32.3%	91 35.0%	167 60.5%	174 59.4%	242 36.9%	76 46.1%	373 61.9%	51 37.2%	18 35.3%	1 16.7%	1,326 46.8%
Total	157	232	260	276	293	656	165	603	137	51	6	2,836

The age of articles differed, though slight, also by the position (Table 5-8). While the professors who read the articles published within a year amounted to more than 60%, the graduate students who did so were less than 40%.

Table 5-8 Age of the article read most recently: by the position

	Positions									Total
	Professor	Associate professor	Lecturer	Assistant professor	Research assistant	Fellow or Researcher	Graduate student (Doctoral course)	Other	Graduate student (Master course)	
Over 15 years (1846~1992)	12 3.8%	30 8.5%	7 4.9%	27 5.7%	7 8.6%	7 8.1%	120 9.5%	11 10.8%	1 12.5%	222 7.8%
11 years - 15 years (1993~1997)	9 2.8%	8 2.3%	6 4.2%	17 3.6%	3 3.7%	2 2.3%	63 5.0%	6 5.9%	1 12.5%	115 4.1%
6 years - 10 years (1998~2002)	33 10.4%	33 9.3%	11 7.6%	49 10.3%	8 9.9%	15 17.4%	191 15.1%	12 11.8%	1 12.5%	353 12.4%
2 years - 5 years (2003~2006)	63 19.9%	98 27.8%	39 27.1%	132 27.7%	28 34.6%	28 32.6%	402 31.7%	27 26.5%	3 37.5%	820 28.9%
1st year (2007 -)	200 63.1%	184 52.1%	81 56.3%	251 52.7%	35 43.2%	34 39.5%	493 38.8%	46 45.1%	2 25%	1,326 46.8%
Total	317	353	144	476	81	86	1269	102	8	2,836

Table 5-9 shows the distribution of the age of articles by the format. The format most frequently used was "Downloaded & printed (e.g., printed out PDF)." Excluding the articles published "over 15 years" before, the rate of this format exceeded 60% in all groups.

Table 5-9 Age of the article read most recently: by the format

	Journal in paper form	Photocopy of journal in paper form	Online computer screen	Previously downloaded/saved and read, on computer screen	Downloaded and printed PDF etc.	Other	Total
Over 15 years (1846~1992)	64 28.8%	63 28.4%	4 1.8%	3 1.4%	85 38.3%	3 1.4%	222 100.0%
11 years - 15 years (1993~1997)	24 20.9%	15 13.0%	3 2.6%	2 1.7%	69 60.0%	2 1.7%	115 100.0%
6 years - 10 years (1998~2002)	49 13.9%	43 12.2%	15 4.2%	10 2.8%	228 64.6%	8 2.3%	353 100.0%
2 years - 5 years (2003~2006)	138 16.8%	54 6.6%	22 2.7%	30 3.7%	562 68.5%	14 1.7%	820 100.0%
1st year (2007 -)	283 21.3%	30 2.3%	83 6.3%	38 2.9%	873 65.8%	19 1.4%	1,326 100.0%
Total	558 19.7%	205 7.2%	127 4.5%	83 2.9%	1,817 64.1%	46 1.6%	2,836 100.0%

5-5 Reading behavior (pattern)

5-5-1 Time spent for reading an article

Q5: Please indicate your best estimate of the time in minutes that you spent reading this article most recently.

The average amount of time spent for reading an article was 68.97 minutes (both the mode and the median were 30 minutes). Faculty took less time (54.90) than graduate students (86.64). The figures were considerably large compared with those found in other investigations on the reading patterns of researchers in the U. S. A.

About 60% of faculty spent 30 minutes or less for reading an article, and more than 80% of them were placed in the bracket of 60 minutes or less. On the other hand, only 40% of graduate students read an article within 30 minutes (Table 5-10).

Table 5-10 Time spent for reading an article: by the position

	Time spent in last reading							Total
	1-30 minutes	31-60 minutes	61-90 minutes	91-120 minutes	121-150 minutes	151-180 minutes	over 180 minutes	
Faculty	861 59.0%	357 24.5%	46 3.2%	109 7.5%	4 0.3%	31 2.1%	52 3.6%	1460 100.0%
Graduate students	528 41.6%	325 25.6%	61 4.8%	168 13.2%	11 0.9%	73 5.7%	104 8.2%	1270 100.0%
Total	1389 50.9%	682 25.0%	107 3.9%	277 10.1%	15 0.5%	104 3.8%	156 5.7%	2730 100.0%

5-5-2 Location for reading articles

Q10: *Where were you when you read this article?*

Most of researchers (84.9%) did their reading “in the office.” The second most popular location was “at home” (27.0%), and “in vehicles on the road” followed that (Table 5-11).

Table 5-11 Location for reading articles (n=2840, multiple answer)

	Frequency	Percentage
In my office or lab	2411	84.9
In the University library	125	4.4
At home	768	27.0
In vehicles on the road	519	18.3
Other	45	1.6

The location for reading articles varied with the field of study. Both faculty and graduate students of the natural sciences read articles overwhelmingly in their offices or labs (88.6% and 90.7%). On the other hand, about a half of the faculty and graduate students in Humanities and Social Sciences, 57.4% and 55.9% respectively, did their reading "in the office or lab" and the other half "at home" (Table 5-12).

Table 5-12 Location for reading articles: by the discipline (n=2840, multiple answer)

	Natural Sciences		Humanities and Social Sciences		Total
	Faculty	Graduate Students	Faculty	Graduate Students	
In my office or lab	1,144 88.6%	952 90.7%	97 57.4%	123 55.9%	2,316 84.8%
In the University library	29 2.2%	44 4.2%	12 7.1%	30 13.6%	115 4.2%
At home	264 20.4%	295 28.1%	85 50.3%	107 48.6%	751 27.5%
In vehicles on the road	215 16.7%	211 20.1%	31 18.3%	50 22.7%	507 18.6%
Other	21 1.6%	14 1.3%	2 1.2%	6 2.7%	43 1.6%
Total	1,291	1,050	169	220	2,730

5-5-3 Articles with familiar contents

Q6: *Prior to your first reading of this article, did you know about the information reported or discussed in this article?*

45.8% (n=2,840) of faculty and graduate students had known the contents of articles prior to actual reading. There were slight differences depending on the position and the field of study.

How the knowledge of article contents came by is shown in Table 5-13. The most frequent was “journal article” (51.5%), and “conference/workshop” (28.4%) and "informal

discussions with colleagues" (23.0%) followed.

Table 5-13 How the knowledge of article contents was acquired
(n=1378, multiple answer)

	Frequency	Percentage
Conference/Workshop	391	28.4
Informal discussions with colleagues	317	23.0
Listserv or news group	61	4.4
Journal article	709	51.5
E-mail from colleague	56	4.1
Eprint server (e.g.arXiv.org)	30	2.2
Web site of author	62	4.5
Suggestion from teacher (Graduate students)	169	12.3
Other	234	17.0

6 Purpose and effect of reading academic articles

6-1 Allocation of work time

Q27: What percentage of your work time do you spend doing the following? (The total should equal 100%)

We asked our survey participants to separate their work time into 7 components: "Research & writing," "Teaching and instruction (including TA)," "Working as an administrator," "Service to school, faculty or university," "Service to academic society," "Consulting/advising to company, government etc." and "Other."

Looking at the median values, they spent 59% of their time on "Research & writing," followed by 20% on "Teaching and instruction," 5% on "Service to academic society" and 3% on "Service to school, faculty or university" (Table 6-1).

The mean values of faculty showed that they spent 40% of their time for "Research & writing," 25% for "Teaching and instruction," 10% for "Service to school, faculty or university" and 5% each for "Working as an administrator" and "Service to academic society." Faculty could afford less than a half of their work time for their research activities, and at the percentile rank of 75 it finally exceeded a half and reached 55% (Table 6-2). Meanwhile, graduate students spent 80% of their time on "Research & writing" (Table 6-3).

Table 6-1 Allocation of work time (All)

	Research and writing	Teaching and instruction (including TA)	Working as an administrator	Service to school, faculty or university	Service to academic society	Consulting/ advising to company	Other
Mean	54.86	19.41	6.20	6.39	7.69	1.84	11.74
Median	59	20	0	3	5	0	0
Mode	80	10	0	0	5, 10	0	0
Std. Deviation	31.52	16.19	12.81	9.50	8.27	6.09	22.64
Percentiles	25	30	5	0	0	2	0
	50	59	20	0	3	5	0
	75	80	30	10	10	10	10

Table 6-2 Allocation of work time (Faculty)

	Research and writing	Teaching and instruction (including TA)	Working as an administrator	Service to school, faculty or university	Service to academic society	Consulting/ advising to company	Other
Mean	39.99	26.05	8.79	10.42	7.59	2.29	12.82
Median	40	25	5	10	5	0	0
Mode	30	30	0	10	5	0	0
Std. Deviation	23.04	15.84	13.15	9.91	6.16	4.92	22.57
Percentiles	25	20	10	0	5	5	0
	50	40	25	5	10	5	0
	75	55	35	10	15	10	20

Table 6-3 Allocation of work time (Graduate students)

	Research and writing	Teaching and instruction (including TA)	Working as an administrator	Service to school, faculty or university	Service to academic society	Consulting/ advising to company	Other
Mean	71.93	12.33	1.42	1.18	7.90	1.31	10.33
Median	80	10	0	0	5	0	0
Mode	80	10	0	0	0	0	0
Std. Deviation	31.25	12.92	6.15	5.70	10.28	7.26	22.32
Percentiles	25	60	3	0	0	0	0
	50	80	10	0	0	5	0
	75	90	20	0	0	10	0

6-2 Main purpose of reading academic articles

Q12: For what purposes have you used, or do you plan to use, the information obtained from the article you last read?

a. Principal Purpose (choose only one):

Reading patterns differ depending on whether it is the first-reading or re-reading. In this survey, 26.5% of the respondents (754 of 2,840) answered that their most recent reading was re-reading of an article they had read before. We examined the purpose of reading for the rest of respondents (73.5%, 2,086 of 2,840) who read the articles for the first time.

Over a half of respondents (54.4 %, 1,134 of 2,086) read articles principally for "Advancing ongoing research," followed by "Current awareness/keeping up" (19.3%, 402), "Writing reports, articles, etc" (11.1%, 232) and "Teaching, lecture, seminar etc" (6.5%, 136) (Table 6-4). The principal purpose of reading was found to be closely linked to their research activities. However, 16.2% (21 of 130) of faculty in Humanities and Social Sciences read articles primarily for "Teaching: lecture, seminar etc." (Table 6-5).

In the Medicine, Dentistry & Pharmacy group, less than a half of respondents (46.9%, 222 of 473) read articles for "Advancing ongoing research," while nearly one-fourth (24.1%, 114) chose "Current awareness/keeping up." The researchers in these disciplines seemed more intent upon acquiring latest information (Table 6-6).

Table 6-4 Main purpose of reading academic articles

	Frequency	Percentage
Advancing ongoing research	1,134	54.4
Teaching: lecture, seminar etc.	136	6.5
Administration (University, School or Faculty)	0	0.0
Current awareness/keeping up	402	19.3
Writing proposals	53	2.5
Writing reports, articles, etc.	232	11.1
Referee reading	38	1.8
Consulting, advising other researchers	18	0.9
Presentations	40	1.9
Other	32	1.5
Don't know	1	0.0
Total	2,086	100.0

Table 6-5 Main purpose of reading academic articles: by the position

	Natural Sciences		Humanities and Social sciences		Total
	Faculty	Graduate students	Faculty	Graduate students	
Advancing ongoing research	538 54.0%	394 54.5%	67 51.5%	92 59.0%	1091 54.4%
Teaching: lecture, seminar etc.	69 6.9%	36 5.0%	21 16.2%	10 6.4%	136 6.8%
Administration (University, School or Faculty)	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%
Current awareness/keeping up	197 19.8%	147 20.3%	21 16.2%	17 10.9%	382 19.0%
Writing proposals	35 3.5%	10 1.4%	0 0.0%	3 1.9%	48 2.4%
Writing reports, articles, etc.	93 9.3%	96 13.3%	10 7.7%	26 16.7%	225 11.2%
Referee reading	27 2.7%	4 0.6%	4 3.1%	2 1.3%	37 1.8%
Consulting, advising other researchers	8 0.8%	6 0.8%	0 0.0%	0 0.0%	14 0.7%
Presentations	11 1.1%	21 2.9%	4 3.1%	4 2.6%	40 2.0%
Other	19 1.9%	9 1.2%	3 2.3%	1 0.6%	32 1.6%
Don't know	0 0.0%	0 0.0%	0 0.0%	1 0.6%	1 0.0%
Total	997	723	130	156	2006

Table 6-6 Main purpose of reading academic articles: by the field

	Disciplines											Total
	Humanities	Social Sciences	Mathematical & Physical Sciences	Biology	Chemistry	Engineering	Agriculture	Medicine, Dentistry & Pharmacy	General Fields	Complex & New Fields	Difficult to classify	
Advancing ongoing research	62 51.7%	96 57.8%	103 59.9%	114 51.8%	120 54.5%	271 58.0%	58 51.8%	222 46.9%	66 64.7%	17 58.6%	5 100.0%	1,134 54.4%
Teaching: lecture, seminar etc.	14 11.7%	17 10.2%	9 5.2%	21 9.5%	11 5.0%	12 2.6%	13 11.6%	33 7.0%	6 5.9%	0 0.0%	0 0.0%	136 6.5%
Administration (University, School or Faculty)	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%
Current awareness/keeping up	22 18.3%	16 9.6%	29 16.9%	35 15.9%	50 22.7%	92 19.7%	25 22.3%	114 24.1%	13 12.7%	6 20.7%	0 0.0%	402 19.3%
Writing proposals	0 0.0%	3 1.8%	5 2.9%	6 2.7%	7 3.2%	12 2.6%	2 1.8%	15 3.2%	2 2.0%	1 3.4%	0 0.0%	53 2.5%
Writing reports, articles, etc.	17 14.2%	20 12.0%	18 10.5%	30 13.6%	22 10.0%	49 10.5%	9 8.0%	57 12.1%	8 7.8%	2 6.9%	0 0.0%	232 11.1%
Referee reading	1 0.8%	5 3.0%	4 2.3%	1 0.5%	3 1.4%	14 3.0%	2 1.8%	6 1.3%	1 1.0%	1 3.4%	0 0.0%	38 1.8%
Consulting, advising other researchers	0 0.0%	0 0.0%	3 1.7%	2 0.9%	1 0.5%	10 2.1%	0 0.0%	0 0.0%	2 2.0%	0 0.0%	0 0.0%	18 0.9%
Presentations	3 2.5%	5 3.0%	1 0.6%	8 3.6%	2 0.9%	4 0.9%	1 0.9%	11 2.3%	3 2.9%	2 6.9%	0 0.0%	40 1.9%
Other	1 0.8%	3 1.8%	0 0.0%	3 1.4%	4 1.8%	3 0.6%	2 1.8%	15 3.2%	1 1.0%	0 0.0%	0 0.0%	32 1.5%
Don't know	0 0.0%	1 0.6%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	1 0.0%
Total	120	166	172	220	220	467	112	473	102	29	5	2,086

6-3 Secondary purposes of reading academic articles

b. Secondary Purpose(s)--If you read the article for more than one purpose, what were your secondary purposes for reading it? (Choose all that apply.)

We asked participants to specify their secondary purposes if they had. 33.1% of respondents (691 of 2,086) chose "Current awareness/keeping up," followed by "Writing reports,

articles, etc" (31.7%, 662) and "Advancing ongoing research" (26.3%, 548), "Presentations" (18.3%, 381), and "Writing proposals" (15.2%, 317). As seen in the main purpose, many read the articles to advance their researches. Only 4 respondents (0.2%) had no secondary purposes, showing that participants had multiple intentions in acquiring the articles they read most recently (Table 6-7).

In the faculty group, 18.0% of respondents (203 of 1127) read the articles for "Teaching: lecture, seminar etc." This tendency was especially remarkable among professors (23.6%, 61 of 259) and associate professors (20.4%, 58 of 285), suggesting that they utilized the articles both for research and instructing purposes (Table 6-8).

Table 6-7 Secondary purpose of reading academic articles

	Frequency	Percentage
Advancing ongoing research	548	26.3
Teaching: lecture, seminar etc.	254	12.2
Administration (University, School or Faculty)	15	0.7
Current awareness/keeping up	691	33.1
Writing proposals	317	15.2
Writing reports, articles, etc.	662	31.7
Referee reading	85	4.1
Consulting, advising other researchers	196	9.4
Presentations	381	18.3
Other	49	2.3
No secondary purpose	4	0.2
Don't know	216	10.4
Total	2,086	100.0

Table 6-8 Secondary purpose of reading academic articles: by the field

	Faculty	Graduate Students	Other	Total
Advancing ongoing research	281 24.9%	247 28.1%	20 25.0%	548 26.3%
Teaching: lecture, seminar etc.	203 18.0%	50 5.7%	1 1.3%	254 12.2%
Administration (University, School or Faculty)	11 1.0%	3 0.3%	1 1.3%	15 0.7%
Current awareness/keeping up	391 34.7%	273 31.1%	27 33.8%	691 33.1%
Writing proposals	180 16.0%	119 13.5%	18 22.5%	317 15.2%
Writing reports, articles, etc.	356 31.6%	278 31.6%	28 35.0%	662 31.7%
Referee reading	54 4.8%	27 3.1%	4 5.0%	85 4.1%
Consulting, advising other researchers	137 12.2%	55 6.3%	4 5.0%	196 9.4%
Presentations	165 14.6%	205 23.3%	11 13.8%	381 18.3%
Other	30 2.7%	19 2.2%	0 0.0%	49 2.3%
No secondary purpose	3 0.3%	1 0.1%	0 0.0%	4 0.2%
Don't know	98 8.7%	106 12.1%	12 15.0%	216 10.4%
Total	1,127	879	80	2,086

6-4 Effects of reading academic articles

Q13: *In what ways did the reading of the article affect the principal purpose? Choose all that apply.*

The survey participants were also asked how their latest reading of an article worked in relation to their main purposes. Multiple answers were allowed and the result showed that the reading affected their research activities in positive ways. Over 60% of respondents (63.3%, 1,321 of 2,086) selected "It narrowed/broadened/changed the focus," followed by "It inspired new thinking/ideas" (47.9%, 999) and "It improved the result" (23.1%, 481) (Table 6-9).

On the other hand, time and labor saving did not appear to be included in their reading purposes. For example, only 8.3% (174) thought "It saved time and other resources" and 7.0% (147) thought "It resulted in faster completion of the purpose." The percentages, however, grew lower as the age of participants increased (Table 6-10).

Table 6-9 Effects of reading academic articles

	Frequency	Percentage
It improved the result	481	23.1
It narrowed/broadened/changed the focus	1,321	63.3
It inspired new thinking/ideas	999	47.9
It resulted in collaboration/joint research	63	3.0
It resulted in faster completion of the purpose	147	7.0
It resolved technical problems	198	9.5
It saved time or other resources	174	8.3
It wasn't helpful; it wasted my time	108	5.2
Other	26	1.2
Total	2,086	100.0

Table 6-10 Effects of reading academic articles: by age group

	Age group						Total
	20-29	30-39	40-49	50-59	60-69	70-	
It improved the result	149	164	112	46	10	0	481
	20.2%	25.3%	24.5%	22.9%	23.8%	0.0%	23.1%
It narrowed/broadened/changed the focus	483	406	286	124	22	0	1321
	65.4%	62.8%	62.6%	61.7%	52.4%	0.0%	63.3%
It inspired new thinking/ideas	371	330	204	81	13	0	999
	50.2%	51.0%	44.6%	40.3%	31.0%	0.0%	47.9%
It resulted in collaboration/joint research	18	20	13	9	3	0	63
	2.4%	3.1%	2.8%	4.5%	7.1%	0.0%	3.0%
It resulted in faster completion of the purpose	51	49	35	9	3	0	147
	6.9%	7.6%	7.7%	4.5%	7.1%	0.0%	7.0%
It resolved technical problems	76	70	29	20	3	0	198
	10.3%	10.8%	6.3%	10.0%	7.1%	0.0%	9.5%
It saved time or other resources	59	54	41	20	0	0	174
	8.0%	8.3%	9.0%	10.0%	0.0%	0.0%	8.3%
It wasn't helpful; it wasted my time	35	29	25	10	9	0	108
	4.7%	4.5%	5.5%	5.0%	21.4%	0.0%	5.2%
Other	10	8	4	4	0	0	26
	1.4%	1.2%	0.9%	2.0%	0.0%	0.0%	1.2%
Total	739	647	457	201	42	0	2,086

6-5 Contribution of the article to the main purpose

Q14: How important is the information contained in this article to achieving your principal purpose?

55.0% of the respondents (1,148 of 2,086) answered that the articles they read were “Somewhat important” for their main purposes. Adding 29.1% (606) who thought they were “Very important” to this, 84.1% of participants recognized the positive contribution of the articles. Meanwhile only 4.0% (84) considered the contribution “Somewhat unimportant” and “Not at all important,” suggesting that the majority felt the information contained in their latest reading contributed to their main purposes (Table 6-11).

These figures show that researchers were searching and retrieving appropriate articles to achieve their main purposes.

Table 6-11 Contribution of the article to the main purpose

	Frequency	Percentage
Very important	606	29.1
Somewhat important	1,148	55.0
Yes and no	248	11.9
Somewhat unimportant	75	3.6
Not all important	9	0.4
Total	2,086	100.0

IV Comments and Opinions

7. Issues and desires surrounding the use of academic e-journals

Respondents were asked to write freely on "issues and desires surrounding the use of academic e-journals" as Q22, and we obtained 1,771 responses. Since the number of total respondents was 2,890, the response rate was 61.3%, quite high for a free comment question. It needs to be added here that there were 1,701 responses after those bearing answers resembling "nothing in particular" were dismissed. Summaries of these comments follow, but the original responses with minimum editing are collected in the appendix.

1) Improvement of access environment

Majority of comments were on the access environment: about 900 desiring access "from home," about 110 "from travel destination" and about 40 "from everywhere" (responses overlapped partly). Clearly, many desired access from outside their schools. The sample answer to the question actually read "want to use it from home," and it might have drawn out the same answer from the respondents. There were indeed 192 answers in exactly the same wording. Even dismissing these, however, as many as half of the respondents desired access from outside school. Some commented, "It's convenient because it's accessible from home," but such voices were rather exceptional. Even when the environment permitted access from home, some respondents pointed out instability of connection and complication of procedure. Desire for off-campus access was not exclusive to the users of certain attribute but quite extensive.

2) Upgrades and expansion of contents

Concerning the desired contents, many wanted older articles published before 1980 and found it inconvenient that they could only view articles published within ten years. Desire for older articles were also voiced among scholars of Natural Sciences. As for journals, many wanted to see more articles written in Japanese digitized and journal titles further enhanced (for example, minor titles, and those published in Europe). Other than journals themselves, there were voices that wanted access to conference proceedings (including preprints) and e-books.

3) Improvement of system function

Some voiced their desire for a simplified procedure for copying services, such as online requests, for easier reference management, for tools to manage downloaded PDF files, and for more intelligent search functions. Others voiced their dissatisfaction with the quality of images in PDFs and also their confusing file names.

4) Opinions attributable to each school

There were comments that seem to have derived from contract conditions of e-journals at respondents' affiliated universities. Some desired for implementation of certain services and for subscription to certain journals (some, despite their high impact factors, were not subscribed to). Others pointed out that the journals with limited simultaneous access (such as SciFinder) were quite hard to use.

5) Opinions in general

Some pointed out that there was a large divide among universities in the e-journal access environment they offer and that it needed to be closed. Others thought all academic articles should be openly accessed and that the prices of e-journals were too high. Still others voiced their opinion about the benefits of paper-print journals as well as their anxiety about e-journal access after an annulment of contract ("wonder if I can really view the contracted journals even after the cancellation.")

8. Desires and opinions concerning the future services of library

In Q23, we asked the respondents to write freely of their "desires and opinions concerning the future services of library," and 1,243 of them responded. The total number of survey respondents was 2,890, so the response rate was 42%. A little short of 10% of the responses read either "nothing" or "nothing in particular" and about 5% "satisfied with the services offered now," suggesting that there was a certain segment of users who were satisfied, though the degree might vary, with the present library services. We might add here that responses partly overlapped with those for Q22 ("Issues and desires surrounding the use of academic e-journals"), and that they were quite diverse and sometimes contradictory to each other. Summaries below lack the comprehensiveness of these diverse opinions and desires; please refer to the appendix where all comments are collected with minimum editing.

1) Enhancement of library services

Concerning the operating hours of the library, there were voices desiring for "the extension of opening hours," "24-hour operation" and "more operating days." While there were a certain number of comments that gave credit to the present ILL service, some saw room for improvement. For example, some desired for the service where PDF files were sent attached to e-mails in order to save time, for the conversion of documents into PDF files because images did not show well in black/white photocopies, for the enhancement of ILL service with overseas institutions, and for the simplification of ILL procedure.

Some respondents wanted more advanced services such as librarians' instructions on information gathering, development of consulting services and workshops, and establishment of the section where users could consult about copyrights. Others wanted to enjoy certain services of library even when charged, if it stayed within the range of actual costs.

2) Enhancement of library collection

As in the case with Q22, many wanted an increase in e-journal titles and digitization of Japanese journals. Concerning library materials, various opinions were collected, such as expansion of library collection in paper-based materials, foreign books and e-books, digitization of old books, and realization of full-text searches. Although this is also related to Q22, some desired continued subscription to paper-based journals for the purpose of browsing.

3) Library staff

Although opinions about library staff were not many, some thought they needed their expertise strengthened and evened out and that their qualities might be declining. There were also voices that wanted staffing of librarians who had intimate knowledge of computer systems, electronic information management, and retrieval technique. Still others thought specialization of information search skills and librarians with rich knowledge in their own

areas of expertise were wanted. Some feared that the quality of librarians in terms of expertise declined due to the increase of temporary and contract staff.

4) Opinions in general

Some respondents desired for services that were already offered in overseas universities (extension of opening hours and translation service) on the premise that the budget allotment would increase. There were also some who wanted to see a promotion of inter-library cooperation in services and e-journal contracts and of service provision to people outside school.

As a whole, the respondents seem to have set the service standard where they could access and read articles in e-journals when needed without actually going to the library, and to have wanted the same or similar convenience when they had to use other means. Also, there were desires that seem to have been voiced due to the respondents' ignorance of the services already offered at their university libraries. This tendency was also seen in Section 9, "Issues and desires surrounding the use of academic e-journals." As some respondents pointed out, probably "library is not doing enough promotional activities."

V Other Demographics

9 Scholarly attainments and research funds

9-1 Scholarly attainments

Q. 28: *In the past two years, how many of the following have you published?*

- a. _____ *Articles in refereed scholarly journals*
- b. _____ *Non-refereed articles*
- c. _____ *Chapters/parts in scholarly books, proceedings, etc.*
- d. _____ *Scholarly books*
- e. _____ *Other (please specify)* _____

As seen in Table 9-1, faculty had published average 7.43 articles in refereed scholarly journals in the past two years. The mean value, however, was 5, and the standard deviation was quite large at 10.98, suggesting that the distribution was quite variable. When all types of publications—refereed journals, non-refereed journals, chapters in books/proceedings, whole books and other—were put together, the values of mean and median were, respectively, 12.75 and 8.

Refereed articles by graduate students, however, were rather few compared with faculty at mean=1.62, median=1 and mode=0, and 426 (34.9%) of them reported that they had published no refereed papers in the past 2 years. Faculty and graduate students seemed to differ greatly in their publication of research attainment, and it was considered that these two groups could not be properly analyzed within the same framework.

Table 9-2 shows the number of faculty's published articles by the discipline. Chemistry (n=146) scored the highest in all values of mean (11.21), median (8), 75th percentile (14.25) and mode (10), while Humanities (n=67) came lowest at mean=1.78, median=1, 75th percentile=2 and mode=1. In the fields of Natural Sciences, not only Chemistry but also Mathematical & Physical Sciences, Engineering and Agriculture had the mean values ranging from 4 to 5, while they stayed from 1 to 2 in the fields within Humanities & Social Sciences, showing a large gap in output quantities between them. Scholars in Engineering, General Fields, Medicine, Dentistry & Pharmacy, Social Sciences and Humanities published relatively more articles in non-refereed journals, while in Chemistry and Biology the number of such articles was very small. As for writing chapters in scholarly books, proceedings and others, the mean values were under 1 in all disciplines, but Humanities, Social Sciences, and Medicine, Dentistry & Pharmacy had 1 for their 75th percentile values and their mean values were also relatively high. In all types of articles including those specified as "Other," the number of articles was large in Engineering, Chemistry and General Fields and small in Humanities and Social Sciences.

Articles in refereed academic journals

		Faculty	Graduate Students	Total
Responses	valid	1,423	1,220	2,754
	missing	61	73	138
Mean		7.43	1.62	4.73
Median		5	1	2
Mode		2	0	0
Std. Deviation		10.98	2.20	8.63
Min		0	0	0
Max		180	33	180
Percentile	25	2	0	1
	50	5	1	2
	75	10	2	5

Articles in non-refereed academic journals

		Faculty	Graduate Students	Total
Responses	valid	1,350	1,132	2,583
	missing	134	161	309
Mean		2.90	0.91	1.98
Median		1	0	0
Mode		0	0	0
Std. Deviation		5.46	2.54	4.44
Min		0	0	0
Max		67	50	67
Percentile	25	0	0	0
	50	1	0	0
	75	3	1	2

Chapters in books, proceedings, etc.

		Faculty	Graduate Students	Total
Responses	valid	1,310	1,080	2,492
	missing	174	213	400
Mean		2.18	0.57	1.43
Median		1	0	0
Mode		0	0	0
Std. Deviation		3.85	2.01	3.21
Min		0	0	0
Max		46	40	46
Percentile	25	0	0	0
	50	1	0	0
	75	3	0	2

Entire books

		Faculty	Graduate Students	Total
Responses	valid	1,231	1,048	2,373
	missing	253	245	519
Mean		0.52	0.23	0.38
Median		0	0	0
Mode		0	0	0
Std. Deviation		1.90	1.87	1.86
Min		0	0	0
Max		30	53	53
Percentile	25	0	0	0
	50	0	0	0
	75	0	0	0

In total, including those specified as "Other"

		Faculty	Graduate Students	Total
Responses	valid	1,440	1,251	2,804
	missing	44	40	86
Mean		12.75	3.32	8.30
Median		8	2	4
Mode		4	0	2
Std. Deviation		15.21	6.11	12.64
Min		0	0	0
Max		220	106	220
Percentile	25	4	1	2
	50	8	2	4
	75	15	4	10

Table 9-1 Number of scholarly attainments in the past 2 years

Table 9-2 Number of scholarly attainments in the past 2 years: faculty only, by the discipline

Articles in refereed academic journals														
		Humanities	Social Sciences	Mathematical and Physical Sciences	Biology	Chemistry	Engineering	Agriculture	Medicine, Dentistry and Pharmacy	General Fields	Complex and New Fields	Unable to classify	*Medicine	
Responses	valid	67	85	156	125	146	306	63	397	58	20	N/A	311	
	missing	9	7	8	2	3	11	2	16	2	1		10	
Mean		1.78	2.01	9.08	6.56	11.21	8.59	6.46	6.80	9.36	6.55		6.63	
Median		1	2	5	4	8	5	5	4	3	5		4	
Mode		1	0	2	2	10	5	2*	2	3	2*		2	
Std. Deviation		1.88	2.24	17.57	6.26	10.75	10.78	5.04	8.02	23.05	4.67		8.13	
Min		0	0	0	0	0	0	0	0	0	1		0	
Max		10	13	180	35	65	100	22	50	120	20		50	
Percentile	25	1	0	3	2	5	3	3	2	1.75	3		2	
	50	1	2	5	4	8	5	5	4	3	5		4	
	75	2	3	10	9	14.25	10	10	10	6.25	9.75		8	
Articles in non-refereed academic journals														
		Humanities	Social Sciences	Mathematical and Physical Sciences	Biology	Chemistry	Engineering	Agriculture	Medicine, Dentistry and Pharmacy	General Fields	Complex and New Fields		Unable to classify	*Medicine
Responses	valid	73	83	152	116	135	292	56	369	54	20	N/A	293	
	missing	3	9	12	11	14	25	9	44	6	1		28	
Mean		2.75	3.16	1.75	1.05	1.13	4.18	1.96	3.29	5.94	2.35		3.68	
Median		2	2	1	0	0	2	1	2	2	1		2	
Mode		1	0*	0	0	0	0	0	0	0	0		0	
Std. Deviation		6.00	4.21	2.56	1.61	2.24	6.67	3.70	5.37	11.90	3.86		5.60	
Min		0	0	0	0	0	0	0	0	0	0		0	
Max		50	20	13	10	15	60	18	50	67	15		50	
Percentile	25	1	1	0	0	0	0	0	0	0	0		0	
	50	2	2	1	0	0	2	1	2	2	1		2	
	75	3	4	3	2	2	5	2	4	5	2.75		5	
Chapters in books, proceedings, etc.														
		Humanities	Social Sciences	Mathematical and Physical Sciences	Biology	Chemistry	Engineering	Agriculture	Medicine, Dentistry and Pharmacy	General Fields	Complex and New Fields		Unable to classify	*Medicine
Responses	valid	65	78	145	112	136	286	58	359	51	20	N/A	282	
	missing	11	14	19	15	13	31	7	54	9	1		39	
Mean		1.62	2.04	1.55	1.36	1.78	2.35	1.50	2.78	3.76	1.10		3.01	
Median		1	2	1	1	1	1	1	2	1	0		2	
Mode		0	2	0	0	0	0	1	0	0	0		0	
Std. Deviation		1.60	1.89	3.27	2.55	4.39	4.53	1.93	3.97	6.14	1.65		4.25	
Min		0	0	0	0	0	0	0	0	0	0		0	
Max		8	10	20	20	46	40	10	30	30	6		30	
Percentile	25	0	1	0	0	0	0	0	0	0	0		0	
	50	1	2	1	1	1	1	1	2	1	0		2	
	75	3	3	2	2	2	3	2	4	4	2		4	
Entire books														
		Humanities	Social Sciences	Mathematical and Physical Sciences	Biology	Chemistry	Engineering	Agriculture	Medicine, Dentistry and Pharmacy	General Fields	Complex and New Fields		Unable to classify	*Medicine
Responses	valid	62	73	137	102	126	274	55	334	48	20	N/A	264	
	missing	14	19	27	25	23	43	10	79	12	1		57	
Mean		0.68	0.71	0.50	0.33	0.53	0.34	0.42	0.73	0.38	0.25		0.76	
Median		0	0	0	0	0	0	0	0	0	0		0	
Mode		0	0	0	0	0	0	0	0	0	0		0	
Std. Deviation		1.08	2.42	3.08	0.90	1.49	0.92	1.50	2.35	1.06	0.91		2.41	
Min		0	0	0	0	0	0	0	0	0	0		0	
Max		6	20	30	7	10	6	8	30	5	4		30	
Percentile	25	0	0	0	0	0	0	0	0	0	0		0	
	50	0	0	0	0	0	0	0	0	0	0		0	
	75	1	1	0	0	0	0	0	1	0	0		1	
Total														
		Humanities	Social Sciences	Mathematical and Physical Sciences	Biology	Chemistry	Engineering	Agriculture	Medicine, Dentistry and Pharmacy	General Fields	Complex and New Fields		Unable to classify	*Medicine
Responses	valid	75	89	157	125	146	307	63	400	58	20	N/A	314	
	missing	1	3	7	2	3	10	2	13	2	1		7	
Mean		6.99	8.11	12.68	9.10	14.66	15.26	10.03	12.97	19.31	10.75		13.42	
Median		5	6	8	7	10	10	8	9	9	10.5		9	
Mode		4	4	2*	4	10	7	4*	3	5	12		3	
Std. Deviation		8.71	8.81	20.59	8.17	15.40	15.33	7.49	13.23	30.80	6.93		13.91	
Min		0	0	0	0	0	0	0	0	1	2		0	
Max		71	63	220	39	116	125	30	81	168	27		81	
Percentile	25	4	4	4	3	6	6	4	4	5	5.5		4	
	50	5	6	8	7	10	10	8	9	9	10.5		9	
	75	8	10	15	12	16	20	14	15	19	13.75		16	

Note: Figures with an asterisk show the minimum mode where multiple modes existed.

9-2 Number of co-authors and sources of research funds

Q. 29: The questions below concern your latest published reviewed article.

- a. How many co-authors did you have? _____
- b. Where did you get the fund for your reviewed article (please choose all that apply):
 - _____ From Government (for example, Grant-in-Aid for Scientific Research)
 - _____ From Foundation
 - _____ From Companies
 - _____ Special fund in your university
 - _____ Regular fund in your university
 - _____ Other (please specify) _____:

9-2-1 Number of co-authors

Of 2,205 articles reported by the respondents, 205 (9.3%) were single-authored and 2,000 (90.7%) were co-authored (with 1 or more co-authors). The average number of authors was 5.33.

Table 9-3 Number of co-authors of the latest published reviewed article

Number of Co-authors	Frequency	Percentage
0	205	9.3
1	177	8
2	256	11.6
3	331	15
4	321	14.6
5	356	16.1
6	192	8.7
7	109	4.9
8	114	5.2
9	26	1.2
>9	118	5.4
Total	2,205	100

9-2-2 Research funds

Table 9-4 shows faculty's sources of research funds for the latest articles by the discipline (n=1,322). More than 80% of the funds in Natural Sciences—Biology (89.9%), Agriculture (86.4%), Mathematical & Physical Sciences (82.2%) and Chemistry (81.1%)—were governmental, such as Grant-in-Aid for Scientific Research, while the same source was quite limited in Humanities (47.1%) and Social Sciences (47.5%). The disciplines with higher percentages of foundation funds were Chemistry (18.9%), Biology (17.6%), Agriculture (16.9%),

and Medicine, Dentistry & Pharmacy (16.7%; 18.7% in only Medicine). Complex & New Fields and Engineering relied on company funds to a large degree, at 20% and 19.9% respectively. As a whole, researchers in Natural Sciences were more often funded by the government, foundations and companies (54.9%), while those in Humanities and Social Sciences relied more on regular funds in their universities (52.5%). In Social Sciences, furthermore, the percentage of inter-university special funds was higher than any other fields at 20.3%.

Table 9-4 Funding source for the latest published reviewed article:
Faculty only, by the discipline

	Humanities	Social Sciences	Mathematical & Physical Sciences	Biology	Chemistry	Engineering	Agriculture	Medicine, Dentistry & Pharmacy	General Fields	Complex & New Fields	Unable to classify	*Medicine
Government grant	28	42	172	171	195	366	88	302	62	22	2	224
	29.5%	34.1%	79.3%	84.7%	75.3%	65.0%	76.5%	62.3%	62.6%	53.7%	50.0%	60.9%
Foundation grant	3	9	17	32	49	58	15	79	9	2	0	66
	3.2%	7.3%	7.8%	15.8%	18.9%	10.3%	13.0%	16.3%	9.1%	4.9%	0.0%	17.9%
Industry grant or contract	1	3	6	11	29	110	7	51	13	7	1	37
	1.1%	2.4%	2.8%	5.4%	11.2%	19.5%	6.1%	10.5%	13.1%	17.1%	25.0%	10.1%
University-provided special grant	9	16	27	19	33	62	7	61	16	3	1	49
	9.5%	13.0%	12.4%	9.4%	12.7%	11.0%	6.1%	12.6%	16.2%	7.3%	25.0%	13.3%
University-provided usual grant	43	48	62	46	80	175	31	152	38	10	1	117
	45.3%	39.0%	28.6%	22.8%	30.9%	31.1%	27.0%	31.3%	38.4%	24.4%	25.0%	31.8%
Other	25	35	3	5	8	29	4	44	4	5	0	35
	26.3%	28.5%	1.4%	2.5%	3.1%	5.2%	3.5%	9.1%	4.0%	12.2%	0.0%	9.5%
Total	95	123	217	202	259	563	115	485	99	41	4	368

9-3 Awards

Q. 30: In the past two years, have you received any awards or special recognition for your research or other profession-related contributions?

_____ Yes

_____ No

Table 9-5 shows the number and ratio of faculty who answered that they had received awards and special recognition for their research within two years (n=1,415). The percentages were higher in Complex & New Fields (35.0%), General Fields (27.6%), Engineering (31.6%) and Chemistry (28.7%) and lower in Humanities (6.8%) and Social Sciences (7.1%). It should be noted here, however, that the population in Complex & New Fields was rather small (n=20).

Table 9-5 Awards or special recognition:
Faculty only, by the discipline

	Humanities	Social Sciences	Mathematical & Physical Sciences	Biology	Chemistry	Engineering	Agriculture	Medicine, Dentistry & Pharmacy	General Fields	Complex & New Fields	Total	*Medicine
Had Awards or Special Recognition in last 2 years	5	6	20	21	41	96	10	65	16	7	287	46
	6.8%	7.1%	12.8%	17.2%	28.7%	31.6%	16.1%	16.6%	27.6%	35.0%	20.3%	15.0%
Number of respondents	74	85	156	122	143	304	62	391	58	20	1,415	306

10 Personal subscriptions to academic journals

Q. 31: How many professional journals do you personally subscribe to, without the mediation of the library, including those that come with your membership to professional societies? (Personal subscriptions are those personally and directly addressed to you at your home, office or lab.)

- a. Subscriptions paid by myself
- b. Subscriptions purchased with grant fund or other sources for my personal use
- c. Subscriptions purchased with grant fund or other sources for shared use with my group or department
- d. Of all subscriptions indicated in a, b and c, how many are exclusively electronic subscriptions?

The number of subscriptions varied greatly. 34.1% of the respondents reported that they did not purchase any journals at their own expenses. Faculty (75th percentile=4) purchased more journals than graduate students (75th percentile=2). The number of personal subscriptions seemed to increase according with the respondents' age, and those in their 60s (mode=2.5) bought more journals than those in any other age group. Humanity scholars (mode=2) personally subscribed to more journals than scholars in any other research field (mode=0). Researchers in medicine and other related fields had their 75th percentile value at 5, higher than in any other field. There was no clear difference between respondents at PULC and JANUL either in their 50th or 75th percentile values.

Table 10-1 Number of subscriptions paid personally:
in total, by the discipline and position

		Natural Sciences		Humanities & Social Sciences	
		Faculty	Graduate Students	Faculty	Graduate Students
Responses	valid	1,313	1,064	171	227
	missing	0	0	0	0
Mean		3.12	2.10	3.11	3.70
Median		2	1	2	2
Mode		0	0	0	0
Std. Dev		13.77	23.11	3.12	20.09
Min		0	0	0	0
Max		463	745	17	300
Percentile	25	0	0	1	1
	50	2	1	2	2
	75	4	2	5	3

Table 10-2 Number of subscriptions paid personally: by the discipline

		Humanities	Social Sciences	Mathematical & Physical Sciences	Biology	Chemistry	Engineering	Agriculture	Medicine, Dentistry & Pharmacy	General Fields	Complex & New Fields	Unable to classify	*Medicine
Responses	valid	162	235	268	277	296	671	166	614	142	53	6	469
	missing	0	0	0	0	0	0	0	0	0	0	0	0
Mean		3.14	3.65	4.71	1.71	1.58	1.73	1.96	3.99	1.87	3.75	2.83	4.16
Median		2	2	1	1	1	1	1	2	1	2	1	2
Mode		2	0	0	0	0	0	0	0	0	0	1	0
Std. Dev		4.47	19.58	46.00	5.57	2.07	2.38	2.30	19.58	2.11	10.91	3.76	21.97
Min		0	0	0	0	0	0	0	0	0	0	0	0
Max		50	300	745	90	15	30	13	463	10	80	10	463
Percentile	25	1	0	0	0	0	0	0	0	0	1	1	0
	50	2	2	1	1	1	1	1	2	1	2	1	2
	75	4	4	2	2	2	3	3	5	3	4	6	5

13.2% of the respondents answered that they purchased journals with their research grant or other sources. There was no clear difference either among the research subjects or between faculty and graduate students, and the values of 75th percentile were generally 0. The respondents in Humanities and Social Sciences were the exception here, with their 75th percentile at 2.

Moreover, 6.9% responded that they subscribed to journals for shared use with their groups and departments paid by their research grant or other sources. Here again there was no clear difference among the research fields or between faculty and graduate students.

Looked as a whole, 74.6% of the respondents purchased academic journals either privately, with their own research grants or other sources, or with grant or other sources for shared use. Faculty (median=3) purchased more journals than graduate students (median=1). By the age group, the respondents in their 60s (75th percentile=7.25) bought more journals than other groups, and those who purchased none occupied only 9.7% of the whole respondents. Although respondents in Humanities, Social Sciences and Medicine (including other related fields) did not show any difference either in their 50th and 75th percentile values, both mode and median values in Humanities were higher than any other discipline at 3 (Table 10-4). Furthermore, 90% of the respondents in Humanities purchased academic journals with some sort of grants or funding, and this percentage was also higher than in any other fields.

Table 10-3 Total number of personal subscriptions: by the age group

		20-29	30-39	40-49	50-59	60-69	70-79
Responses	valid	1084	905	582	256	62	1
	missing	0	0	0	0	0	0
Mean		1.90	4.28	4.95	4.65	5.26	1.00
Median		1	2	3	4	3.5	1
Mode		0	0	0	4	3	1
Std. Dev		5.54	27.32	19.81	3.81	5.09	-
Min		0	0	0	0	0	1
Max		100	745	465	22	21	1
Percentile	25	0	1	1	2	2	1
	50	1	2	3	4	3.5	1
	75	2	4	5	6	7.25	1

Table 10-4 Total number of personal subscriptions: by the discipline

		Humanities	Social Sciences	Mathematical and Physical Sciences	Biology	Chemistry	Engineering	Agriculture	Medicine, Dentistry and Pharmacy	General Fields	Complex and New Fields	Unable to classify	*Medicine
Responses	valid	162	235	268	277	296	671	166	614	142	53	6	469
	missing	0	0	0	0	0	0	0	0	0	0	0	0
Mean		4.17	4.73	5.06	2.23	2.43	2.45	2.74	4.96	2.65	6.04	3.33	5.23
Median		3	3	1	1	1	2	2	3	2	2	1	3
Mode		3	0	0	0	0	0	0	0	0	1	1	0
Std. Dev		5.07	19.89	45.98	5.71	6.29	2.96	3.28	19.79	3.21	14.31	4.13	22.21
Min		0	0	0	0	0	0	0	0	0	0	0	0
Max		50	300	745	90	100	30	23	465	20	100	10	465
Percentile	25	1	1	0	0	0	0	1	1	1	1	1	1.00
	50	3	3	1	1	1	2	2	3	2	2	1	3
	75	5	5	2	3	3	3	4	5	3	5	8	5

Among the respondents who personally subscribed to academic journals either with their own research grants or other sources, those who exclusively subscribed to electronic journals were extremely limited.