

SCREAL Report: Results of a Survey on
Information Access and E-journal Usage of
Researchers and Graduate Students, 2011

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c/o Yoshinori Sato

Faculty of Letters

Tohoku Gakuin University

1-3-1, Tsuchitai, Aoba-ku, Sendai, Miyagi, 980-8511 JAPAN

Foreword

The SCREAL (Standing Committee for Research on Academic Libraries) was founded in March of 2007 with an aim to support and coordinate various efforts of academic communication and research on universities/libraries and thus to promote the development of Library and Information Sciences and actual services of the library. Since its inception the committee has been conducting large-scale surveys on e-journal usage by researchers and other related issues.

This is the report of our second survey conducted in 2011. The preceding survey in 2007 found that more than 90 % of its respondents engaged in natural sciences (Chemistry, Biology, Medicine/Dentistry/Pharmacy, Mathematics/Physics, Agriculture and Engineering) utilized e-journals “more than once a month.” More than a half of the respondents in Chemistry, Biology and Medicine/Dentistry/Pharmacy, furthermore, were found to use e-journals “almost everyday.” The 2007 survey showed how e-journals, started in the late 1990s, had grown to become indispensable media in an extremely short span. This is the second of our surveys; we expanded the target institutions from 25 to 45, partially revised our questionnaire items, and conducted the survey to see how researchers now used and thought of the digital information, including e-journals, which kept evolving over the time.

Some parts of the survey results were made public in scholarly meetings and journals.^{1&2} To sum them up:

- 1) In the fields of natural sciences, more than 90 % of researchers now used e-journals more than once a month. In many fields, moreover, more than a half replied they used them almost everyday. This tendency was affirmed to be common to our respondents despite the fact that they belonged to various types of research institutions.
- 2) Even in the fields of humanities and social sciences, more than 70 % now used e-journals more than once a month.
- 3) The ratio of those who considered the printed version unnecessary grew much larger since the 2007 survey. It showed that the user’s awareness, as the usage of e-journals was being firmly established, went through steady changes.
- 4) The potential demand for e-books was extremely high.

This report details these and related findings. We hope it will be a collection of primary data for those who seek to understand the changes that practical affairs of academic libraries and digital information bring to the academic researches.

In conducting this study, we have had countless cooperation and support from the staff at the participant university libraries, as well as from Elsevier Japan, Nature Publishing Group, ProQuest,

¹ Sato, Yoshinori; Koyama, Kenji; Mine, Shinji; Kurata, Keiko; Itsumura, Hiroshi; Taleuchi, Hiroya; Tutiya, Syun. “The changes in Japanese researchers’ usage and perception of electronic resources: Result of SCREAL Survey 2011,” Baltimore, *ASIS&T 75th Annual Meeting* (poster), 2012.10.

² Sato, Yoshinori; Koyama, Kenji; Mine, Shinji; Kurata, Keiko; Itsumura, Hiroshi; Taleuchi, Hiroya; Tutiya, Syun. “Japanese researchers’ usage and perception of electronic resources [in Japanese],” *Journal of Information Processing and Management*. 56 (8), pp. 506-514, 2013.8.

Springer Japan, Thomson Reuters, and John Wiley & Sons. With this report as our collective fruit, we would like to thank all who came into our path. Part of our questionnaire items were identical with those Doctor Carol Tenopir used for her surveys in the U. S. and Australia, etc. We would like to thank her and Doctor Donald W. King (professor emeritus at Bryant University) for their invaluable advice as well as for Professor Tenopir's ready consent to our use of her items. Lastly, my personal appreciation also goes to each and every member of the SCREAL (all of whom are listed at the end of this report) who poured such energy and fervor into the pains- as well as time-taking analytical work. The publication of the report has been long delayed—and the fault is solely mine.

Yoshinori Sato
(Chairman, Professor at Tohoku Gakuin University)

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

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2011 Survey on the Trends in Acquisition of Scholarly Information and the Degree of E-journal Usage

I. Survey overview

1. Survey design

1-1. Purpose of the survey

Focusing on how researchers and graduate students behave when they use information, this survey was conducted in order to clarify how they discover, collect and utilize scholarly articles. The questionnaire items for the 2011 survey were developed from two viewpoints, succeeding the 2007 survey.

One viewpoint is to observe the successive changes that the enhancement of electronic information resources and their dissemination have been making in scholars and graduate students' information demands as well as in their expectations toward academic libraries. To secure this standpoint, we partly took over the questionnaire items used in "Survey on Current and Future Use of E-journals at Universities: Results," which was conducted through 2001 to 2004 by the E-journals Taskforce of Japan Association of National University Libraries (JANUL) and the Private and Public University Libraries Consortia (PULC).

The other viewpoint is to shed light on the relationship between scholarly information usage and research and education activities. In order to do this, we shared the same questionnaire items with the surveys conducted in the U. S., the U. K., Australia, etc. administered by the research team headed by Professor Carol Tenopir of the University of Tennessee. We aimed to grasp the usage of scholarly information characteristic of our country by chronological as well as international comparisons.

This survey, en passant, was conducted as a part of the study "Changes in scholarly communication and access to digital information resources" (Years 2010-12; Grant number 22300084; Head researcher Yoshinori Sato) supported by JSPS Grant-in-Aid (B).

1-2. Target population

The population of this survey was researchers who used scholarly materials in Japan; our supposed targets were, in principle, researchers who belonged to universities and other academic institutions and laboratories (regardless of their full- or part-time status), and doctoral students (including international students). We decided not to invite students in master's courses but to incorporate their responses, if any turned up, into our analysis.

We called for participation mainly through the Japanese Coordinating Committee for University Libraries, and 45 institutions shown in Table 1 answered our call. Compared with the 2007 survey with 25 institutions (24 universities and one national research institute), the participants showed not only a great increase in number but also a large variety in the balance between education and research. This seems to have made it possible for us to collect information that reflected the usage situations in Japanese institutions of higher education and research more

truly; it is advancement from preceding surveys that mainly focused on the actual usage under the advanced environment of e-journals, etc.

1-3. Methodology

The survey was conducted in two separate periods (5 weeks each). The participant institutions were allotted to either period in accordance with their preferences.

- Period One: Wednesday, October 12, 2011 to Tuesday, November 15.
- Period Two: Wednesday, November 16, 2011 to Tuesday, December 20.

Table 1-1 Participant institutions and their responses

Participant institution	Period	Number of responses			Number of population	Estimated response rate
		Japanese ver.	English ver.	Total		
Tohoku University	Period One (2011/10/12 - 11/15)	234	5	239	5,756	4.15%
The University of Tokyo ^{*1}		165	8	173	1,196	14.46%
Obihiro University of Agriculture and Veterinary Medicine		121	5	126	158	79.75%
University of Tsukuba		98	7	105	3,763	2.79%
Kanazawa University		101	3	104	1,967	5.29%
Yamaguchi University		97	5	102	1,215	8.40%
Shizuoka University		92	4	96	903	10.63%
Tokyo Woman's Christian University		88	3	91	504	18.06%
Osaka University ^{*2}		74	2	76	1,194	6.37%
Hokusho University		39	0	39	138	28.26%
Muroran Institute of Technology		36	2	38	191	19.90%
Kyoto Sangyo University		34	2	36	645	5.58%
The University of Electro-Communications		20	1	21	638	3.29%
Okayama University of Science		20	0	20	298	6.71%
Nagaoka University of Technology		11	0	11	205	5.37%
Sapporo City University		6	0	6	138	4.35%
Waseda University	Period Two (2011/11/16 - 12/20)	319	53	372	8,748	4.25%
National Institute of Advanced Industrial Science and Technology		262	10	272	4,339	6.27%
Hokkaido University		157	11	168	4,480	3.75%
Ritsumeikan University		160	6	166	1,568	10.59%
National Institute for Materials Science		138	17	155	547	28.34%
Nihon University, School of Dentistry		148	0	148	276	53.62%
Nihon University, College of Bioresource Sciences		132	0	132	324	40.74%
Chiba University		92	0	92	1,967	4.68%
Gifu University		88	4	92	1,356	6.78%
Kyushu Institute of Technology		79	8	87	585	14.87%
Tohoku Gakuin University		72	1	73	325	22.46%
Kinki University		69	1	70	6,177	1.13%
Japan Atomic Energy Agency		70	0	70	1,084	6.46%
Tokyo University of Foreign Studies		68	1	69	645	10.70%
Riken		46	8	54	1,303	4.14%
Nihon University, College of Humanities and Sciences		52	1	53	335	15.82%
Komazawa University		49	0	49	1,113	4.40%
Hitotsubashi University		49	0	49	1,093	4.48%
Nihon University, College of Economics		39	0	39	122	31.97%
Tokyo University of Information Sciences		38	0	38	70	54.29%
Japan Agency for Marine-Science and Technology		36	2	38	396	9.60%
Tokyo Kasei University		35	0	35	161	21.74%
Ochanomizu University		31	1	32	774	4.13%
National Research Institute for Earth Science and Disaster Prevention		32	0	32	98	32.65%
Kyushu University		27	2	29	300	9.67%
Japan Aerospace Exploration Agency		28	0	28	1,274	2.20%
Rikkyo University ^{*3}		27	0	27	399	6.77%
Keio University ^{*4}		25	2	27	739	3.65%
National Institute for Environmental Studies		26	1	27	345	7.83%
Hiroshima University		26	0	26	3,512	0.74%
Joetsu University of Education		19	0	19	192	9.90%
National Institute of Radiological Sciences		15	0	15	281	5.34%
Other or Unknown		52	4	56	N/A	N/A
Total		3,742	180	3,922	63,837	6.04%

*1 Graduate School of Pharmaceutical Sciences, Faculty of Pharmaceutical Sciences, Graduate School of Science,

Faculty of Science, Institute for Advanced Studies on Asia.

*2 Graduate School of Law and Politics, Graduate School of Economics, Graduate School of Engineering.

*3 College of Science, College of Business, College of Contemporary Psychology.

*4 Faculty of Policy Management, Faculty of Environment and Information Studies, Graduate School of Media and Governance.

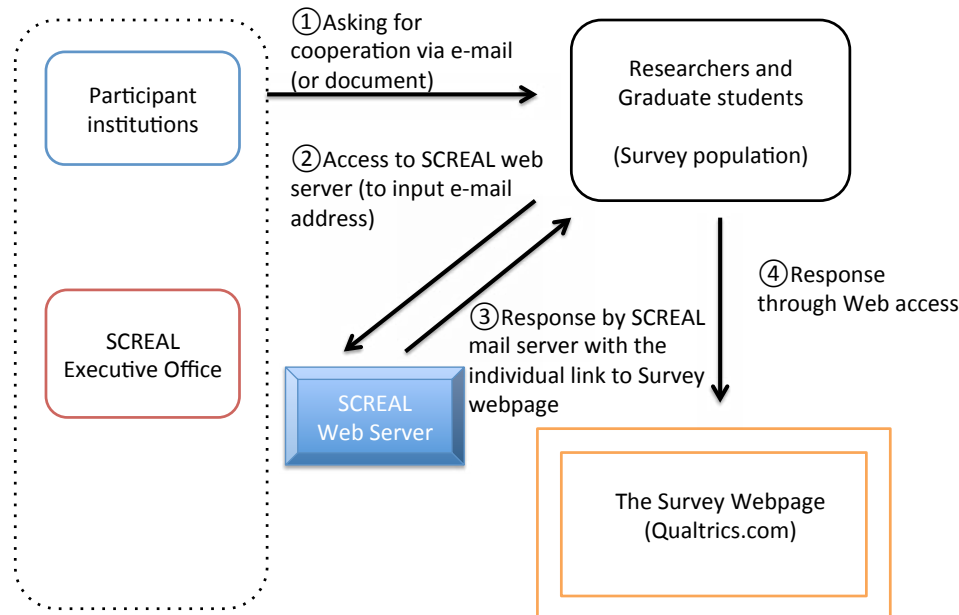


Figure 1-1 Procedures from request to response

The survey procedure is shown in Figure 1-1.

1. Request for cooperation by mail (paper document)

The section in charge at each participant institution sent mail or document to all its survey population asking for cooperation. Preceding or following this, the library at each institution announced the upcoming survey on their Web pages etc. Announcements were also made at faculty meetings. In the mail (paper document), we asked the survey population to access the SCREAL Website (versions in Japanese and English) following the specified link (URL) if they chose to participate.

2. Access to SCREAL Website by those wished to participate

The Website led the visitors to read “Handling of Personal Information in This Survey” and “Survey Overview” and, when they agreed to participate, requested them to input their email addresses in the form as the contact information.

The “Handling of Personal Information in This Survey” read as follows:

Handling of Personal Information in This Survey

The Standing Committee for Research on Academic Libraries shall treat personal information of respondents as follows. Please note that if you find any conditions unacceptable, you are free to leave without answering the questionnaire.

1. No personal information, such as the respondent's name or passport number that can tie the results back to an individual, is collected when individuals take the "2011 Survey on the Use of Academic Information" (hereafter, the Survey). While email is used to communicate with respondents and demographic data is included in some survey items (position, gender, age, etc.), this data is kept separate from information that can be associated with respondents and is immediately deleted when the survey is completed. If _information is provided in free-answer comments that might identify an individual, the information is recast when this is detected to protect the anonymity of the respondent.
2. Information obtained through the Survey shall not be used for any purpose other than the stated objectives of the study.
3. All communication between respondents and the survey web server (a Qualtrics.com ASP server) is encrypted by TLS (Transport Layer Security) as well as HTTPS (Hypertext Transfer Protocol over Secure Socket Layer) to protect transmitted data against electronic eavesdropping. For an overview of Qualtrics.com's data security policies and practices, visit this site:
http://webservices.its.umich.edu/mediawiki/qualtrics/sites/qualtrics/uploads/b/b2/Qualtrics_HIPAA_Data_Security_Documentation.pdf.

3. Response by SCREAL mail server

Following the form input explained above, the SCREAL mail server returned a different URL (Individual Link) to each prospective respondent. We opted for the Individual Link solely to bar the respondents from making multiple responses, whether intentionally or by mistake; it was not used for analysis or any other purposes.

4. Questionnaire response through Web access

Prospective respondents clicked on the URL specified in the mail, accessed the webpage for this survey (set on qualtrics.com; two versions—Japanese and English—available), and answered the questionnaire.

Adding to the procedures above, we requested the section in charge of the survey at each participant institution to send a reminder to their survey population through mail or document one week prior to the end of the survey period (for Period One, November 9th and for Period Two, December 14th).

1-4. Responses

1) Total number of respondents

The total number of respondents was 3,922 (those with valid responses who also specified their institutions³). The total sum of the survey population at all the participant institutions was 63,837; the response rate, therefore, was assumed to be about 6.04% (see Table 1-1).

2) Respondents' status

As Figure 1-2 shows, of all respondents, 1,030 (26.2%) were professors, 686 (17.4%) were associate professors, 244 (6.2%) were lecturers, 414 (10.5%) were assistant professors, 94 (2.4%) were research assistants, and 390 (9.9%) held other research positions; there were 900 (22.9%) doctoral students and 142 (3.6%) were enrolled in master's courses, 37 (0.9%) fitted into none of these categories.

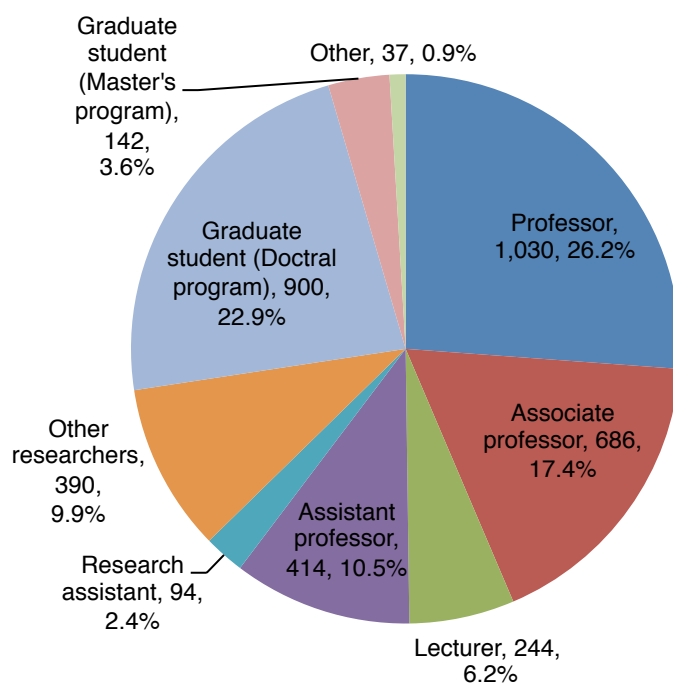


Figure 1-2 Breakdown of respondents' status

3) Respondents' affiliations

Table 1-1 shows the breakdown of the respondents' affiliations. The three largest bodies of responses came from Waseda University (372 respondents), National Institute of Advanced Industrial Science and Technology (272) and Tohoku University (239). Extremely high response rates, furthermore, were seen at Obihiro University of Agriculture and Veterinary Medicine (79.75%), Tokyo University of Information Sciences (54.29%), Nihon University School of

³ Some answers lacked the affiliation information but we included them in our analysis as long as they were valid. Consequently, the number of respondents varies from question to question.

Dentistry (53.62%), etc.

4) Respondents' ages

Figure 1-3 indicates the breakdown of the respondents' ages, both as a whole and also grouped up into faculty members and graduate students. Faculty members numbered 2,857 in this survey and 4.3% of them were between ages 20 and 29, 28.7% between 30 and 39, 32.3% between 40 to 49, 23.6% between 50 and 59, and 10.9% between 60 to 69. Although the percentage of the respondents in their 50s might be somewhat low, the sample covered various age brackets. Of 1,043 graduate students, only 64.3% were between 20 and 29, and more than a third were over 30. According to *School Basic Survey 2011*,⁴ 34.8% of fresh doctoral students were adult students. Considering this figure, the distribution in our survey seemed appropriate.

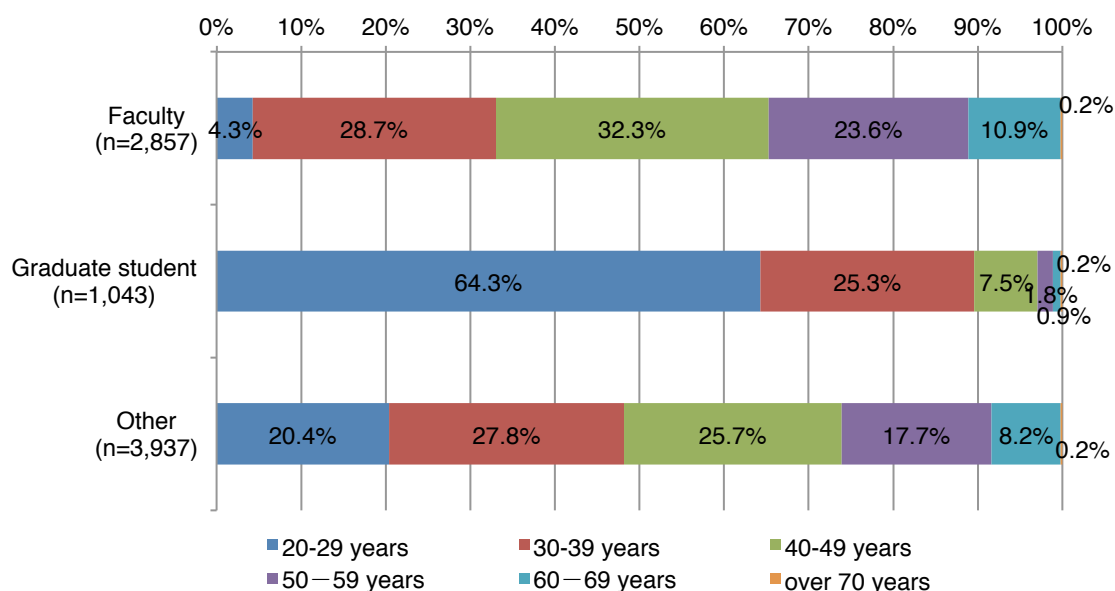


Figure 1-3 Breakdown of respondents' ages

5) Distribution of respondents' specialties

Tables 1-2 and 1-3 show the distribution of the respondents' disciplines. We identified their disciplines based on their responses concerning the specialty and the journal title that carried the articles they read; then referring to the "Grants-in-Aid for Scientific Research FY2011. List of Categories, Areas, Disciplines and Research Fields,"⁵ we further specified their disciplines and the special fields of study. As for the discipline, the largest number of respondents specialized in Social Sciences (628 in number; 15.0%), which was followed by Engineering (614; 14.6%),

⁴ Ministry of Education, Culture, Sports, Science and Technology, *School Basic Survey 2011; Overview of Survey Results [in Japanese]*

http://www.mext.go.jp/component/b_menu/other/_icsFiles/afieldfile/2012/02/06/1315583_3.pdf

⁵ Japan Society for the Promotion of Science, "[Grants-in-Aid for Scientific Research FY2011 List of Categories,] Attached Table 3 Appendix Table of Keywords."

https://www.jsps.go.jp/j-grantsinaid/03_keikaku/data/h23/download/e/06_e.pdf

Humanities (426; 10.2%) and Chemistry (300; 7.2%). Within Engineering, the number of those who specialized in Material Engineering was the largest at 213, probably due to the participation of such institutions as National Institute of Advanced Industrial Science and Technology and National Institute for Material Science.

Table 1-2 Breakdown of respondents' specialties (disciplines)

	Number of respondents	Ratio
Medicine	209	5.0%
Dentistry	144	3.4%
Pharmacy	111	2.6%
Nursing	18	0.4%
Agriculture	230	5.5%
Animal Husbandry/Veterinary Medicine	135	3.2%
Biology	269	6.4%
Physics	177	4.2%
Geosciences & Others	132	3.2%
Chemistry	300	7.2%
Engineering	614	14.7%
Mathematics	85	2.0%
General Fields	366	8.7%
Complex & New Fields	143	3.4%
Social Sciences	628	15.0%
Humanities	426	10.2%
Other	202	4.8%
Total	4,189	100.0%

Table 1-3 Breakdown of respondents' specialties (disciplines)

Discipline	Sub-total	Study field	
Medicine	209	Basic medicine	50
		Clinical internal medicine	38
		Society medicine	29
		Clinical surgery	8
		Boundary medicine	4
		not specified	80
Dentistry	144		144
Pharmacy	111		111
Nursing	18		18
Agriculture	230	Agricultural chemistry	117
		Agricultural economics	17
		Boundary agriculture	16
		Agro-engineering	13
		Forestry	13
		Fisheries Science	9
		not specified	45
Animal husbandry/Veterinary medicine	135		135
Biology	269	Bioscience	147
		Fundamental biology	78
		Somatology	2
		not specified	42

Discipline	Sub-total	Study field	
Physics	177		177
Geosciences & Others	132	Geosciences	115
		Astronomy	14
		Plasma science	3
Chemistry	300	Basic chemistry	104
		Complex chemical systems	73
		Materials chemistry	27
		Synthetic chemistry	5
		Physical chemistry	1
Engineering	614	not specified	90
		Material engineering	213
		Electrical & electronic engineering	99
		Mechanical engineering	87
		Civil engineering	61
		Integrated engineering	61
		Applied physics	29
		Process engineering	26
		Architecture	23
		not specified	15
Mathematics	85		85

Discipline	Sub-total	Study field	
General Fields	366	Informatics	190
		Health & sports sciences	62
		Human medical engineering	38
		Neuroscience	23
		Human life sciences	15
		Geography	14
		Science education/Educational technology	10
		Sociology of science/History of science & technology	7
		Oncology	4
		Laboratory animal science	3
Complex & New Fields	143	Environmental science	81
		Social/safety systems science	32
		Nano/micro science	13
		Area studies	11
		Genome science	3
		Quantum beam science	2
		Resource conservation science	1
		Informatics	190
		Health & sports sciences	62

Discipline	Sub-total	Study field	
Social Sciences	628	Economics	135
		Law	98
		Psychology	93
		Pedagogy	90
		Business	83
		Sociology	69
		Politics	60
Humanities	426	Linguistics	139
		Literature	116
		History	91
		Philosophy	45
		Cultural Anthropology	20
		Arts	14
No answer		Human Geography	1
			202

6) Gender of respondents

Figure 1-4 shows the breakdown of respondents' gender grouped into faculty members and graduate students. Of 2,808 faculty members who joined our survey, 83.4% were male and 16.6% were female. According to the above-mentioned *School Basic Survey 2011*, the percentage of women among full-time faculty members was 20.6% at the time, suggesting that the ratio of men in this survey was somewhat high. On the other hand, the percentage of women among graduate students was comparatively high; they took up about a third (33.5%) of the whole.

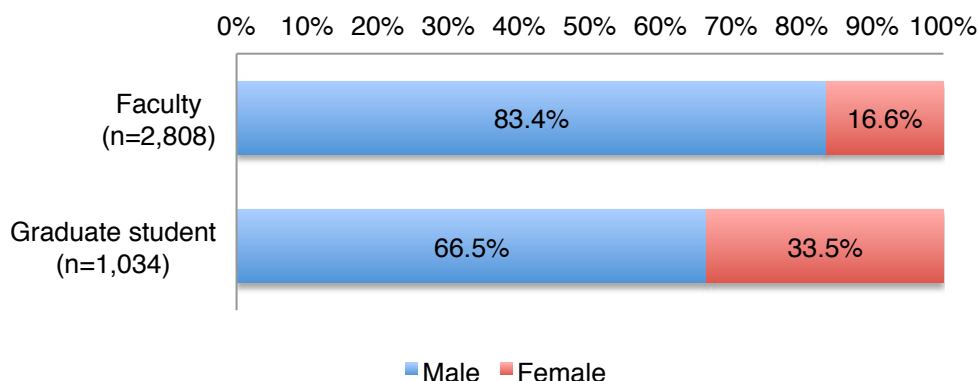


Figure 1-4 Gender ratio of respondents (by the status)

As for the disciplines, Physics, Mathematics and Engineering conjointly took up more than 90% of the male respondents' specialties. On the other hand, 88.2% of respondents specialized in Nursing were female; Humanities also had a high percentage of women at 38.9%.

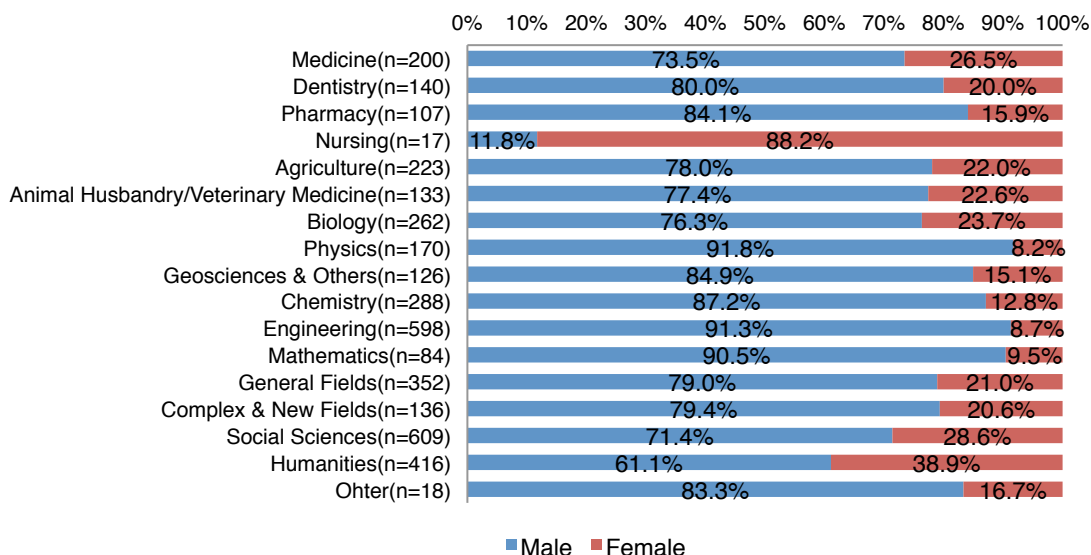


Figure 1-5 Gender ratio of respondents (by the discipline)

II. Usage of digital information resources

2. Usage of e-journals

2-1. Frequency of use

Q15 How often do you use online journals including browsing table of contents? Please choose one answer.

1) Overview

Table 2-1 shows the result concerning how often online journals are used. 32.2% of the respondents use them almost everyday, and 35.5% use them once or twice weekly, each cluster taking up about a third of the whole. 18.8% utilize online journals once or twice a month. Nearly 90% are found to be regular users of e-journals.

Table 2-1 Frequency of e-journal usage

	Frequency	Rate (%)
Almost everyday	1,239	32.2
One or two times a week	1,366	35.5
One or two times a month	725	18.8
Have used in the past but don't use now	264	6.9
Have knowledge of them but have never used one	202	5.2
Don't know about online journals	54	1.4
Total	3,850	100.0

2) By the disciplinary group

Figure 2-1 shows the results grouped up by the respondents' scholarly disciplines. In this figure, the disciplines are arranged in descending order of the selection rate of "almost everyday" from the top. In Pharmacy, Chemistry, Biology, Physics and Medicine, more than a half respondents use e-journals nearly everyday. Pharmacy has the highest rate of such users at about 70%.

About 90% (92.6% of Pharmacy, 91.0% of Physics, 89.3% of Chemistry, 88.3% of Biology) use e-journals oftener than once a week. In addition, more or less 80% of Geosciences (84.9%), Medicine (83.2%), Agriculture (77.3%), Animal Husbandry/Veterinary Medicine (77.1%) utilize these resources as often. 76.1% of the natural scientists as a whole use e-journals more than once a week. Although there are differences among disciplines, the use of e-journals seems quite established.

On the other hand, the rates of respondents who use online journals nearly everyday stayed at 7.6% in Humanities and 15.4% in Social Sciences. 33.3 % of Humanities and 50.8% of Social Sciences use online journals once or twice weekly, reaching a majority in the latter. Although 39.5% of Humanities and 22.8% of Social Sciences responded that they didn't use e-journals, it is inferable that online journals are growing to be an indispensable tool in both disciplines, too.

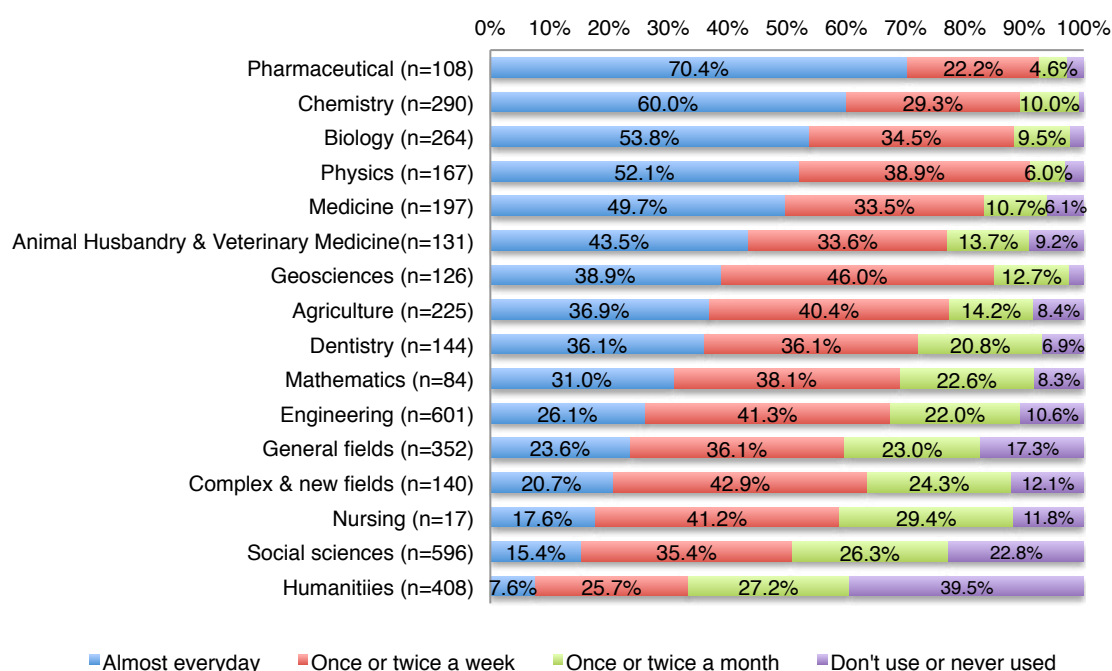


Figure 2-1 Frequency of e-journal usage (by the discipline)

3) By the institution

Table 2-2 shows the results grouped up by the type of institutions (national universities, public/private universities, and national research institutes) the respondents belong to. The largest body of the responses in each group is: “almost everyday” at national universities (37.9%) and “one or two times a week” both at public/private universities (33.9%) and at national research institutes (40.7%). 72.6% of respondents at national universities, 57.3% at public/private universities, and 77.7% at national research institutes use e-journals more than once a week. The percentage of public/private universities is 15-20 points lower than those of national universities and national research institutes.

Table 2-2 Frequency of e-journal usage (by the institution)

	National universities	Public/private universities	National research institutes	Total
Almost everyday	633 37.9%	351 23.5%	255 37.0%	1,239 32.2%
One or two times a week	579 34.7%	506 33.9%	281 40.7%	1,366 35.5%
One or two times a month	262 15.7%	342 22.9%	121 17.5%	725 18.8%
Have used in the past but don't use now	97 5.8%	144 9.7%	23 3.3%	264 6.9%
Have knowledge of them but have never used one	70 4.2%	124 8.3%	8 1.2%	202 5.2%
Don't know about online journals	27 1.6%	25 1.7%	2 0.3%	54 1.4%
Total	1,668	1,492	690	3,850

4) By the age group

By the age group, the largest selection rate of “more than once a week” is found in those between 20-29 years of age (75.7%), followed by 30-39 (73.5%), 40-49 (68.1%), 50-59 (57.4%) and 60-69 (45.2%), showing a clear proportion to the age. The respondents in their 20s to 40s are remarkable in their active use of e-journals. Furthermore, the response rate of “more than once a month” exceeds 70 % in all age brackets, showing that e-journals are prevalent regardless of the generation (see Figure 2-2).

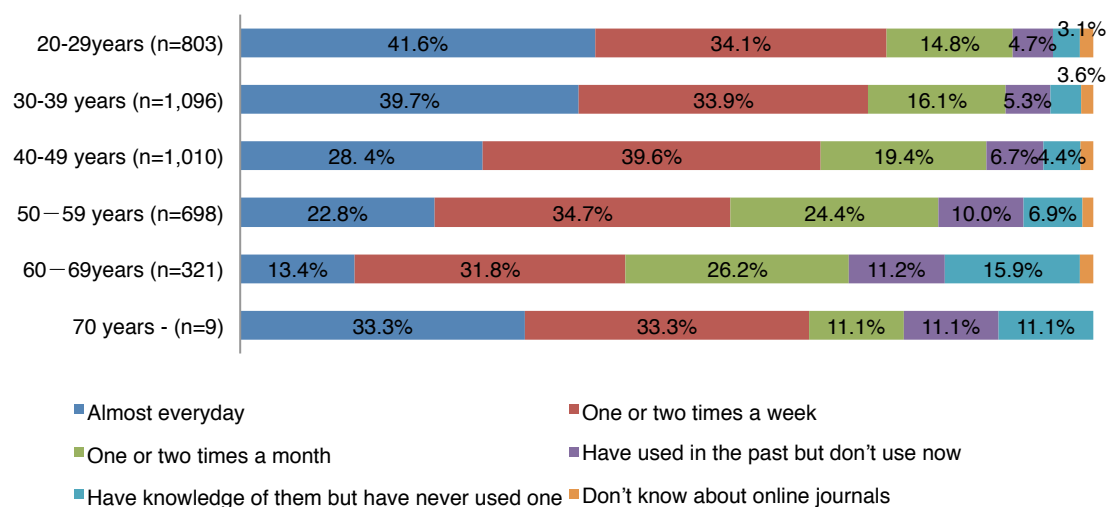


Figure 2-2 Frequency of e-journal usage (by the age group)

5) Comparison with the 2007 survey

In this section, the 2011 results are compared with those acquired in the 2007 survey to identify the changes in the four years. The data are divided into two groups: Natural Sciences and Humanities/Social Sciences.

Figure 2-3 shows the results of 2007 and 2011 surveys in Natural Sciences. In 2007, 82.3% of the respondents used e-journals more than once in a week, but in the 2011 survey the percentage decreased 6.2 points to 76.1%.

It seemed unconceivable, however, that the percentage of e-journal users actually decreased in a time when more and more academic journals, especially those published overseas, were being digitized. Therefore, we divided the respondents into three different groups according to the type of institutions they belonged to: institutions participated in both the 2007 and 2011 surveys (referred to as 2007 participant universities below), those took part in the survey for the first time in 2011 (newly joined universities), and national research institutes (see Figure 2-4).

Figure 2-4 shows about a half of the respondents who belong to the 2007 participant universities use online journals almost everyday. Those who use them more than once a week amount to 84.8%, showing a slight increase from the 2007 survey. In the newly joined

universities, however, only 67.8% use e-journals oftener than once a week, pointing to possible differences in the usage environment of e-journals between these two groups.

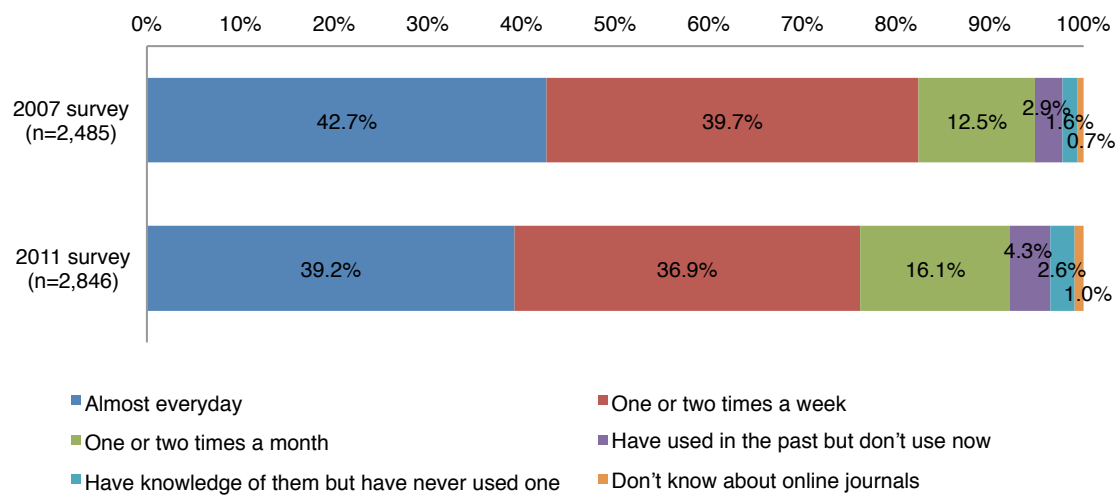


Figure 2-3 Frequency of e-journal usage (Comparison with 2007 survey: Natural Sciences)

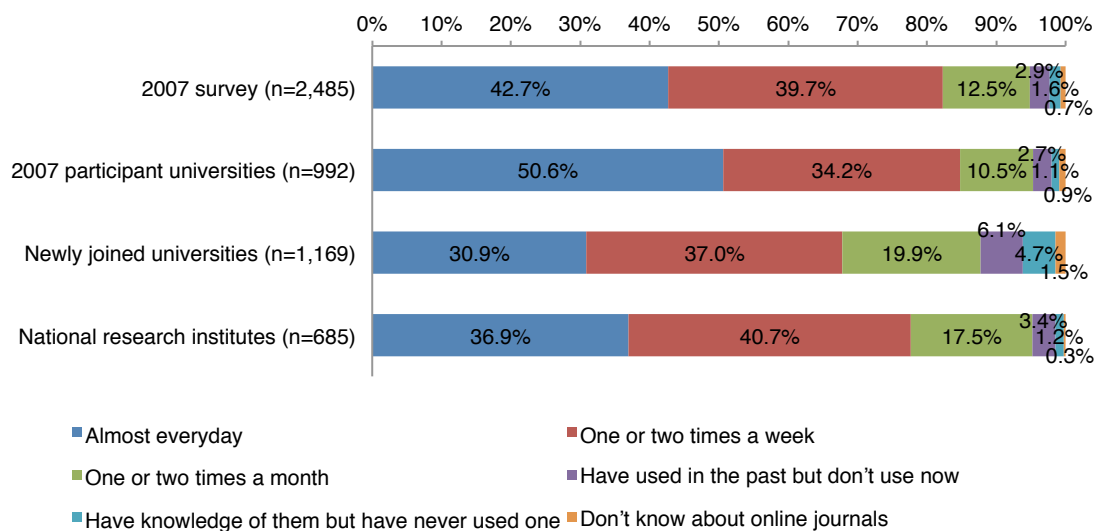


Figure 2-4 Frequency of e-journal usage
(Comparison with 2007 survey: Natural Sciences—details)

Figures 2-5 and 2-6 show the results of Humanities/Social Sciences in like manner. On the whole, 41.5% used e-journals more than once a week in 2007, and the figure slightly increased to 43.7% in 2011. When only the respondents at the 2007 participant universities are considered, however, the corresponding figure amounts to 54.9%, showing an increase of 13.4 points. It is confirmed that e-journal usage is being promoted in Humanities/Social Sciences as well with the expansion of e-journals environment.

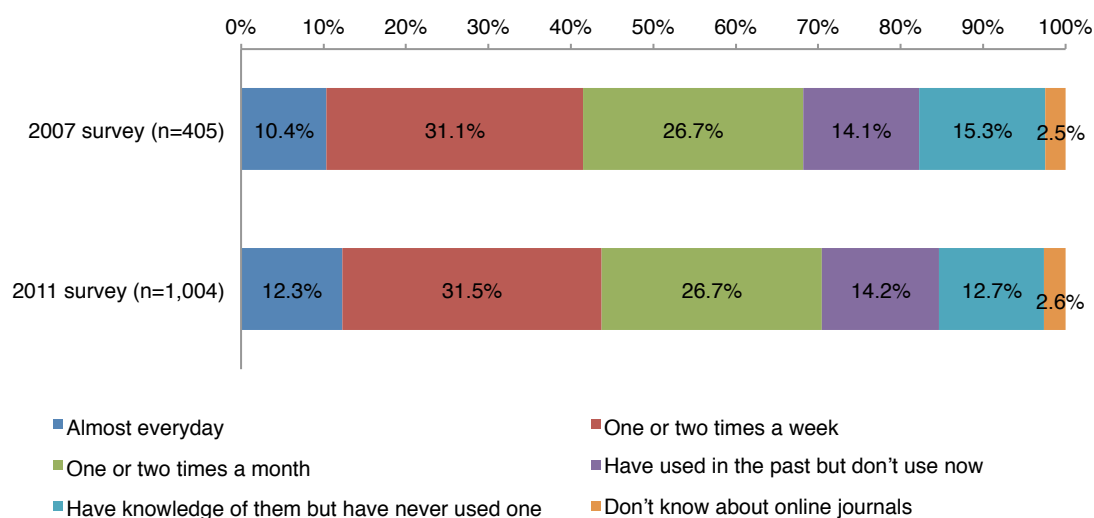


Figure 2-5 Frequency of e-journal usage
(Comparison with 2007 survey: Humanities/Social Sciences)

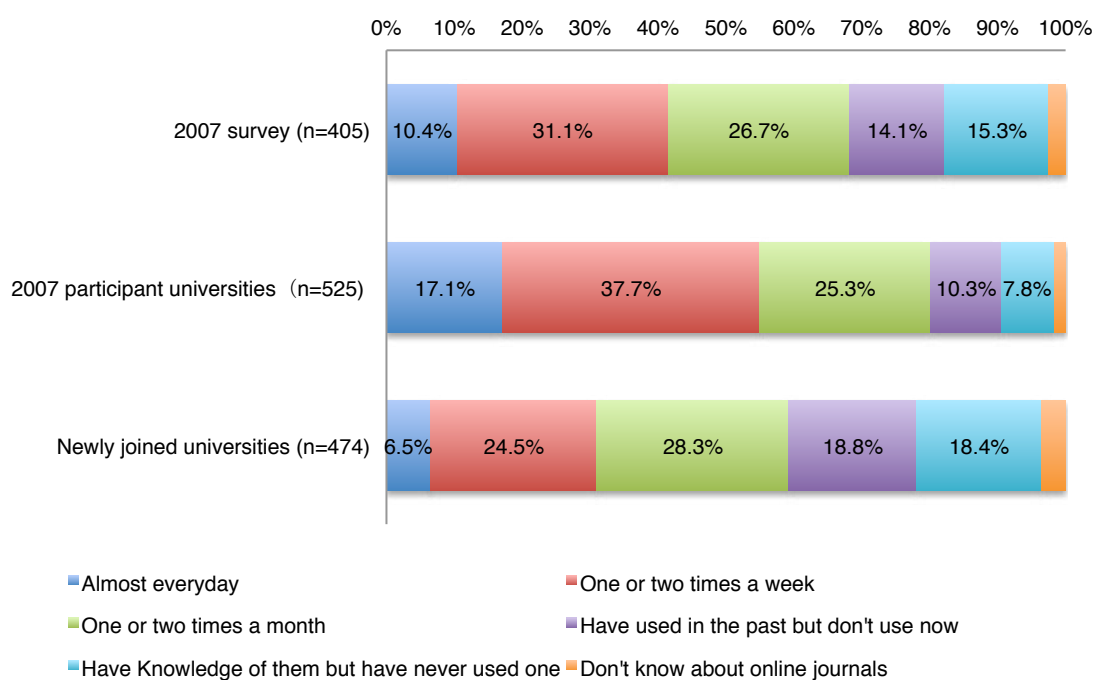


Figure 2-6 Frequency of e-journal usage
(Comparison with 2007 survey: Humanities/Social Sciences—details)

2-2. Number of e-journal titles in use

Q15-2 How many titles of online journals do you use generally? Please specify with numbers.

The respondents wrote down the actual number of e-journals they used. There were 11 cases in which an extremely large number was specified (exceeding 500), but we did not exclude them.

As a whole, the respondents use 10.45 online journals on average; the median is 5 and the mode also is 5 (Table 2-3). The value of 75th percentile is 10, showing that 75% of the respondents use 10 or less e-journals and the remaining 25% do more than 10.

Table 2-3 shows the figures broken down by the disciplinary group (Natural Sciences and Humanities/Social Sciences) as well as by the status of the respondent (faculty members and graduate students). Although the values of median and mode for the faculty respondents in Natural Sciences are slightly larger than other groups, the percentile values show that the differences are insignificant.

Table 2-3 Number of e-journal titles in use
(Total and breakdowns by disciplinary group and status)

		Natural Sciences		Humanities/Social Sciences		Total
		Faculty	Graduate students	Faculty	Graduate students	
Number of respondents	Valid	1,966	663	488	242	3,359
	Missing value	158	66	234	66	524
Mean		10.83	12.47	7.71	7.31	10.45
Median		6	5	5	4.5	5
Mode		10	5	5	5	5
Standard deviation		38.02	64.31	24.78	20.06	42.21
Minimum value		0	0	0	0	0
Maximum value		999	999	500	300	999
Percentile	25	4	3	3	3	3
	50	6	5	5	4.5	5
	75	10	10	10	6.25	10

Table 2-4 shows the number of online journals being used in each discipline. The highest median is 10, which is found in Pharmacy, Biology, and Chemistry. Biology and Chemistry show the 75th percentile at 15, indicating that the respondents in these disciplines use more e-journal titles than those in other disciplines. On the other hand, the smallest number is 3, found in Humanities. In disciplines other than those above, the mode is either 5 or 7.

Table 2-4 Number of e-journal titles in use (by discipline)

		Medicine	Dentistry	Pharmacy	Nursing	Agriculture	Animal Husbandry/ Veterinary Medicine	Biology	Physics
Number of respondents	Valid	191	134	107	15	210	121	263	170
	Missing value	18	10	4	3	20	14	6	7
Mean		11.63	15.55	11.09	5.33	12.36	13.37	14.60	7.02
Median		7	5	10	5	7	5	10	5
Mode		10	3	10	2, 10	5, 10	5	10	5
Standard deviation		36.71	86.53	11.68	3.33	34.96	63.26	61.55	8.45
Minimum value		1	1	2	2	1	0	0	1
Maximum value		500	999	100	10	500	700	999	100
Percentile	25	5	3	5	2	4	3	5	4
	50	7	5	10	5	7	5	10	5
	75	10	10	10	10	11	10	15	10

		Geosciences & Others	Chemistry	Engineering	Mathematics	General Fields	Complex & New Fields	Social Sciences	Humanities
Number of respondents	Valid	127	298	545	77	301	124	482	257
	Missing value	5	2	69	8	65	19	146	169
Mean		8.70	15.33	8.71	9.58	8.52	11.28	8.17	8.31
Median		7	10	5	7	5	5	5	3
Mode		10	10	5	10	5	5	5	3
Standard deviation		8.76	58.25	43.21	9.74	29.54	45.30	25.00	36.31
Minimum value		0	0	0	0	0	0	0	0
Maximum value		80	999	999	50	500	500	500	500
Percentile	25	5	5	3	3	3	3	3	2
	50	7	10	5	7	5	5	5	3
	75	10	15	10	10	10	10	10	5

2-3. Satisfaction level of e-journals

Q15-3 To what extent are you satisfied with the online journals you use?

The responses to this question indicate that 31.9% of respondents are “very satisfied,” 60.1% “somewhat satisfied,” and 8.0% “dissatisfied” (Table 2-5). Many of e-journal users are satisfied, and this tendency does not change even when the data are divided and compared by the respondent’s status (faculty or graduate students) or by the disciplinary group (Natural Sciences or Humanities/Social Sciences).

In the survey, the respondents dissatisfied with e-journals were asked to specify the reasons,

and 1) the accessibility to e-journals and 2) the usability of them turned out to be the two major reasons. The main cause of the former was the lack of contract to the desired e-journals at the institutions the respondents belonged. This included the lack of accessibility to back numbers, and many also felt dissatisfied at the time lag, caused by embargo etc., before the latest issues became available. The latter centered on the problems concerning the usage environment of e-journals, such as difficulty of searching, time-consuming downloads, and occasional inaccessibility to e-journals. There were also references to the document quality (e.g. the bad quality of figures and pictures). Complaints about the inaccessibility to e-journals from outside the institutions were few, suggesting that the usage environment was being improved.

Table 2-5 Satisfaction level of e-journals
(Total and breakdowns by disciplinary group and status)

	Natural Sciences		Humanities/Social Sciences		Total
	Faculty	Graduate students	Faculty	Graduate students	
Very satisfied	644	214	136	77	1,071
	32.8%	32.3%	27.9%	31.8%	31.9%
Somewhat satisfied	1,178	393	311	138	2,020
	59.9%	59.3%	63.7%	57.0%	60.1%
Dissatisfied	144	56	41	27	268
	7.3%	8.4%	8.4%	11.2%	8.0%
Total	1,966	663	488	242	3,359

2-4. Reasons not to use e-journals

Q15-4 Why don't you use online journals? Please choose all answers that apply to you.

The respondents who chose either "have used in the past but don't use now," "have knowledge of them but have never used one," or "don't know about online journals" in Q. 15 were also asked to specify their reasons. The responses to this question amounted to 551, that is, approximately 14% of the whole respondents.

As Table 2-6 shows, the largest body of respondents (27.2%) does not use online journals because there are few titles in their fields of study. It is followed by those who think hardcopy documents are good enough (25.6%), who find it difficult to read on a PC screen (25.0%), and who do not know how to use online journals (24.7%).

According to the disciplinary groups, 29.1% of respondents in Natural Sciences are not sure how to use e-journals. 24.4% of respondents in this group find hardcopy documents good enough, and 21.4% do not use online journals in order to avoid reading on a PC screen. As for the scholars in Humanities/Social Sciences on the other hand, 35.9% of respondents face the lack of online journal titles in their fields, 28.2% want to evade reading on PC screens, and 26.9% think hardcopy documents are good enough. A few slight but clear differences are identified between these two groups.

Table 2-6 Reasons for not using e-journals (Total and by disciplinary group)

	Natural Sciences	Humanities/Social Sciences	Others	Total
No titles I want to use	12	18	0	30
	5.1%	5.8%	0.0%	5.4%
Few titles in my field of study	38	111	1	150
	16.2%	35.9%	12.5%	27.2%
Don't know how to use	68	66	2	136
	29.1%	21.4%	25.0%	24.7%
Hardcopy documents are good enough	57	83	1	141
	24.4%	26.9%	12.5%	25.6%
Not enough back number issues	12	27	0	39
	5.1%	8.7%	0.0%	7.1%
Difficult to read on a PC screen	50	87	1	138
	21.4%	28.2%	12.5%	25.0%
Interfaces are difficult to use	13	22	1	36
	5.6%	7.1%	12.5%	6.5%
Takes too long time to download	13	20	0	33
	5.6%	6.5%	0.0%	6.0%
Few titles other than in English	9	12	0	21
	3.8%	3.9%	0.0%	3.8%
Other	50	44	4	98
	21.4%	14.2%	50.0%	17.8%
Total	234	309	8	551

Table 2-7 shows the result in each discipline. Remarkably, as many as 77 respondents (46.4%) in Humanities claim there are few titles in their fields, and nearly 40% (26 respondents) in Engineering do not know how to use e-journals. While the digitization of academic journals progresses and the usability improves, it is very important not to forget to provide educational programs focused on the usage of e-journals.

Table 2-7 Reasons not to use e-journals (by discipline)

	Medicine	Dentistry	Pharmacy	Agriculture	Animal Husbandry/ Veterinary Medicine	Biology	Physics	Geo- Sciences
No titles I want to use	1	0	0	3	0	0	0	0
	8.3%	0.0%	0.0%	15.0%	0.0%	0.0%	0.0%	0.0%
Few titles in my field of study	0	1	0	5	2	0	0	0
	0.0%	10.0%	0.0%	25.0%	15.4%	0.0%	0.0%	0.0%
Don't know how to use	3	3	2	4	6	1	0	0
	25.0%	30.0%	66.7%	20.0%	46.2%	16.7%	0.0%	0.0%
Hardcopy documents are good enough	6	2	0	5	3	1	1	0
	50.0%	20.0%	0.0%	25.0%	23.1%	16.7%	20.0%	0.0%
Not enough back number issues	1	0	1	0	0	2	1	0
	8.3%	0.0%	33.3%	0.0%	0.0%	33.3%	20.0%	0.0%
Difficult to read on a PC screen	2	3	1	3	1	0	2	0
	16.7%	30.0%	33.3%	15.0%	7.7%	0.0%	40.0%	0.0%
Interfaces are difficult to use	0	2	1	1	2	0	0	1
	0.0%	20.0%	33.3%	5.0%	15.4%	0.0%	0.0%	33.3%
Takes too long time to download	0	2	0	0	0	0	0	0
	0.0%	20.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Few titles other than in English	0	3	1	2	0	0	0	0
	0.0%	30.0%	33.3%	10.0%	0.0%	0.0%	0.0%	0.0%
Other	3	1	0	5	5	3	2	2
	25.0%	10.0%	0.0%	25.0%	38.5%	50.0%	40.0%	66.7%
Total	12	10	3	20	13	6	5	3

	Chemistry	Engineering	Mathematics	General Fields	Complex & New Fields	Social Sciences	Humanities
No titles I want to use	0	4	0	4	0	6	13
	0.0%	6.0%	0.0%	6.2%	0.0%	4.2%	7.8%
Few titles in my field of study	0	12	1	12	2	35	77
	0.0%	17.9%	14.3%	18.5%	11.1%	24.5%	46.4%
Don't know how to use	0	26	2	15	6	32	34
	0.0%	38.8%	28.6%	23.1%	33.3%	22.4%	20.5%
Hardcopy documents are good enough	1	17	3	13	5	39	44
	50.0%	25.4%	42.9%	20.0%	27.8%	27.3%	26.5%
Not enough back number issues	0	2	1	2	3	9	18
	0.0%	3.0%	14.3%	3.1%	16.7%	6.3%	10.8%
Difficult to read on a PC screen	0	13	1	15	7	37	50
	0.0%	19.4%	14.3%	23.1%	38.9%	25.9%	30.1%
Interfaces are difficult to use	0	3	0	2	1	11	11
	0.0%	4.5%	0.0%	3.1%	5.6%	7.7%	6.6%
Takes too long time to download	0	4	0	4	3	9	11
	0.0%	6.0%	0.0%	6.2%	16.7%	6.3%	6.6%
Few titles other than in English	0	1	0	1	1	3	9
	0.0%	1.5%	0.0%	1.5%	5.6%	2.1%	5.4%
Other	1	11	0	15	2	29	15
	50.0%	16.4%	0.0%	23.1%	11.1%	20.3%	9.0%
Total	2	67	7	65	18	143	166

2-5. Necessity of printed journals

1) Latest issues (newly arrived magazines and journals)

Q17 What do you think about newly published issues of journals? Please choose one from the following choices.

Table 2-8 shows the results concerning the medium of newly arrived journals (latest issues). As a whole, 47.6% of respondents think “printed journals are unnecessary when e-journals are accessible,” and slightly fewer respondents (46.4%) think both media necessary. Those who think “only printed journals are necessary” are a small minority, at 1.3%.

In Natural Sciences, 54.2% think “printed journals are unnecessary when e-journals are accessible,” exceeding those who need both printed and e-journals (40.6%) by about 14 points. In Humanities/Social Sciences, on the other hand, 62.5% consider both printed and e-journals necessary, more than double the respondents who do not need printed journals as long as e-journals are available (29.4%).

Table 2-8 Necessity of printed journals (Latest issues – total and by disciplinary group)

	Natural Sciences	Humanities/Social Sciences	Total
Printed journals are unnecessary when e-journals are accessible	1,574	308	1,882
	54.2%	29.4%	47.6%
Both printed and e-journals are necessary	1,178	656	1,834
	40.6%	62.5%	46.4%
Only printed journals are necessary	16	34	50
	0.6%	3.2%	1.3%
Don't know	74	37	111
	2.5%	3.5%	2.8%
Other	62	14	76
	2.1%	1.3%	1.9%
Total	2,904	1,049	3,953

Figure 2-7 shows the results assessed by the discipline and arranged in order of the selection rate of “printed journals are unnecessary when e-journals are accessible.” (Since the respondents in Nursing are few in number, they are excluded.) Even within the group of Natural Sciences, tendencies vary by discipline. In Animal Husbandry/Veterinary Medicine, for example, there are more respondents who think “both printed and e-journals are necessary” than those who think “printed journals are unnecessary when e-journals are accessible.” In Physics, however, it is the other way around.

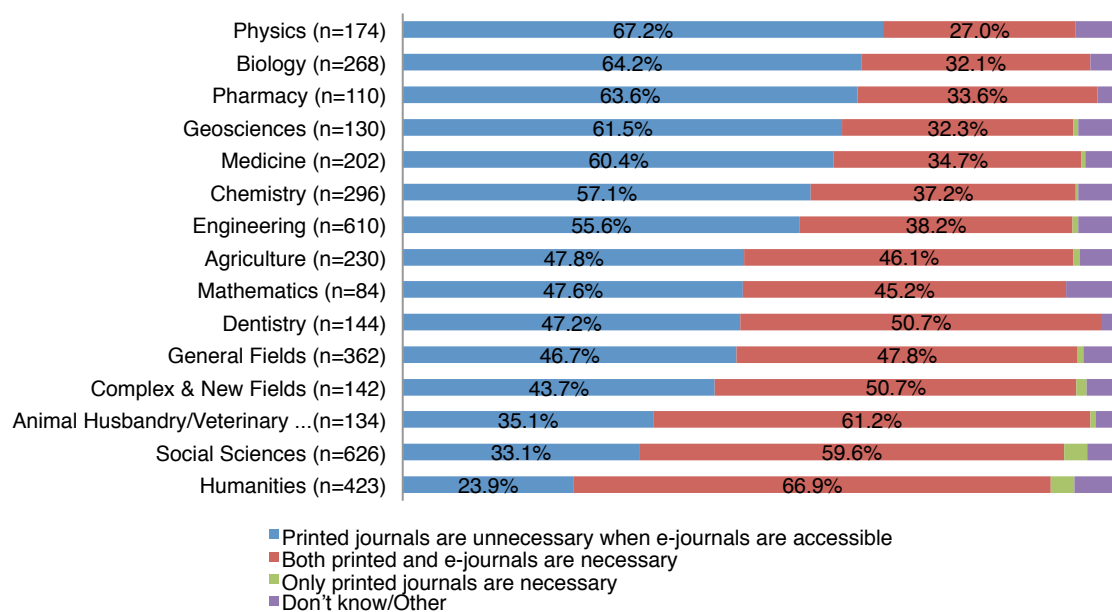


Figure 2-7 Necessity of printed journals (Latest issues —by discipline)

2) Back numbers

Q18 What do you think about the back numbers of journals? Please choose one from the following choices.

Table 2-9 shows the respondents' opinions about the back numbers of journals. On the whole, the largest body of respondents, 56.4%, consider printed journals inessential when e-journals are accessible. The second largest body, 18.5 points less at 37.9%, need both printed and e-journals.

In Natural Sciences, about 60% of respondents do not need printed journals as long as e-journals are available. On the other hand, 53.6% in Humanities/Social Sciences think both media are necessary. What is to be noted about this group, however, is that 39.8% do not feel the need for printed journals if e-journals are accessible.

Compared with the responses concerning the latest issues discussed in the previous section, more respondents think "printed journals are unnecessary when e-journals are accessible" in both Natural Sciences and Humanities/Social Sciences. Even in the latter group, when it comes to back issues, 10.4 percentage points more respondents feel this way, and the percentage of those who feel both media necessary drops 8.9 points.

Table 2-9 Necessity of printed journals (Back numbers—total and by disciplinary group)

	Natural Sciences	Humanities/Social Sciences	Total
Printed journals are unnecessary when e-journals are accessible	1,810 62.3%	418 39.8%	2,228 56.4%
Both printed and e-journals are necessary	938 32.3%	562 53.6%	1,500 37.9%
Only printed journals are necessary	8 0.3%	23 2.2%	31 0.8%
Don't know	80 2.8%	26 2.5%	106 2.7%
Other	68 2.3%	20 1.9%	88 2.2%
Total	2,904	1,049	3,953

Figure 2-8 shows the results in each discipline. In accordance with the results concerning the latest issues, the disciplines are arranged in order of the selection rate of “printed journals are unnecessary when e-journals are accessible.” In all disciplines except Humanities, Social Sciences, and Animal Husbandry/Veterinary Medicine, respondents who feel this way outnumbered those who thought otherwise. Even in the three disciplines mentioned above, the percentage of people who do not need printed journals is 10 points higher than that of the latest issues. As long as the back numbers are concerned, the necessity for printed journals is getting relatively smaller.

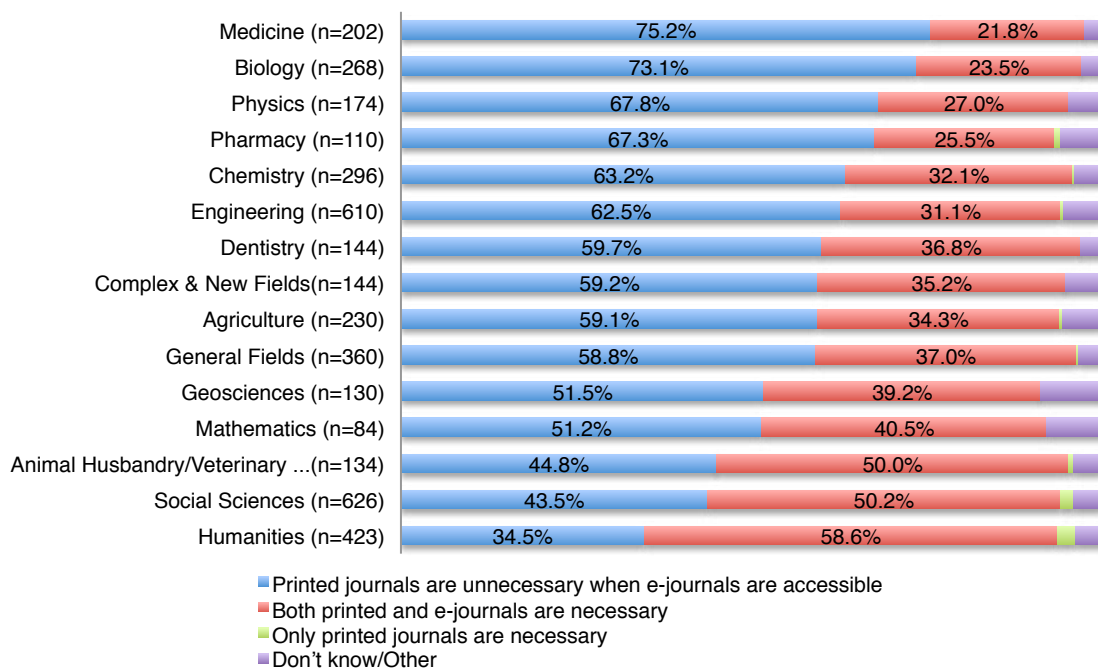


Figure 2-8 Necessity of printed journals (Back numbers—by discipline)

3) Comparison of needs for latest issues and for back numbers

Tables 2-10 and 2-11 are the cross tables of the responses concerning the preferable medium for the latest and the back issues. In Natural Sciences, the respondents who feel “printed journals are unnecessary when e-journals are accessible” concerning both the latest and back issues form the largest cluster at 48.0%. The second largest is composed of people who need their journals in both media and their percentage is 26.7%.

In Humanities/Social Sciences, it is the other way around. 48.9% need both media and 26.4% think “printed journals are unnecessary when e-journals are accessible.”

Table 2-10 Needs for latest issues and for back numbers (Natural Sciences)

Back numbers \ Latest issues	Printed journals are unnecessary when e-journals are accessible	Both printed and e-journals are necessary	Only printed journals are necessary	Don't know	Other
Printed journals are unnecessary when e-journals are accessible	48.0%	4.8%	0.0%	0.6%	0.9%
Both printed and e-journals are necessary	12.8%	26.7%	0.1%	0.8%	0.2%
Only printed journals are necessary	0.2%	0.2%	0.0%	0.0%	0.1%
Don't know	0.6%	0.4%	0.1%	1.4%	0.0%
Other	0.8%	0.1%	0.0%	0.0%	1.2%

Table 2-11 Needs for latest issues and for back numbers (Humanities/Social Sciences)

Back numbers \ Latest issues	Printed journals are unnecessary when e-journals are accessible	Both printed and e-journals are necessary	Only printed journals are necessary	Don't know	Other
Printed journals are unnecessary when e-journals are accessible	26.4%	2.6%	0.1%	0.0%	0.3%
Both printed and e-journals are necessary	12.1%	48.9%	0.5%	0.4%	0.7%
Only printed journals are necessary	0.3%	1.4%	1.5%	0.0%	0.0%
Don't know	0.9%	0.5%	0.1%	2.1%	0.0%
Other	0.2%	0.2%	0.0%	0.0%	1.0%

4) Comparison with 2007 survey

Table 2-12 compares the 2007 and 2011 surveys. It clearly shows the users' preference of medium changed from print to e-journals in these few years.

When seen by the disciplinary group, the tendency to need e-journals rather than printed journals grew in Natural Sciences. Compared with the 2007 results, the percentage of the respondents who felt this way about the latest issues increased 13.2 points, and that concerning the back issues rose 21.3 points—both exceeding 50% in 2011 (Figure 2-9). Although many in Humanities/Social Sciences still think “both printed and e-journals are necessary,” the ratio has grown smaller (Figure 2-10). Concerning back numbers especially, about 40 % of respondents think only e-journals are necessary.

Table 2-12 Needs for printed journals (2007 and 2011 surveys)

	2007 survey	2011 survey (latest issues)	2011 survey (back numbers)
Printed journals are unnecessary when e-journals are accessible	1,099 38.0%	1,882 47.6%	2,228 56.4%
Both printed and e-journals are necessary	1,609 55.7%	1,834 46.4%	1,500 37.9%
Only printed journals are necessary	25 0.9%	50 1.3%	31 0.8%
Don't know	56 1.9%	111 2.8%	106 2.7%
Other	101 3.5%	76 1.9%	88 2.2%
Total	2,890	3,953	3,953

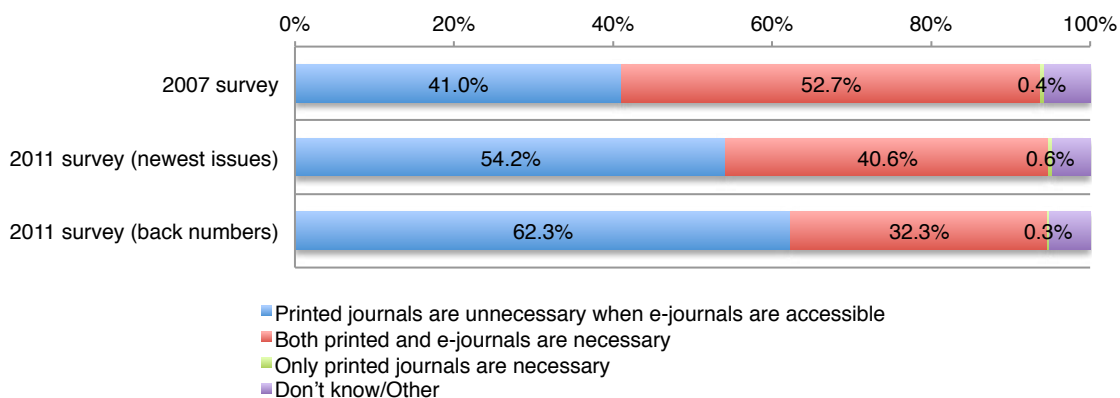


Figure 2-9 Necessity for printed journals (2007 and 2011 surveys—Natural Sciences)

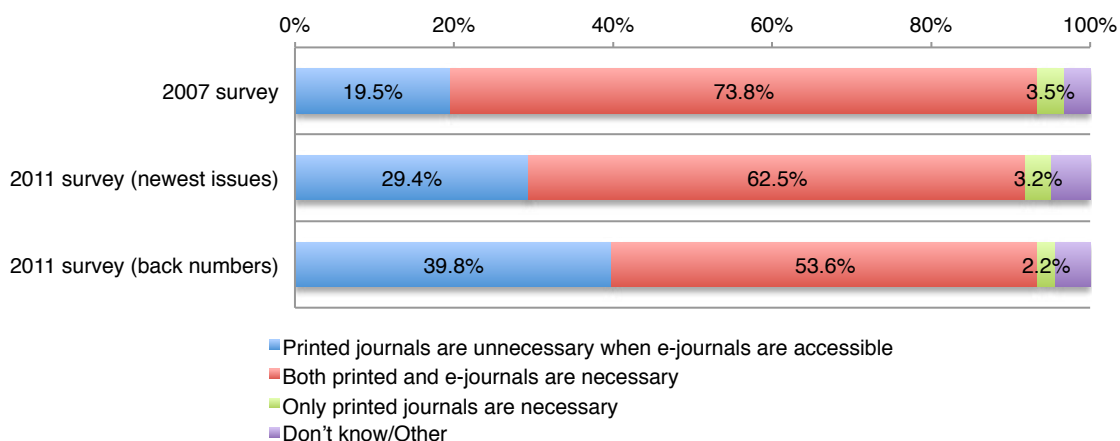


Figure 2-10 Necessity for printed journals
(2007 and 2011 surveys—Humanities/Social Sciences)

2-6. Methods to obtain articles neither in e-journals nor in printed journals

*Q19 What do you do when needed articles are available neither in e-journals nor printed journals?
(Multiple answers allowed)*

1) Overview

The question asks respondents' behaviors when the articles they want are not available at the institutions they belong. 69.6% of respondents will "request inter-library loans," 29.4% will "search institutional repositories on the Internet or author's website," and 26.7% will "ask a friend or acquaintance to send a copy" (Table 2-13).

Although the ILL request is the most frequent choice, 11.3 points more faculty members resort to this method than graduate students. 29.1% of graduate students, moreover, will "give up on getting articles," exceeding the faculty who will do the same by 8.2 points. These show there is an enthusiasm gap in getting articles between faculty members and graduate students.

Table 2-13 Methods to obtain articles other than e-journals and printed journals
(Total and breakdowns by status)

	Faculty (n=2,846)	Graduate students (n=1,037)	Total (n=3,883)
Request inter-library loans	2,067	636	2,703
	72.6%	61.3%	69.6%
Purchase from the websites of publishers etc. (credit-card transaction)	491	148	639
	17.3%	14.3%	16.5%
Ask the author via e-mail etc. to send offprint	419	82	501
	14.7%	7.9%	12.9%
Search institutional repositories on the Internet or author's website	812	330	1,142
	28.5%	31.8%	29.4%
Ask a friend or acquaintance to send a copy	760	275	1,035
	26.7%	26.5%	26.7%
Give up on getting articles	594	302	896
	20.9%	29.1%	23.1%
Other	60	39	99
	2.1%	3.8%	2.5%

2) By the disciplinary group

Table 2-14 shows the data of Table 2-13 re-broken-down by the disciplinary group. As a whole, the second largest body of respondents, who will go on the Internet to search repositories or author's website, takes up a large rate in Humanities/Social Sciences (39.8% of faculty members and 42.5% of graduate students). More than 20% of this group (24.1% of faculty members and 22.7% of graduate students) will also purchase their target articles from publishers' websites, evidencing their enthusiasm for article acquisition.

On the other hand, only 56.0% of graduate students in Natural Sciences will request for ILL, more than 16 points behind any other group, and more than 30% of them will give up on getting the articles. It may suggest that the awareness of libraries is slight for graduate students in Natural Sciences.

Table 2-14 Methods to obtain articles other than e-journals and printed journals
(Breakdowns by disciplinary group and status)

	Natural Sciences		Humanities/Social Sciences	
	Faculty (n=2,124)	Graduate students (n=729)	Faculty (n=722)	Graduate students (n=308)
Request inter-library loans	1,529 72.0%	408 56.0%	538 74.5%	228 74.0%
Purchase from the websites of publishers etc. (credit-card transaction)	317 14.9%	78 10.7%	174 24.1%	70 22.7%
Ask the author via e-mail etc. to send offprint	337 15.9%	54 7.4%	82 11.4%	28 9.1%
Search institutional repositories on the Internet or author's website	525 24.7%	199 27.3%	287 39.8%	131 42.5%
Ask a friend or acquaintance to send a copy	583 27.4%	200 27.4%	177 24.5%	75 24.4%
Give up on getting articles	505 23.8%	226 31.0%	89 12.3%	76 24.7%
Other	32 1.5%	20 2.7%	28 3.9%	19 6.2%

3) Comparison with 2007 survey

Table 2-15 shows the results of 2007 and 2011 surveys side by side. The options, “ask a friend or acquaintance to send a copy” and “give up on getting articles,” first appeared in 2011, so there are no corresponding data for the 2007 survey.

The use of ILL takes up a large percentage of responses in both surveys, but compared with the 2007 results, less people now resort to this method. The 2011 results show the decreases of 11.2 points among faculty members and of 20.3 points among graduate students. On the other hand, more people will get the articles via institutional repositories or authors’ websites now. The 2011 results show the increases of 11 points among faculty members and of 12.4 points among graduate students. Those who will buy articles from publishers’ websites are also on the rise. The development in the distribution of scholarly information via Internet, as evident in the wide spread of institutional repositories and the now allowed purchase by the article, seems to have been greatly influencing researchers’ behaviors.

Table 2-15 Methods to obtain articles other than e-journals and printed journals
(Comparison with 2007 survey)

	Faculty		Graduate students	
	2007 survey (n=1,484)	2011 survey (n=2,846)	2007 survey (n=1,291)	2011 survey (n=1,037)
Request inter-library loans	1,244 83.8%	2,067 72.6%	1,054 81.6%	636 61.3%
Purchase from the websites of publishers etc. (credit-card transaction)	163 11.0%	491 17.3%	97 7.5%	148 14.3%
Ask the author via e-mail etc. to send offprint	239 16.1%	419 14.7%	86 6.7%	82 7.9%
Search institutional repositories on the Internet or author's website	259 17.5%	812 28.5%	251 19.4%	330 31.8%
Ask a friend or acquaintance to send a copy	—	760 26.7%	—	275 26.5%
Give up on getting articles	—	594 20.9%	—	302 29.1%
Other	92 6.2%	60 2.1%	104 8.1%	39 3.8%

3. Usage of other digital information resources than e-journals

3-1. Tools for finding resources

Q20 How often do you use the following services to retrieve the necessary information for your research and/or education?

Figure 3-1 and Table 3-1 show the responses concerning the tools for finding resources. The most frequently used tool is the Web search engine—43.4% of respondents use it almost everyday, 75.9% more than once a week, and 91.3% more than once a month. Table 3-1 shows the result divided by status (faculty members and graduate students) and disciplinary groups (Natural Sciences and Humanities/Social Sciences); the frequencies of the use of Web search engines are very high in all groups, indicating that they have become an indispensable tool.

About 80% search in abstract and indexing databases and browse major journals in their own fields more than once a month. The result, however, shows that the use of abstract and indexing databases is relatively low among faculty members of Humanities/Social Sciences, and that the frequency of browsing journals in their fields varies.

The rates of those who search library's online catalog or NACSIS-WebCat everyday or one to two times a week are quite high in Humanities/Social Sciences at 62.2% in faculty members and 74.0% in graduate students. The same in Natural Sciences, however, are quite low at 21.6% in faculty members and 31.6% in graduate students. Researchers in Natural Sciences seem to rarely use catalogs because their major materials are journals and they mainly retrieve their target articles via e-journals list or directly from publishers.

Majority of faculty members in both disciplinary groups and graduate students in Natural Sciences searched directories and/or bibliographies in print format in the past but do not do so anymore, but remarkably, 65.3% of graduate students in Humanities/Social Sciences still use them more than once a month.

On the other hand, while 30.9% of graduate students in Natural Sciences consult with their colleagues and/or advisors oftener than once or twice a week, the same behavior is seen only in 11.9% of faculty members in Natural Sciences, 8.3% of faculty members in Humanities/Social Sciences, and 15.6% of graduate students in Humanities/Social Sciences. Among faculty members, the percentage of those who used to consult their colleagues and advisors but not any more is rather high—34.0% in Natural Sciences and 36.8% in Humanities/Social Sciences.

The degrees of both usage and recognition are the lowest in “asking reference service in library.” In Natural Sciences, 13.3% of faculty members and 18.1% of graduate students, and in Humanities/Social Sciences, 24.6% of faculty members and 17.1% graduate students use reference services oftener than once a month. About 30% of respondents (in Natural Sciences, 29.7% of faculty members and 29.9% of graduate students; in Humanities/Social Sciences, 28/1% of faculty members and 25.3% of graduate students) know the service but have never used it. Another 30 % (27.1% of faculty members and 30.9% of graduate students), furthermore, are ignorant of the existence of reference service itself. This indicates the necessity to scheme out new roles and

significance of future reference service.

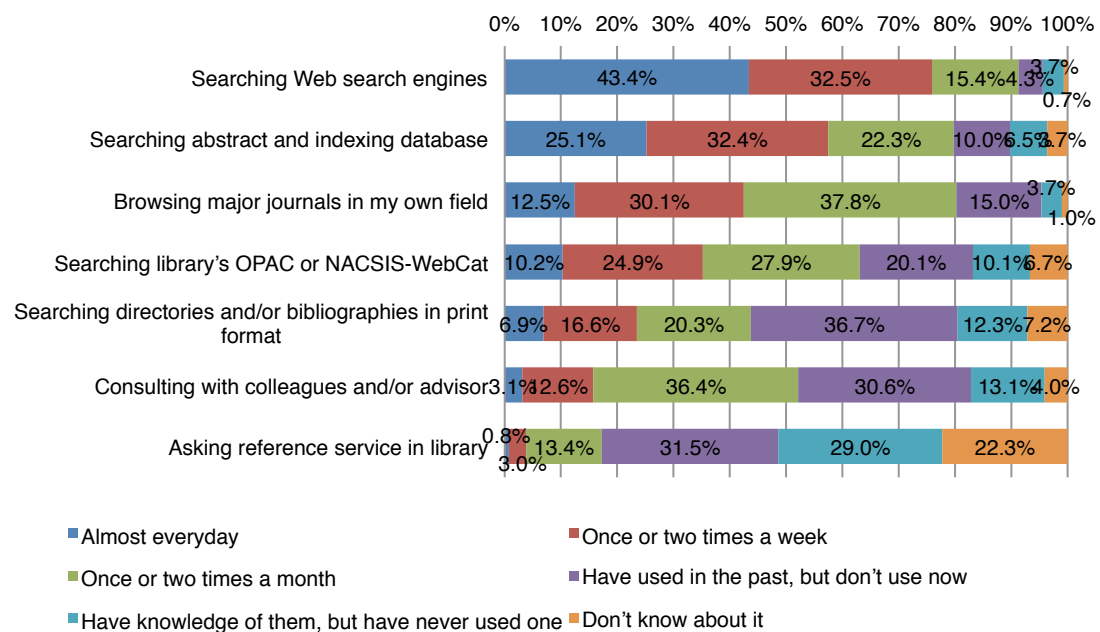


Figure 3-1 Degree of usage and recognition of tools for finding resources

Table 3-1 Degree of usage and recognition of tools for finding resources (by disciplinary group and by status)

Searching Web search engines (e.g. Google, Yahoo, Bing, Excite, etc.)	Almost every-day	Once or two times a week	Once or two times a month	Have used in the past, but don't use now	Have knowledge of them, but have never used one	Don't know about it
Natural Sciences—faculty (n=2,124)	41.0%	32.0%	16.9%	4.8%	4.5%	0.8%
Natural Sciences—graduate students (n=729)	45.1%	35.4%	12.8%	4.1%	2.1%	0.5%
Humanities/Social Sciences—faculty (n=722)	47.1%	31.0%	14.0%	3.6%	3.6%	0.7%
Humanities/Social Sciences—graduate students (n=308)	48.4%	31.8%	15.6%	2.6%	1.3%	0.3%

Searching abstract and indexing database (e.g. PubMed (Medline), Scopus, Web of Science, CiNii, JDrainII, etc.)	Almost every-day	Once or two times a week	Once or two times a month	Have used in the past, but don't use now	Have knowledge of them, but have never used one	Don't know about it
Natural Sciences—faculty (n=2,124)	28.3%	30.9%	22.4%	10.8%	5.3%	2.3%
Natural Sciences—graduate students (n=729)	32.1%	36.6%	18.2%	5.1%	4.7%	3.3%
Humanities/Social Sciences—faculty (n=722)	13.0%	29.9%	24.4%	13.0%	12.2%	7.5%
Humanities/Social Sciences—graduate students (n=308)	17.2%	39.9%	25.6%	8.8%	4.2%	4.2%

Browsing major journals in my own field	Almost every-day	Once or two times a week	Once or two times a month	Have used in the past, but don't use now	Have knowledge of them, but have never used one	Don't know about it
Natural Sciences—faculty (n=2,124)	13.0%	30.0%	36.1%	17.3%	3.1%	0.6%
Natural Sciences—graduate students (n=729)	15.1%	27.0%	34.8%	13.3%	7.8%	1.9%
Humanities/Social Sciences—faculty (n=722)	9.4%	33.0%	44.6%	10.5%	1.7%	0.8%
Humanities/Social Sciences—graduate students (n=308)	11.0%	31.2%	42.5%	13.0%	1.6%	0.6%

Searching library's online catalog or NACSIS-WebCat	Almost every-Day	Once or two times a week	Once or two times a month	Have used in the past, but don't use now	Have knowledge of them, but have never used one	Don't know about it
Natural Sciences—faculty (n=2,124)	4.2%	17.4%	31.3%	26.6%	12.7%	7.8%
Natural Sciences—graduate students (n=729)	7.5%	24.1%	26.9%	18.4%	12.5%	10.6%
Humanities/Social Sciences—faculty (n=722)	22.3%	39.9%	23.7%	8.3%	4.3%	1.5%
Humanities/Social Sciences—graduate students (n=308)	29.5%	44.5%	16.9%	6.8%	1.0%	1.3%

Searching directories and/or bibliographies in print format	Almost every-day	Once or two times a week	Once or two times a month	Have used in the past, but don't use now	Have knowledge of them, but have never used one	Don't know about it
Natural Sciences—faculty (n=2,124)	5.2%	12.2%	17.5%	45.4%	12.1%	7.5%
Natural Sciences—graduate students (n=729)	7.4%	16.9%	21.8%	25.1%	18.2%	10.6%
Humanities/Social Sciences—faculty (n=722)	8.6%	23.1%	25.9%	31.7%	8.3%	2.4%
Humanities/Social Sciences—graduate students (n=308)	12.7%	31.8%	20.8%	18.5%	8.8%	7.5%

Consulting with colleagues and/or advisor	Almost every-day	Once or two times a week	Once or two times a month	Have used in the past, but don't use now	Have knowledge of them, but have never used one	Don't know about it
Natural Sciences—faculty (n=2,124)	2.1%	9.8%	34.2%	34.0%	15.3%	4.5%
Natural Sciences—graduate students (n=729)	7.4%	23.5%	39.6%	19.3%	8.1%	2.1%
Humanities/Social Sciences—faculty (n=722)	1.2%	7.1%	35.3%	36.8%	14.3%	5.3%
Humanities/Social Sciences—graduate students (n=308)	3.6%	18.2%	49.4%	20.1%	7.5%	1.3%

Asking reference service in library	Almost every-day	Once or two times a week	Once or two times a month	Have used in the past, but don't use now	Have knowledge of them, but have never used one	Don't know about it
Natural Sciences—faculty (n=2,124)	0.4%	1.9%	11.0%	29.9%	29.7%	27.1%
Natural Sciences—graduate students (n=729)	1.5%	4.9%	11.7%	21.1%	29.9%	30.9%
Humanities/Social Sciences—faculty (n=722)	0.7%	2.9%	19.7%	43.1%	28.1%	5.5%
Humanities/Social Sciences—graduate students (n=308)	1.3%	5.8%	19.5%	39.3%	25.3%	8.8%

3-2. Usage of e-book readers

Q21 Do you use devices which can display e-books, e.g. iPad, Kindle, Sony Reader, GALAPAGOS, iPhone etc. for research/education purposes?

As a whole, the saturation level of e-book readers is not high, with only 17.1% using them often and 8.7% having used in the past (Table 3-2). Seen by the disciplinary group, the number of users is relatively larger in Humanities/Social Sciences than in Natural Sciences, and the highest rate of frequent users is found in graduate students in Humanities/Social Science at 22.1%. While the actual usage level is low, 47.5% of total respondents chose “have never used, but want to use,” showing there is a large body of people who are interested in e-book readers.

Looked by the discipline, the usage rates are relatively high in General Fields (22.4%), Social Sciences (21.4%) and Pharmacy (20.0%); on the contrary, they are relatively low in Chemistry (10.1%), Animal Husbandry/Veterinary Medicine (11.9%) and Complex & New Fields (12.0%) (Figure 3-2). The interests in future use are high in Dentistry (62.5%) and Medicine (58.9%) and quite low in Mathematics (36.9%), showing great variations depending on the discipline (Figure 3-2).

Table 3-2 Usage degree of e-book readers

	Frequency	Rate
Often use	663	17.1%
Have used in the past	336	8.7%
Have never used, but want to use	1,845	47.5%
Have never used, and don't want to use	1,083	26.7%
	3,883	100.0%

Table 3-3 Usage degree of e-book readers
(by disciplinary group and status)

		Natural Sciences		Humanities/Social Science	
		Faculty (n=2,124)	Graduate students (n=729)	Faculty (n=722)	Graduate students (n=308)
Often use	Frequency	332	127	137	68
	Rate (%)	15.6%	17.4%	19.0%	22.1%
Have used in the past	Frequency	167	75	60	34
	Rate (%)	7.9%	10.3%	8.3%	11.0%
Have never used, but want to use	Frequency	999	366	355	125
	Rate (%)	47.0%	50.2%	49.2%	40.6%
Have never used, and don't want to use	Frequency	626	161	170	81
	Rate (%)	29.5%	22.1%	23.5%	26.3%

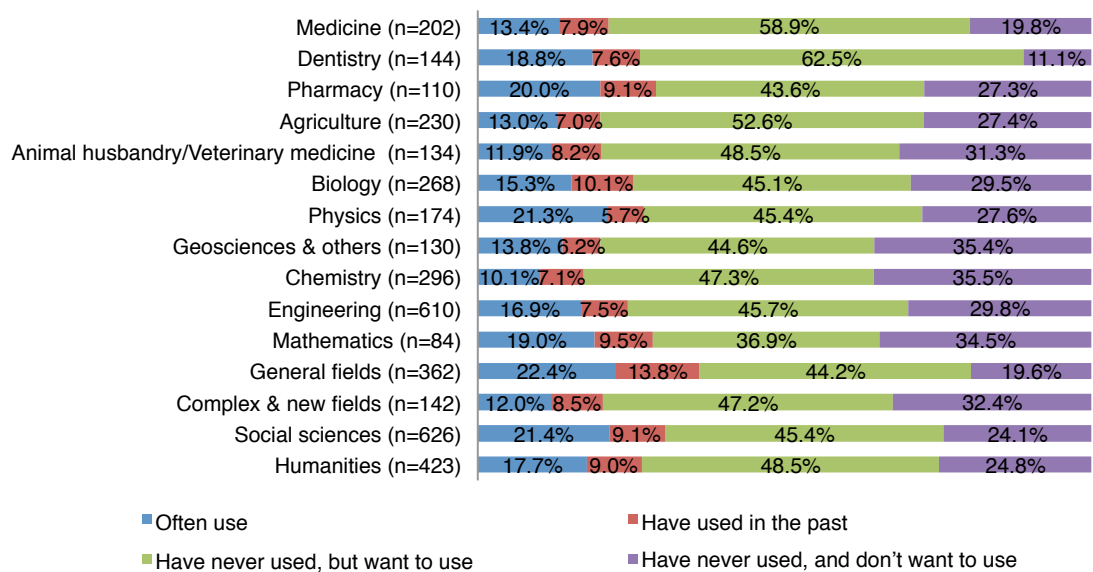


Figure 3-2 Degree of usage and intention to use of e-book readers (by discipline)

3-3. Usage of e-book platforms

Q22 How often do you use the following e-book platforms (services to provide PDF versions of published books on the Internet) for academic purposes? Please choose from the following choices that apply to each platform.

Figure 3-3 shows the degrees of usage and recognition of e-book platforms. ScienceDirect is the most often used platform with over 40% being its regular users (24.8% using it more than once a week and 18.4% once or twice a month). SpringerLink and Wiley Online Library, follow it, but the usage degrees of them in Humanities/Social Sciences are relatively low (Table 3-4). Concerning the publishers, Oxford Univ. Press, Cambridge Univ. Press and Taylor & Francis, large discrepancies between the disciplinary groups are absent, but the usage rates on the whole are not high.

Among the non-publisher platforms, Google books shows a relatively high usage rate. In Humanities/Social Sciences especially, its use is notably high with 14.0% using it more than once a week and 15.6% once or twice a month. While usages of Amazon Kindle Store and Apple iBookstore are nothing conspicuous, graduate students in Humanities/Social Sciences use these stores with a relatively higher rate.

Not only the usage rates but also the recognition rates are quite low in so called “aggregate services” such as Safari (Safari TechBooks Online) and Net Library and ebrary. The percentage of the respondents who do not know the services themselves are 69.2% for Safari, 78.1% for Net Library and 84.1% for ebrary.

The results above show the use of e-book platforms is still at a low ebb. When compared with the 2007 survey (Figure 3-4), however, both the usage and recognition degrees are a lot higher on the whole.

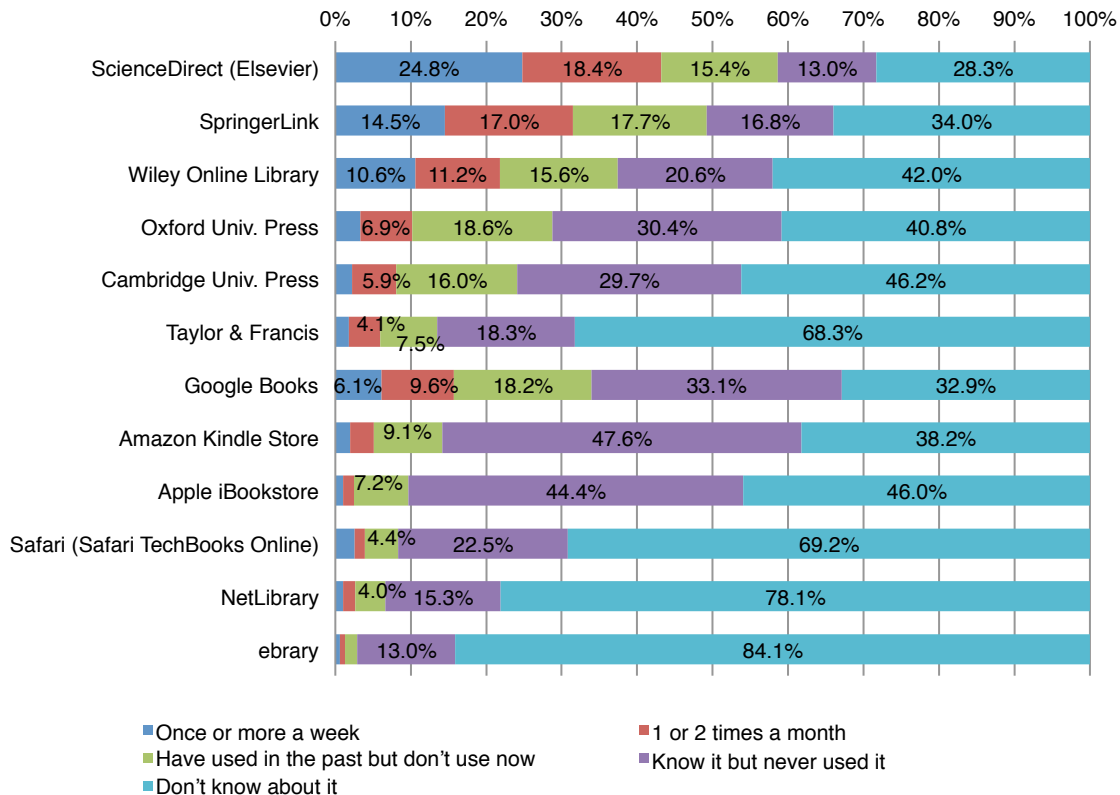


Figure 3-3 Degree of usage and recognition of e-book platforms

Table 3-4 Degree of usage and recognition of e-book platforms
(by disciplinary group and status)

ScienceDirect (Elsevier)	Once or more a week	1 or 2 times a month	Have used in the past but don't use now	Know it but never used it	Don't know about it
Natural Sciences—faculty (n=2,124)	30.8%	23.1%	18.7%	12.1%	15.2%
Natural Sciences—graduate students (n=729)	33.5%	18.2%	13.6%	11.1%	23.6%
Humanities/Social Sciences—faculty (n=722)	7.2%	8.7%	10.5%	18.8%	54.7%
Humanities/Social Sciences—graduate students (n=308)	7.5%	9.4%	9.1%	9.7%	64.3%

SpringerLink	Once or more a week	1 or 2 times a month	Have used in the past but don't use now	Know it but never used it	Don't know about it
Natural Sciences—faculty (n=2,124)	16.9%	21.0%	22.1%	17.6%	22.5%
Natural Sciences—graduate students (n=729)	21.4%	18.9%	14.4%	13.0%	32.2%
Humanities/Social Sciences—faculty (n=722)	4.2%	7.6%	11.5%	20.1%	56.6%
Humanities/Social Sciences—graduate students (n=308)	7.8%	8.1%	11.7%	11.0%	61.4%

Wiley Online Library	Once or more a week	1 or 2 times a month	Have used in the past but don't use now	Know it but never used it	Don't know about it
Natural Sciences—faculty (n=2,124)	11.7%	13.0%	19.8%	22.5%	33.1%
Natural Sciences—graduate students (n=729)	16.0%	13.9%	10.8%	14.4%	44.9%
Humanities/Social Sciences—faculty (n=722)	5.0%	5.4%	10.9%	23.0%	55.7%
Humanities/Social Sciences—graduate students (n=308)	5.8%	7.5%	10.7%	14.6%	61.4%

Oxford Univ. Press	Once or more a week	1 or 2 times a month	Have used in the past but don't use now	Know it but never used it	Don't know about it
Natural Sciences—faculty (n=2,124)	3.6%	7.2%	20.8%	31.2%	37.2%
Natural Sciences—graduate students (n=729)	3.7%	7.5%	13.6%	23.6%	51.6%
Humanities/Social Sciences—faculty (n=722)	2.9%	6.1%	17.5%	35.0%	38.5%
Humanities/Social Sciences—graduate students (n=308)	1.9%	5.8%	19.8%	28.2%	44.2%

Cambridge Univ. Press	Once or more a week	1 or 2 times a month	Have used in the past but don't use now	Know it but never used it	Don't know about it
Natural Sciences—faculty (n=2,124)	2.3%	5.6%	17.3%	30.8%	44.1%
Natural Sciences—graduate students (n=729)	1.9%	6.0%	11.2%	22.2%	58.6%
Humanities/Social Sciences—faculty (n=722)	2.6%	6.6%	16.2%	34.5%	40.0%
Humanities/Social Sciences—graduate students (n=308)	2.3%	6.2%	18.8%	27.3%	45.5%

Taylor & Francis	Once or more a week	1 or 2 times a month	Have used in the past but don't use now	Know it but never used it	Don't know about it
Natural Sciences—faculty (n=2,124)	1.7%	4.4%	9.5%	19.0%	65.3%
Natural Sciences—graduate students (n=729)	1.9%	3.3%	3.7%	14.8%	76.3%
Humanities/Social Sciences—faculty (n=722)	1.8%	4.4%	5.5%	21.5%	66.8%
Humanities/Social Sciences—graduate students (n=308)	2.3%	3.6%	7.1%	13.0%	74.0%

Google books	Once or more a week	1 or 2 times a month	Have used in the past but don't use now	Know it but never used it	Don't know about it
Natural Sciences—faculty (n=2,124)	4.0%	7.5%	16.2%	34.7%	37.5%
Natural Sciences—graduate students (n=729)	7.4%	11.0%	18.5%	30.6%	32.5%
Humanities/Social Sciences—faculty (n=722)	7.9%	11.9%	20.6%	35.0%	24.5%
Humanities/Social Sciences—graduate students (n=308)	14.0%	15.6%	25.0%	22.4%	23.1%

Amazon Kindle Store	Once or more a week	1 or 2 times a month	Have used in the past but don't use now	Know it but never used it	Don't know about it
Natural Sciences—faculty (n=2,124)	1.2%	2.4%	9.0%	46.8%	40.6%
Natural Sciences—graduate students (n=729)	1.6%	3.2%	6.6%	42.5%	46.1%
Humanities/Social Sciences—faculty (n=722)	2.9%	4.4%	10.1%	55.3%	27.3%
Humanities/Social Sciences—graduate students (n=308)	4.5%	5.5%	12.0%	49.4%	28.6%

Apple iBooksotre	Once or more a week	1 or 2 times a month	Have used in the past but don't use now	Know it but never used it	Don't know about it	Safari (Safari TechBooks Online)	Once or more a week	1 or 2 times a month	Have used in the past but don't use now	Know it but never used it	Don't know about it
Natural Sciences—faculty (n=2,124)	0.8%	1.2%	6.7%	43.4%	48.0%	Natural Sciences—faculty (n=2,124)	2.1%	0.9%	3.5%	21.5%	72.0%
Natural Sciences—graduate students (n=729)	1.2%	1.5%	7.0%	42.1%	48.1%	Natural Sciences—graduate students (n=729)	4.4%	1.8%	6.0%	22.9%	64.9%
Humanities/Social Sciences—faculty (n=722)	0.7%	1.2%	8.0%	50.0%	40.0%	Humanities/Social Sciences—faculty (n=722)	1.7%	1.8%	4.8%	25.1%	66.6%
Humanities/Social Sciences—graduate students (n=308)	2.9%	2.9%	8.4%	43.8%	41.9%	Humanities/Social Sciences—graduate students (n=308)	4.2%	1.3%	5.2%	22.1%	67.2%

NetLibrary	Once or more a week	1 or 2 times a month	Have used in the past but don't use now	Know it but never used it	Don't know about it	ebrary	Once or more a week	1 or 2 times a month	Have used in the past but don't use now	Know it but never used it	Don't know about it
Natural Sciences—faculty (n=2,124)	0.5%	0.8%	3.0%	14.1%	81.6%	Natural Sciences—faculty (n=2,124)	0.3%	0.1%	0.9%	11.6%	87.1%
Natural Sciences—graduate students (n=729)	1.6%	1.8%	4.1%	13.6%	78.9%	Natural Sciences—graduate students (n=729)	1.2%	1.0%	1.8%	11.5%	84.5%
Humanities/Social Sciences—faculty (n=722)	0.8%	2.8%	4.7%	20.9%	70.8%	Humanities/Social Sciences—faculty (n=722)	0.7%	1.4%	2.9%	17.6%	77.4%
Humanities/Social Sciences—graduate students (n=308)	3.2%	2.6%	7.8%	13.3%	73.1%	Humanities/Social Sciences—graduate students (n=308)	0.6%	2.3%	2.6%	13.3%	81.2%

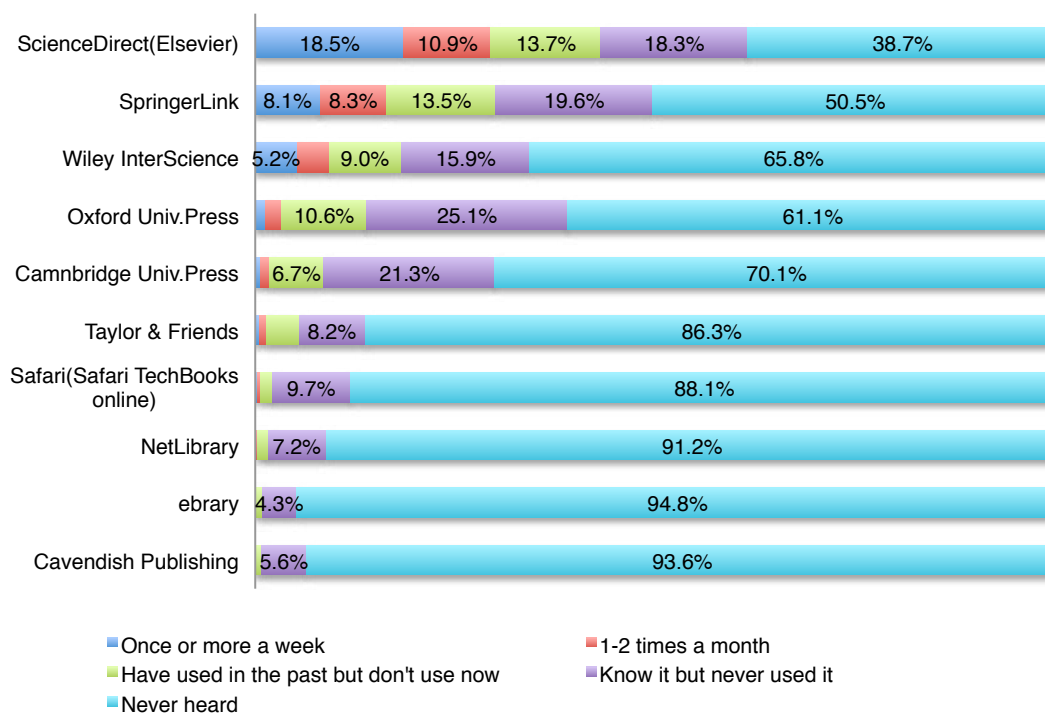


Figure 3-4 Degree of usage and recognition of e-book platforms (2007 survey)

3-4. Acquisition of information on e-books

Q22-2 Which sources were effective for you for learning about the e-books, if any? Please choose all answers that apply to you.

As Table 3-5 shows, means of acquisition of information on e-books hardly reflect the difference of discipline. Starting with the most frequent means, they are: “Happened to find out on the Web” (59.3% of Natural Sciences and 54.7% of Humanities/Social Sciences), “Notification from the library” (21.2% of Natural Sciences and 24.5% of Humanities/Social Sciences), and “Recommendation by a colleague” (20.4% of Natural Sciences and 19.4% of Humanities/Social Sciences).

Table 3-5 Means of acquisition of information on e-books

		Natural Sciences	Humanities/Social Sciences	Total
Notification from the library	Frequency	615	257	872
	Rate (%)	21.2%	24.5%	22.1%
Happened to find out on the Web	Frequency	1,723	574	2,297
	Rate (%)	59.3%	54.7%	58.1%
Information from a bookseller	Frequency	116	74	190
	Rate (%)	4.0%	7.1%	4.8%
Information from the publisher	Frequency	415	126	541
	Rate (%)	14.3%	12.0%	13.7%
Advertisement in an academic journal	Frequency	427	141	568
	Rate (%)	14.7%	13.4%	14.4%
Recommendation by a colleague	Frequency	592	204	796
	Rate (%)	20.4%	19.4%	20.1%
Saw and/or heard at a conference venue	Frequency	331	103	434
	Rate (%)	11.4%	9.8%	11.0%
Other	Frequency	83	28	111
	Rate (%)	2.9%	2.7%	2.8%
Never used e-books	Frequency	544	272	816
	Rate (%)	18.7%	25.9%	20.6%
Total		2,904	1,049	3,953

III. Trends in acquisition of scholarly information

4. Reading amount of scholarly articles and patterns in information retrieval

4-1. Reading amount of scholarly articles

Q1 In the last 4 weeks, approximately how many scholarly articles have you read? Articles can include those found in journal issues, on websites, or may be 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.

In Question 1, we asked the number of scholarly articles the respondents read in the past four weeks. The results were grouped into the disciplines as Table 4-1 shows. The mean numbers somewhat varied from 10 to 22, but the median values, from 6 to 15, and the mode values, either 10 or 20, showed a stable tendency. It can be said that faculty members and graduate students read about 10 articles a month on average.

Table 4-1 Reading amount of scholarly articles by discipline

		Medicine	Dentistry	Pharmacy	Agriculture	Animal Husbandry/ Veterinary Medicine	Biology	Physics	Geosciences & Others
Frequency	Valid	209	144	111	230	135	269	177	132
	Missing value	0	0	0	0	0	0	0	0
Mean		16.06	11.51	22.26	14.29	15.92	15.80	14.11	12.52
Median		10	6	15	10	10	10	10	10
Mode		10	20	<u>10</u>	10	20	10	10	10
Minimum value		0	0	0	0	0	0	0	0
Maximum value		100	100	200	300	150	400	100	100
Percentile	25	5	4	8	4	4	5	4	5
	75	20	19	20	20	20	20	20	15

		Chemistry	Engineering	Mathematics	General Fields	Complex & New Fields	Social Sciences	Humanities
Frequency	Valid	300	614	85	366	143	628	426
	Missing value	0	0	0	0	0	0	0
Mean		22.43	12.57	11.73	12.56	11.88	14.68	10.62
Median		15	10	10	9	8	10	7
Mode		10	10	10	10	10	10	10
Minimum value		0	0	0	0	0	0	0
Maximum value		300	200	100	500	100	400	120
Percentile	25	10	4	4	4	4	5	4
	75	27	15	10	15	12	20	15

* Underline designates where multiple mode values appeared. The table shows only the smallest value.

4-2. Format, source, etc. of the last read article

4-2-1. Rate of re-reading

Q4 Had you previously read this article, i.e. is this a re-reading?

We first asked if the last reading was re-reading or not. About 30% of faculty members and nearly 40% of graduate students answered to this question in the affirmative, showing that re-reading took up not a small rate in each. The exact act of “re-reading,” whether it is reading an article divided into sections or actually reading the whole article repeatedly, is not known. The results gained in the 2007 survey were much the same.

From the further analyses from 4.3 to 4.6 in this chapter, the data of re-reading are deducted.

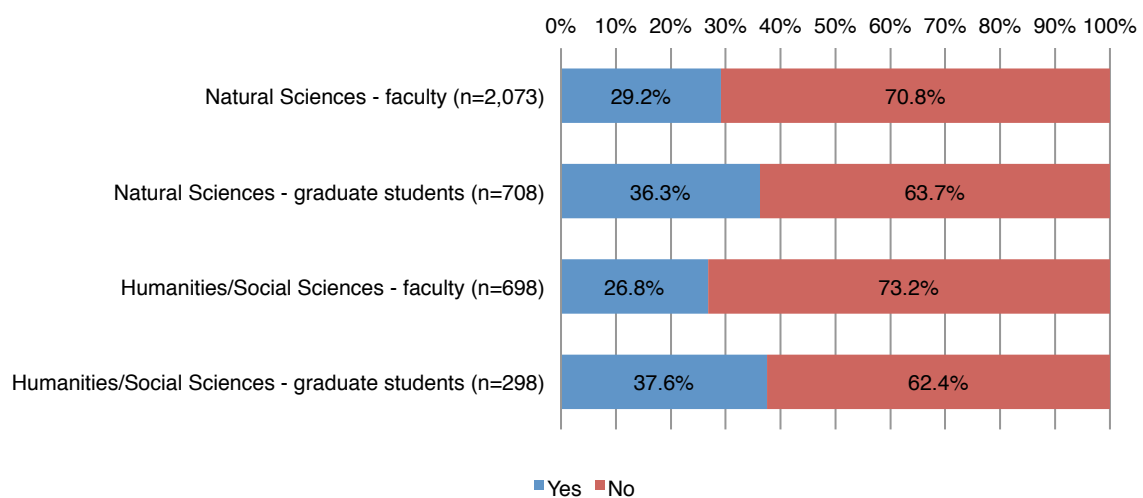


Figure 4-1 Rate of re-reading

4-2-2. Format and source

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

The respondents were asked to choose from five selective answers concerning the format and the source of their last read articles. More than a half of both faculty members and graduate students of Natural Sciences (50.4% and 57.9% respectively) got the files in PDF format etc. online, printed them out, and read them (Figure 4-2). More than 20% read the articles on screen in some ways. Those who read the scholarly journals in print format or in photocopies were few, about 20% even when combined.

On the other hand, in Humanities/Social Sciences, the largest bodies of faculty members and graduate students read the articles, respectively, in print journals and in photocopies. When the rates of these two formats were combined, the sums were 64% in the faculty members and 56.1% in the graduate students.

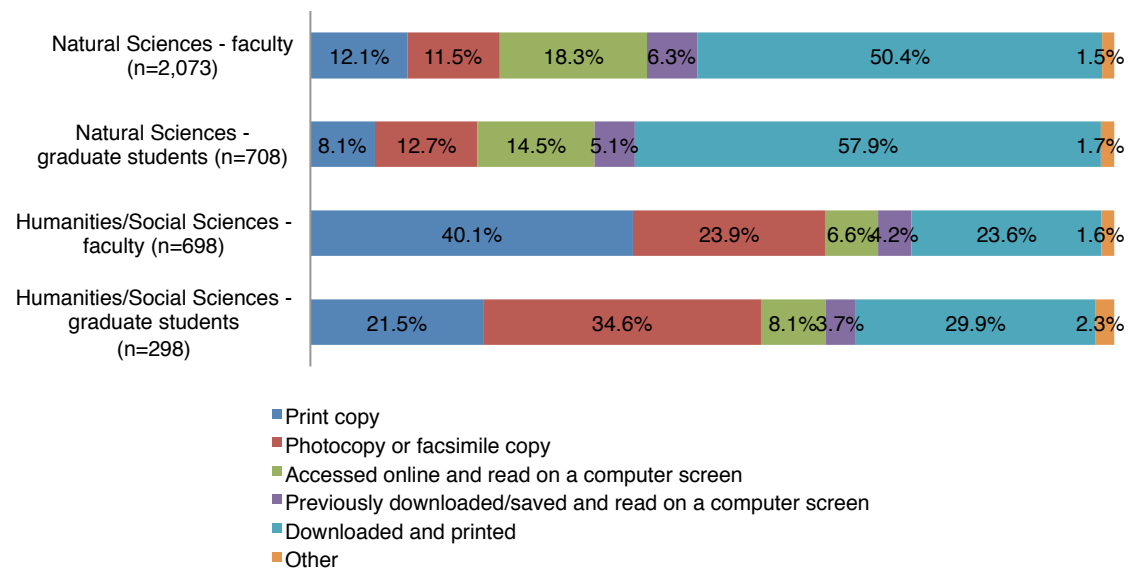


Figure 4-2 Format and source of last read article

In the 2007 survey (Figure 4-3), more or less 70% of faculty and graduate students in Natural Sciences acquired the files in PDF format etc. and printed them out to read, but in 2011 the rate of the same item decreased to about 50% and those who read the articles on screen, on the contrary, doubled (from 9.8% to 24.6% among faculty members; from 10.0% to 19.6% among graduate students). In Humanities/Social Sciences, those who read the articles in printed journals decreased from about 60% to 40% in faculty members and from 40% to 20% in graduate students.

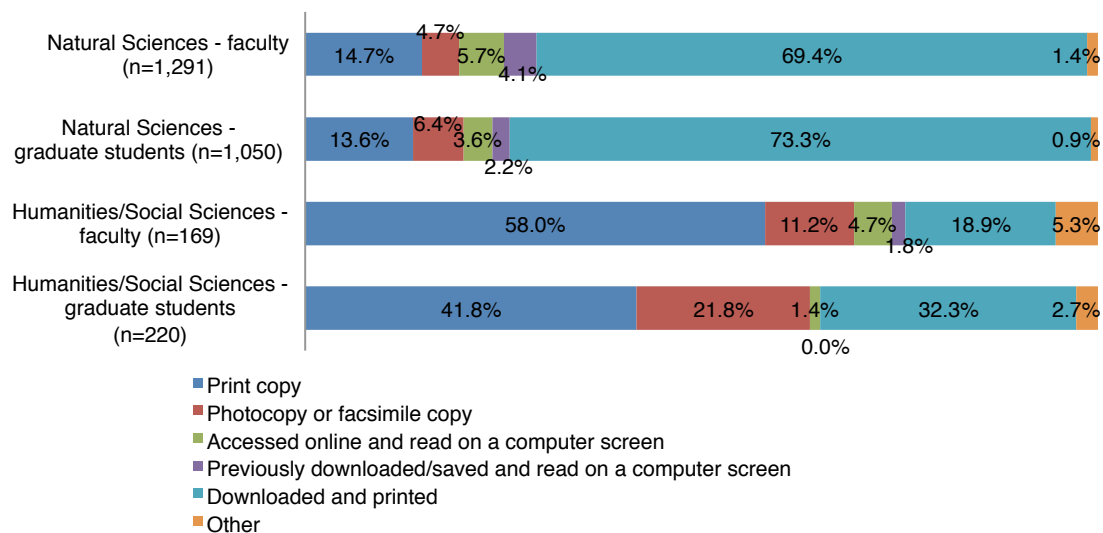


Figure 4-3 Format and source of last read article (2007)

4-2-3. Journal title or article type

Q2 What is the title of the journal from which this last article was read, or, if not from a journal, what is the type of the article (e.g. conference proceeding, from collected papers, report, dissertation/thesis, etc.)?

*Q11 If this article was (or will be) published in a specific journal, approximately how many articles did you read from this journal in the **last 12 months**?*

Table 4-2 shows the 103 cases where the respondents left the journal title blank and specified the type of the article. This only took up 2.9% of the last read articles; the remaining 97% were from journals.

Nearly a half of the 103 cases were conference proceedings, and books, collected papers and preprints followed them. Conference proceedings appeared in 49 cases, and 45 out of them were found in the responses from faculty and graduate students of Natural Sciences. Books appeared in 15 cases, and 14 were found in faculty and graduate students of Social Sciences.

Table 4-2 Article type other than journal publication

49	13	<type>academic society</type>IEEE
	1	<type>conference</type>IEEE Eurocon 2009
	1	<type>conference</type>ACM International Conference on Ubiquitous Computing
	1	<type>conference</type>IEEE Real-Time and Embedded Technology and Applications Symposium
	1	<type>conference</type>International Conference on Computer Vision
	1	<type>conference</type>International Symposium on Power Semiconductor Devices and Ics
	1	<type>conference</type>Advances in neural information processing systems
	1	<type>conference</type>Africa Fertilizer Summi
	1	<type>conference</type>AIAA Joint Propulsion Conference and Exhibit
	1	<type>conference</type>Congreso Internacional de ASELE
	1	<type>conference</type>Generative Approaches to Language Acquisition - North America
	1	<type>conference</type>IEEE Electron Device Meeting
	1	<type>conference</type>IEEE International Solid-State Circuits Conference
	1	<type>conference</type>InfoVis : IEEE Information Visualization
	1	<type>conference</type>Nuclear Science Symposium Conference Record
	1	<type>conference</type>OFC/NFOEC
	1	<type>conference</type>Proceedings of ICWSSP (International Conference on Acoustics, Speech, and Signal Processing)
	1	<type>conference</type>Proceedings of ISTU (International Symposium on Therapeutic Ultrasound)
	1	<type>conference</type>Proceedings of PICMET '11
	1	<type>conference</type>Proceedings of Symposium on Ultrasonic Electronics
	1	<type>conference</type>Proceedings of the 10th ACM/IEEE International Conference on Information Processing in Sensor Networks (IPSN 2011)
	1	<type>conference</type>Proceedings of the ACM SIGCOMM
	1	<type>conference</type>SPIE 2005
	1	<type>conference</type>メタンハイドレート総合シンポジウム
	1	<type>conference</type>組み込みソフトウェアシンポジウム論文集（情報処理学会ソフトウェア工学研究会）
	1	<type>conference</type>日本 AEM 学会 MACDA(Magnetodynamics)研究会予稿集
	1	<type>academic society</type>ACI (American Concrete Institute)
	1	<type>academic society</type>ACM
	1	<type>academic society</type>AIP
	1	<type>academic society</type>American Anthropological Association

	1	<type>academic society</type>ASCE ; American Society of Civil Engineers
	1	<type>academic society</type>MSA (The Mycological Society of America)
	1	<type>academic society</type>情報処理学会
	1	<type>academic society</type>情報処理学会 MPS（数理モデル化と問題解決）研究会関連テクニカルレポート
	1	<type>academic society</type>電子情報通信学会
	1	<type>academic society</type>電池討論会
	1	<type>academic society</type>土木学会
16	16	<type>book</type>
8	7	<type>collected paper</type>
	1	<type>report</type>
4	2	<type>yearbook</type>
	1	<type>policy paper</type>
	1	<type>government publication</type>
2	1	<type>web site</type>
	1	<type>webpage</type>
9	5	<type>arXiv</type>
	3	<type>preprint</type>
	1	<type>working paper</type>
14	4	<type>database</type>CNKI（中国学術文献オンラインサービス）
	2	<type>official journal of academic society</type>
	2	<type>academic journal</type>
	2	<type>kiyo - bulletin</type>
	1	<type>database</type>IEEE/IET Electronic Library
	1	<type>database</type>ScienceDirect
	1	<type>publisher</type>Elsevier
	1	<type>publisher</type>Springer Science+Business Media
1	1	<type>other</type>

103 2.9%

4-3. Means to find out articles

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

The respondents were asked to choose from 15 answers concerning the means through which they found their last read articles. The largest cluster was “searching an indexing/abstracting database” at 21.2%, followed by “browsing a library electronic subscription” (18.1%) and “browsing a personal print subscription” (12.9%).

Table 4-3 Means to find out articles (by disciplinary group and status)

		Natural Sciences		Humanities/Social Sciences		Other (n=95)	Total (n=2,711)
		Faculty (n=1,468)	Graduate students (n=451)	Faculty (n=511)	Graduate students (n=186)		
Browsing	Browsing a personal print subscription	10.2%	4.0%	28.8%	11.3%	15.8%	12.9%
	Browsing a personal electronic subscription	2.9%	1.6%	3.1%	0.0%	5.3%	2.6%
	Browsing a library print subscription	3.0%	2.9%	8.0%	12.9%	3.2%	4.6%
	Browsing a library electronic subscription	22.3%	16.9%	11.2%	10.8%	11.6%	18.1%
	Browsing a print subscription copy in the collection of a school, department, unit, etc.	0.8%	2.0%	5.3%	2.7%	2.1%	2.0%
	Browsing other electronic collection	1.8%	1.8%	2.0%	2.2%	3.2%	1.9%
Online Search	Searching an indexing/abstracting database	23.4%	27.9%	10.0%	17.2%	24.2%	21.2%
	Searching Web search engine	8.8%	12.9%	7.0%	11.8%	8.4%	9.3%
	Searching online journal collections	5.6%	8.2%	2.9%	4.3%	3.2%	5.3%
Other	Sent to me as a part of an alert service	4.4%	3.1%	0.8%	0.5%	0.0%	3.1%
	Received from a listserv or news group	1.1%	0.4%	2.2%	0.5%	0.0%	1.1%
	Found on a twitter or blog	0.3%	0.9%	1.0%	1.6%	1.1%	0.6%
	Cited in another publication	5.0%	3.3%	6.3%	9.7%	6.3%	5.3%
	Another person (e.g., a colleague) told me about it	7.4%	4.7%	4.5%	4.8%	8.4%	6.3%
	Introduced by an adviser (I am a graduate student)	0.2%	8.0%	0.6%	7.5%	4.2%	2.2%
	Don't know or other	2.7%	1.6%	6.5%	2.2%	3.2%	3.2%

Regarding the means to find out articles, quite large differences were found between Humanities/Social Sciences and Natural Sciences. While close to a quarter of faculty members in Natural Sciences searched in indexing/abstracting databases (23.4%), only 10.0% of faculty member in Humanities/Social Sciences did the same. Regardless of the difference of disciplinary groups, more graduate students than faculty members utilized index-abstract databases.

The rate of the faculty members who browsed library electronic subscriptions was 22.3% in Natural Sciences, almost equaling to the use of index/abstracting databases. In Humanities/Social Sciences, however, only a half, of both faculty members and graduate students, browsed library electronic subscriptions. As long as the use of library electronic subscriptions was concerned, not much difference was found between faculty members and graduate students in Humanities/Social Sciences; to be exact, the rate was slightly higher among the former.

The uses of index/abstracting databases and of library electronic subscriptions added up to more than 40% in both faculty members and graduate students of Natural Sciences. On the other hand,

the most resorted-to means among faculty members of Humanities/Social Sciences was their personal print subscriptions (28.8%). The rate of the same among faculty members of Natural Sciences was as small as 10.2%. In both disciplinary groups, the rates of graduate students who browsed their personal print subscriptions were less than half of those of faculty members. This points to the financial difficulty students face in subscribing journals personally.

The choice of three categories of printed subscriptions—personal, library, and school/department/unit—added up to 42.1% among faculty members of Humanities/Social Sciences, showing their dependence on printed scholarly journals as a means to find articles.

Figure 4-4 shows the means to find out articles divided into three categories of browsing, searching and others and the tendencies by the scholarly discipline. (Since Nursing and Others had only small numbers of respondents, 15 and 25 respectively, they were excluded from the figure.) More than a half of faculty members and graduate students in Social Science and Humanities (53.4% and 53.7%) found their articles by browsing, and their rates of online searching remained low (26.3% and 19.1%).

In Medicine, Biology and other disciplines affiliated with them, the rates of online searching turned out to be quite large. The largest rate of online searching was found in Animal Husbandry/Veterinary Medicine at 59.6%, followed by Agriculture (51.2%), Medicine (50.4%), and Biology (46.0%). The same rates were rather high in Pharmacy (41.0%) and Dentistry (38.9%), but these disciplines had as high or higher rates of browsing, pointing to a tendency a little different from Medicine and Biology.

As for another disciplines in Natural Sciences, in Physics and Geosciences the percentages of browsing exceeded 40 while those of online searching remained in the 20s, revealing a tendency rather close to Humanities and Social Sciences. Chemistry and Engineering had rather high rates of online searching, 37.7% and 34.5% respectively, but their rates of browsing also exceeded 40%. In this sense, it can be said that they fall somewhere in between Medicine, Biology and Physics, Geosciences.

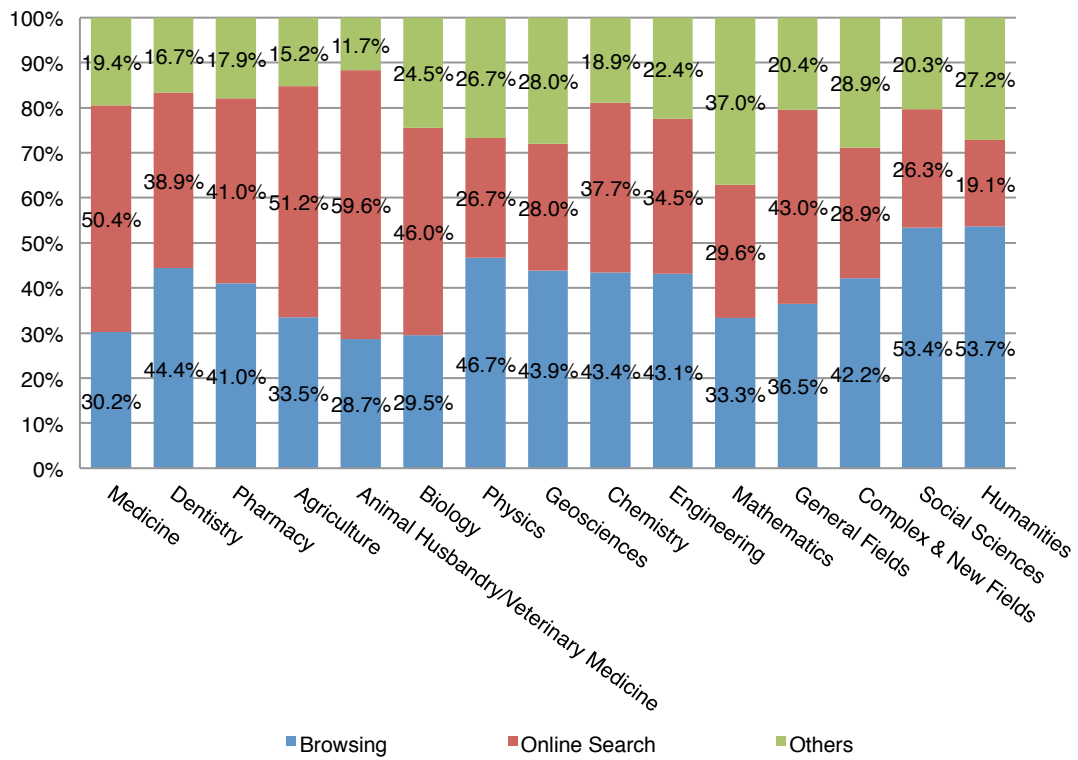


Figure 4-4 Means to find out articles—
divided into three categories and shown by discipline

4-4. Age of the article read most recently

Q3 Appropriately what year was this article publish/posted?

The most frequent answer was 2011, the same year this survey was conducted, taking up about a half of the whole answer, 54.1% in Natural Sciences and 44.1% in humanities/Social Sciences. As the publication year went back, the rates got smaller. Accumulating from the latest, the percentage exceeded 80% in the year 2007 in Natural Sciences and in the 2000-2004 in Humanities/Social Sciences (Figure 4-5).

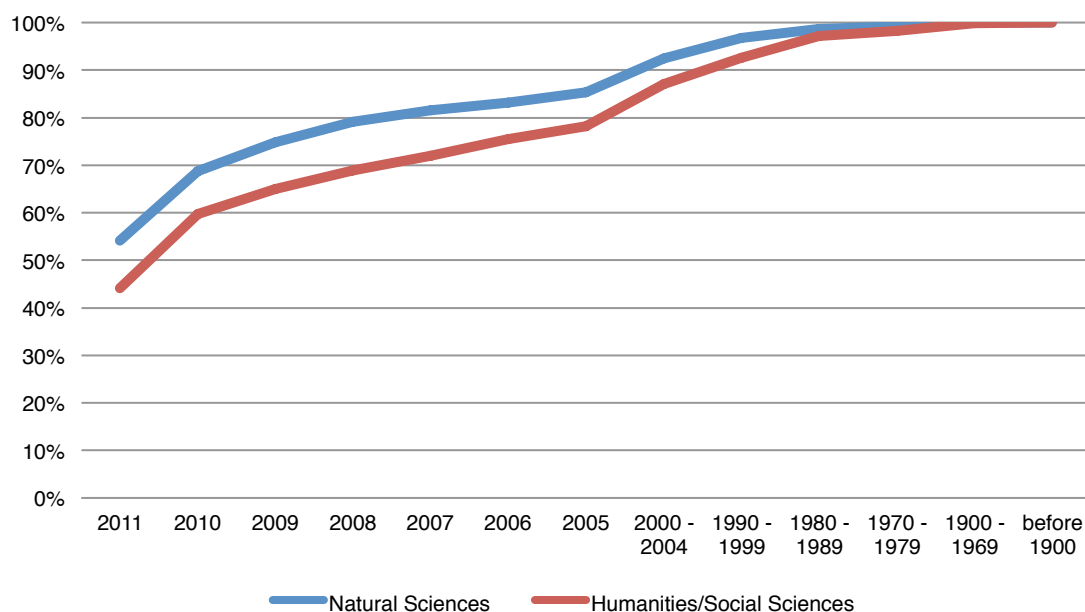


Figure 4-5 Publication years of last read article

Table 4-4 shows the publication years by the discipline. In Natural Sciences, the frequency of 2011 exceeded 60% in Biology, Medicine and Pharmacy, but in the rest it remained in the 50s. The exception was Mathematics, with the rate of 2011 articles stopping at 29.6%, quite lower than even Humanities. In Mathematics, accumulation had to be continued till the 1990s before the percentage reached 80.

The formats of articles were then examined by the publication year. Concerning the articles published in and after 2000, 20 to 30% were read in print and 40 to 60% in printed-out PDF. It did not turn out that the rate of reading in electric format turned up as the publication year got later (cf. Figure 4-6). Newest articles brought out in 2011 were actually read in print journals oftener than older articles published in any other year. As for the articles published before the 1990s, as much as 30 to 40% were read in photocopies but about the same amount was read in printed PDF. It suggests that the digitization has advanced enough to cover quite old articles.

Table 4-4 Publication years of last read article by discipline

	Medicine (n=142)	Dentistry (n=90)	Pharmacy (n=79)	Agriculture (n=164)	Animal Husbandry... (n=94)
2011	61.3%	58.9%	62.0%	55.5%	56.4%
2010	18.3%	15.6%	11.4%	12.8%	13.8%
2009	7.0%	7.8%	3.8%	7.3%	5.3%
2008	0.7%	5.6%	5.1%	4.9%	3.2%
2007	2.1%	3.3%	2.5%	0.6%	3.2%
2006	0.7%	2.2%	1.3%	2.4%	2.1%
2005	0.7%	0.0%	1.3%	2.4%	5.3%
2000 - 2004	5.6%	3.3%	7.6%	7.3%	4.3%
1990 - 1999	2.1%	3.3%	3.8%	4.9%	4.3%
1980 - 1989	0.7%	0.0%	1.3%	1.2%	1.1%
1970 - 1979	0.0%	0.0%	0.0%	0.0%	1.1%
1900 - 1969	0.7%	0.0%	0.0%	0.6%	0.0%
before 1900	0.0%	0.0%	0.0%	0.0%	0.0%

	Biology (n=200)	Physics (n=120)	Geosciences (n=82)	Chemistry (n=212)	Engineering (n=407)
2011	63.5%	56.7%	52.4%	55.2%	48.2%
2010	16.0%	10.8%	9.8%	9.9%	18.9%
2009	6.0%	2.5%	7.3%	3.8%	5.2%
2008	2.0%	4.2%	1.2%	6.1%	4.9%
2007	1.0%	1.7%	2.4%	2.4%	3.4%
2006	1.0%	0.0%	3.7%	2.4%	1.5%
2005	0.5%	1.7%	2.4%	2.8%	2.7%
2000 - 2004	6.5%	10.8%	9.8%	6.6%	7.6%
1990 - 1999	1.5%	7.5%	6.1%	7.1%	4.2%
1980 - 1989	0.5%	2.5%	4.9%	3.8%	1.0%
1970 - 1979	1.0%	0.8%	0.0%	0.0%	1.2%
1900 - 1969	0.5%	0.8%	0.0%	0.0%	1.2%
before 1900	0.0%	0.0%	0.0%	0.0%	0.0%

	Mathematics (n=54)	General Fields (n=230)	Complex & New Fields (n=91)	Social Sciences (n=430)	Humanities (n=284)
2011	29.6%	50.0%	58.2%	45.6%	41.9%
2010	7.4%	17.0%	12.1%	17.9%	12.3%
2009	5.6%	9.6%	5.5%	5.8%	4.2%
2008	7.4%	5.2%	4.4%	2.8%	5.6%
2007	7.4%	2.2%	3.3%	2.8%	3.5%
2006	1.9%	0.9%	1.1%	2.6%	4.9%
2005	0.0%	3.0%	2.2%	2.3%	3.2%
2000 - 2004	14.8%	6.1%	7.7%	7.7%	10.9%
1990 - 1999	7.4%	3.5%	1.1%	5.1%	6.0%
1980 - 1989	13.0%	1.3%	1.1%	4.4%	4.9%
1970 - 1979	0.0%	0.4%	2.2%	1.2%	1.1%
1900 - 1969	5.6%	0.9%	1.1%	1.6%	1.4%
before 1900	0.0%	0.0%	0.0%	0.2%	0.0%

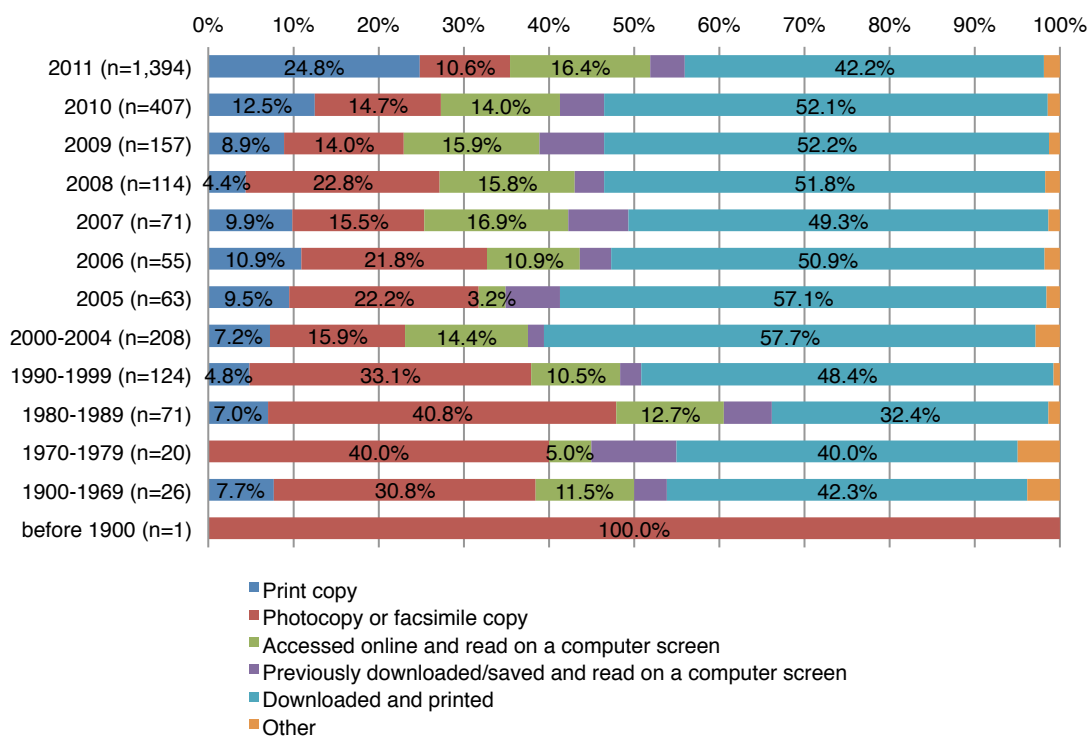


Figure 4-6 Format of article by publication year

4-5. Usage behavior regarding article reading

4-5-1. Time consumed to read the article

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

The average times spent reading the last articles were, in Natural Sciences, about 60 minutes for faculty members and about 100 minutes for graduate students. The same in Humanities/Social Sciences were about 70 minutes for both faculty members and graduate students (Table 4-4). The values of both the median and the mode were 60 minutes in graduate students of Natural Sciences and 30 minutes in all other groups. The times spent reading articles were divided into seven groups and Figure 4-6 shows the ratio of each. Only 39.2% of graduate students in Natural Sciences read the articles within 30 minutes; the percentage did not reach 60 until combined with those who read in 31 to 60 minutes. In the other three groups, however, 50 to 60% read the articles within 30 minutes, 70 to 80% within 60 minutes. Not much difference was seen when compared with the results of 2007 survey.

Table 4-5 Mean, median, mode and standard deviation of time spent for reading article

		Natural Sciences		Humanities/Social Sciences	
		Faculty	Graduate students	Faculty	Graduate students
Frequency	Valid	1,468	451	511	186
	Missing value	0	0	0	0
Mean		60.49	109.26	69.10	75.54
Median		30	60	30	30
Mode		30	60	30	30
Standard deviation		88.82	154.99	100.80	112.43
Minimum value		1	1	1	2
Maximum value		999	999	999	999
Percentile	25	20	30	20	20
	50	30	60	30	30
	75	60	120	60	90

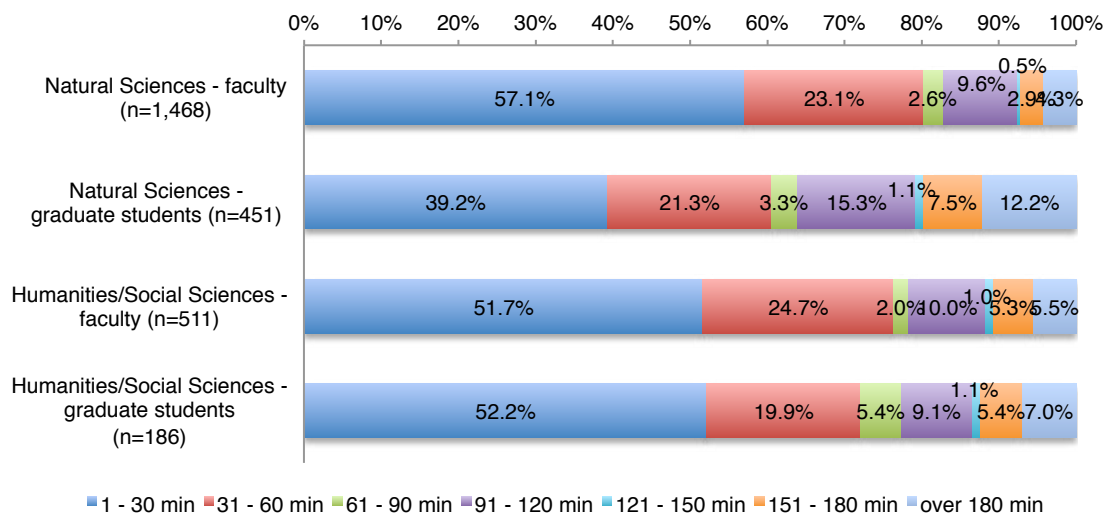


Figure 4-7 Distribution of time spent for reading the article

4-5-2. Place of reading

Q10 Where were you when you read this article? Please choose all answers that apply.

About 90% of both faculty members and graduate students in Natural Sciences read the articles in their offices or labs (Figure 4-8). In Humanities/Social Sciences the rates of the same location dropped to 60% for faculty members and to 40% for graduate students. Since this item allows multiple answers, the sum total naturally exceeds 100%.

Only graduate students of Humanities/Social Sciences showed a considerable rate of reading in university libraries (21.1%). This suggests that they are not as privileged with study rooms and labs as their correspondents in Natural Sciences, and that university libraries are providing the research/study space for them.

There was not much difference when compared with the results of 2007 survey.

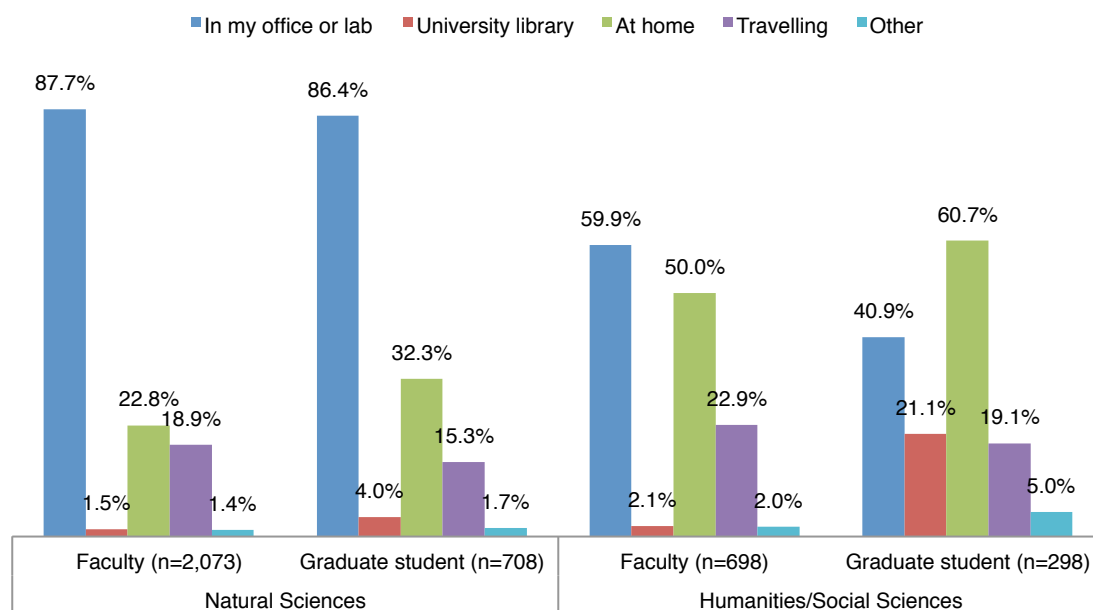


Figure 4-8 Place of reading by disciplinary group and status (multiple answers)

4-6. Novelty of the article

4-6-1. Pre-knowledge of content

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

Asked whether they had pre-knowledge of the last read article, about 40% of faculty members and graduate students answered in the affirmative.

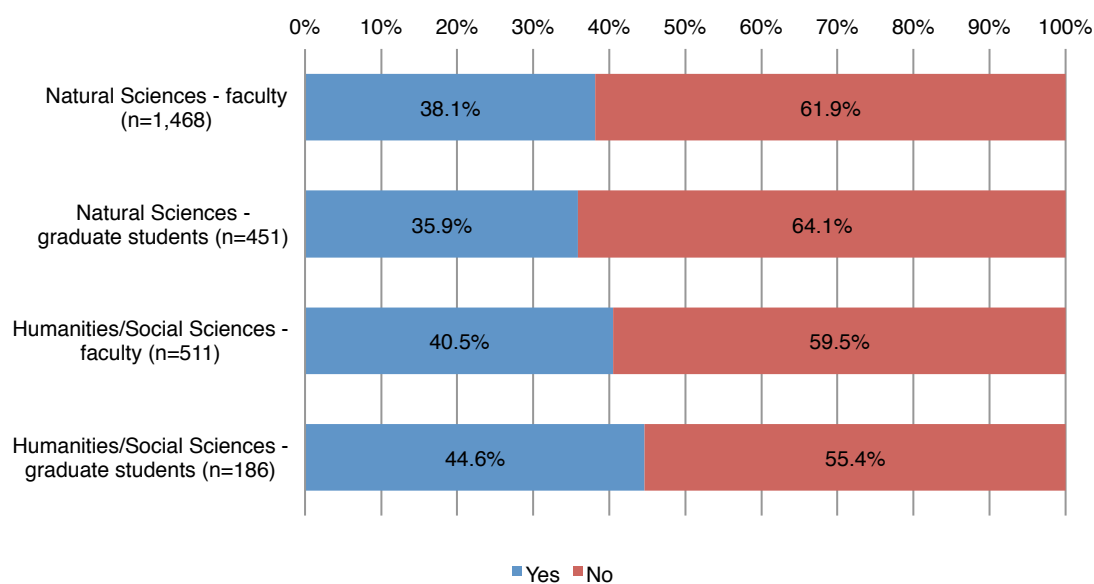


Figure 4-9 Ratio of pre-knowledge of article content

4-6-2. Source of pre-knowledge

Q7 If yes, how did you first find out about the information? Please choose all answers that apply.

Next, the respondents were asked the source of the pre-knowledge. 40 to 50% of respondents got it from journal articles, and conference/workshop, informal discussions with colleagues followed.

The rate of those who had pre-knowledge was rather high, nearing a half. The fact that many respondents specified the source as journal articles suggests that other articles quoted their last read articles and informed them of the contents.

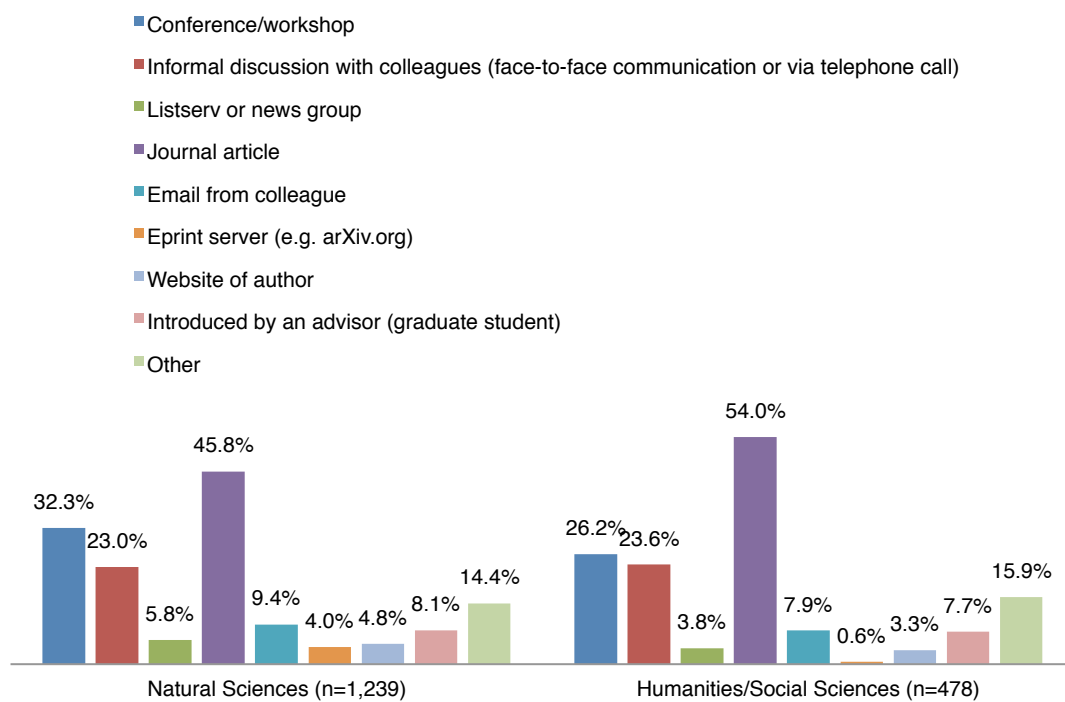


Figure 4-10 Detailed sources of pre-knowledge of article content

5. Purpose of reading scholarly articles

5-1. Proportion of working time

Q28 What percentage of your work time do you spend doing the following? (The total should equal 100%).

As a whole, the median values show “research and writing,” at 40%, is the work the respondents spend the longest hours. “Teaching including class, lecture, student advising, and working as teaching assistant” (20%), “service to school, faculty, and university” (5%) along with “service to academic society” (5%) follow it. The proportion of work hours spent for research and writing is now below 50%, nearly a 20% drop from 59% in 2007 (Table 5-1).

When classified by the status, faculty members spend 30% of their work time for education and 10% for service to school and/or university. In 2007, they spent 40% for research, 25% for education, and 10% for service to school and/or university, showing that researchers now allot less work time for research (Table 5-2). Graduate students spend most of their time, namely 70%, for “research and writing.” “Teaching class etc. and working as teaching assistant” and “other” follow, both at 10% (Table 5-3). Since they do not take major part in education, they seem to use the time in other activities.

Table 5-1 Allocation of work time (whole)

	Research and writing	Teaching	Administrative	Service to school, faculty, and university	Service to academic society	Consulting/ advising	Other
Frequency	3,937	3,934	3,929	3,935	3,934	3,935	3,927
Mean	47.23	23.08	6.60	10.21	6.05	1.67	5.22
Median	40	20	0	5	5	0	0
Mode	30	0	0	0	0	0	0
Standard deviation	28.72	20.08	13.61	13.68	6.92	5.32	16.15
Percentile	25	20	5	0	0	0	0
	50	40	20	0	5	0	0
	75	70	40	10	10	0	0

Table 5-2 Allocation of work time (faculty)

	Research and writing	Teaching i	Administrative	Service to school, faculty, and university	Service to academic society	Consulting/ advising	Other
Frequency	2,857	2,857	2,851	2,857	2,854	2,855	2,852
Mean	40.12	27.40	8.44	12.75	6.20	2.02	3.10
Median	30	30	0	10	5	0	0
Mode	30	0	0	10	0	0	0
Standard deviation	26.00	20.15	14.71	13.58	6.50	5.47	11.29
Percentile	25	20	0	5	0	0	0
	50	30	0	10	5	0	0
	75	57	10	20	10	0	0

Table 5-3 Allocation of work time (graduate students)

	Research and writing	Teaching i	Administrative	Service to school, faculty, and university	Service to academic society	Consulting/ advising	Other
Frequency	1,043	1,040	1,041	1,041	1,043	1,043	1,038
Mean	66.99	11.84	1.47	3.23	5.75	0.73	10.08
Median	70	10	0	0	2	0	0
Mode	80	0	0	0	0	0	0
Standard deviation	26.11	14.65	7.28	10.81	7.98	4.83	22.70
Percentile	25	50	0	0	0	0	0
	50	70	0	0	2	0	0
	75	90	0	0	10	0	0

5-2. Main purposes of reading articles

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

The act of reading changes depending on whether the article is read for the first time or not. Because of this, only the respondents who read the particular article for the first time (69.6% of the whole, 2,724 in number) are analyzed.

As a whole, advancing their research is the purpose of the last reading for the majority (53.2%) (Table 5-4). “Current awareness/keeping informed” (18.3%) and “writing reports, articles, etc.” (11.6%) follow this. The three most frequent answers in 2011 are identical with those in 2007, showing that main purposes of reading articles have not changed since 2007.

Table 5-4 Purpose of reading articles (main purpose—whole)

	2011		2007	
	Frequency	Rate	Frequency	Rate
Research	1,439	53.2%	1,134	54.4%
Teaching	208	7.7%	136	6.5%
Administration	7	0.3%	0	0.0%
Current awareness/keeping informed	494	18.3%	402	19.3%
Writing proposals (including proposals for grant-in-aid for scientific research)	42	1.6%	53	2.5%
Writing reports, articles, etc.	313	11.6%	232	11.1%
Referee reading	76	2.8%	38	1.8%
Consulting, advising others	28	1.0%	18	0.9%
Presentations	54	2.0%	40	1.9%
Other	43	1.6%	32	1.5%
Total	2,704	100.0%	2,085	100.0%

Even when seen in the clusters divided by the status and the discipline of respondents, three major purposes remain the same. The rate of educational purposes in the faculty (15.3%) and that of the graduate students of Humanities/Social Sciences whose purposes are to write reports and articles (22.0%) are larger than in other groups (Figure 5-1).

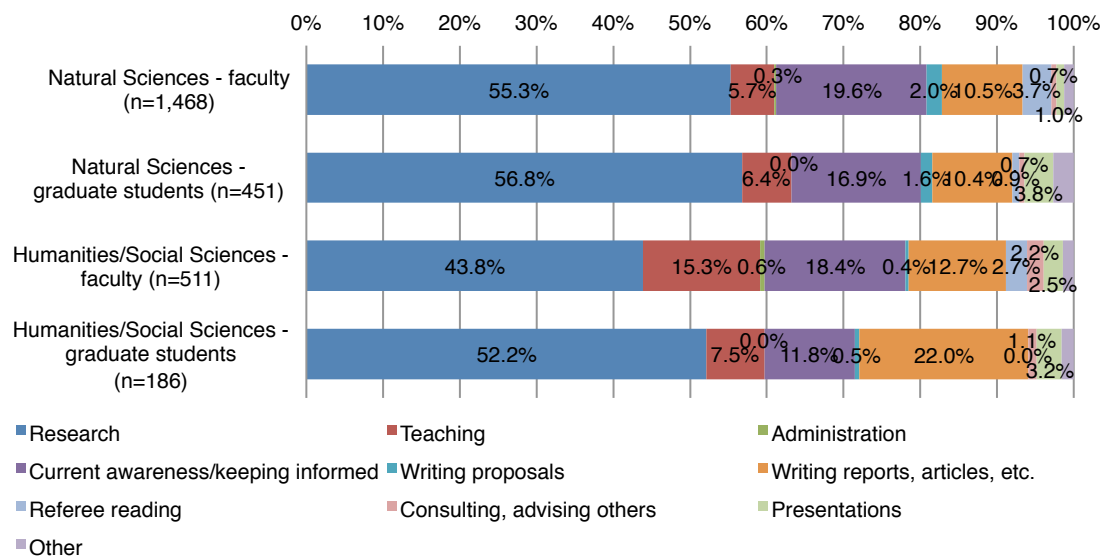


Figure 5-1 Purpose of reading articles (main purpose—by disciplinary group and status)

Even when seen by the individual discipline, the three major purposes take the high ranks except in Pharmacy and Physics (Table 5-5). The purpose to advance research is the most frequent in all

disciplines, but the percentage is remarkably high in Physics at 67.2%. As exceptions, “referee reading” in Mathematics and “presentations” in Agriculture, Social Sciences and Humanities show frequencies higher than in other disciplines.

Table 5-5 Purpose of reading articles (main purpose—by discipline)

	Medicine	Dentistry	Pharmacy	Agriculture	Animal Husbandry/ Veterinary Medicine	Biology	Physics	Geosciences & Others	Chemistry	Engineering	Mathematics	General Fields	Complex & New Fields	Social Sciences	Humanities	total
Research	70 50.4%	45 50.0%	41 52.6%	93 56.7%	54 57.4%	107 53.5%	80 67.2%	44 54.3%	114 53.8%	233 57.4%	27 50.0%	131 57.0%	53 58.9%	204 47.6%	122 43.3%	1,425 53.1%
Teaching	14 10.1%	7 7.8%	6 7.7%	22 13.4%	4 4.3%	14 7.0%	1 0.8%	2 2.5%	9 4.2%	7 1.7%	3 5.6%	16 7.0%	7 7.8%	53 12.4%	40 14.2%	207 7.7%
Administration	1 0.7%	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 0.2%	1 1.9%	1 0.4%	0 0.5%	2 0.5%	1 0.4%	7 0.3%
Current awareness/keeping informed	20 14.4%	11 12.2%	20 25.6%	22 13.4%	14 14.9%	49 24.5%	28 23.5%	19 23.5%	52 24.5%	76 18.7%	9 16.7%	39 17.0%	15 16.7%	71 16.6%	49 17.4%	494 18.4%
Writing proposals	4 2.9%	1 1.1%	2 2.6%	5 3.0%	3 3.2%	2 1.0%	1 0.8%	0 0.0%	7 3.3%	5 1.2%	0 0.0%	4 1.7%	3 3.3%	2 0.5%	1 0.4%	41 1.5%
Writing reports, articles, etc.	16 11.5%	15 16.7%	4 5.1%	15 9.1%	13 13.8%	22 11.0%	3 2.5%	11 13.6%	20 9.4%	54 13.3%	3 5.6%	18 7.8%	7 7.8%	65 15.2%	42 14.9%	311 11.6%
Referee reading	1 0.7%	3 3.3%	1 1.3%	2 1.2%	1 1.1%	1 0.5%	2 1.7%	2 2.5%	7 3.3%	19 4.7%	8 14.8%	11 4.8%	2 2.2%	9 2.1%	6 2.1%	75 2.8%
Consulting, advising others	0 0.0%	1 1.1%	2 2.6%	0 0.0%	0 0.0%	1 0.5%	0 0.0%	1 1.2%	1 0.5%	4 1.0%	1 1.9%	1 0.4%	0 0.0%	8 1.9%	5 1.8%	27 1.0%
Presentations	3 2.2%	1 1.1%	1 1.3%	4 2.4%	3 3.2%	2 1.0%	4 3.4%	2 2.5%	1 0.5%	3 0.7%	1 1.9%	5 2.2%	2 2.2%	9 2.1%	12 4.3%	54 2.0%
Other	10 7.2%	6 6.7%	1 1.3%	1 0.6%	2 2.1%	2 1.0%	0 0.0%	0 0.0%	1 0.5%	4 1.0%	1 1.9%	4 1.7%	1 1.1%	6 1.4%	4 1.4%	43 1.6%
total	139	90	78	164	94	200	119	81	212	406	54	230	90	429	282	2,684

5-3. Secondary purposes of reading articles

Q12b If you read the article for more than one purpose, what were your secondary purposes for reading? Please choose all that apply.

As a whole, the percentage of the respondents who read the article for “current awareness/keeping informed” is the largest at 33.9%, and “research” at 28.9% and “writing reports, articles, etc.” at 26.4% follow. Whether it is main or secondary purposes, the information acquired through reading articles is most often utilized for research purposes (Table 5-6).

Both faculty members and graduate students, even in their secondary purposes, read articles for research. While faculty members use them for educational purposes, the rate of this purpose is low among graduate students who generally teach only a little. Because of this exemption, they read articles more for “writing reports, articles, etc.” (29.4%) and preparing for “presentation” (17.3%).

When seen by the disciplinary group, large differences come to surface (Figure 5-2). For both faculty and graduate students in Natural Sciences, “current awareness/keeping informed” is the most frequent answer. In faculty members of Humanities/Social Sciences, the most frequent answer is “research” at 31.7%, and “current awareness/keeping informed” (27.8%) and “teaching” (23.7%) follow. It shows that faculty in Humanities/Social Sciences use articles for educational purposes oftener than faculty in Natural Sciences. The highest percentage among graduate students of Humanities/Social Sciences is seen in “writing reports, articles, etc.” (34.9%), and “research”

follows it at 34.4%. The newest research outcome is published much oftener in journals in Natural Sciences than in those in Humanities/Social Sciences. This disciplinary difference seems to be causing the contrastive results evident here.

Table 5-6 Purpose of reading articles (secondary purpose—whole)

	Faculty	Graduate students	Other/ unidentified	Total
Research	568	199	20	787
	28.6%	31.1%	20.4%	28.9%
Teaching	335	40	9	384
	16.9%	6.3%	9.2%	14.1%
Administration	27	2	0	29
	1.4%	0.3%	0.0%	1.1%
Current awareness / keeping informed	680	221	23	924
	34.2%	34.5%	23.5%	33.9%
Writing proposals (including proposals for grant-in-aid for scientific research)	216	58	6	280
	10.9%	9.1%	6.1%	10.3%
Writing reports, articles, etc.	462	188	19	669
	23.3%	29.4%	19.4%	24.6%
Referee reading	120	18	4	142
	6.0%	2.8%	4.1%	5.2%
Consulting, advising others	166	36	2	204
	8.4%	5.6%	2.0%	7.5%
Presentations	187	111	7	305
	9.4%	17.3%	7.1%	11.2%
No secondary purpose	284	82	18	384
	14.3%	12.8%	18.4%	14.1%
Other	15	12	1	28
	0.8%	1.9%	1.0%	1.0%
Total	1,986	640	98	2,724

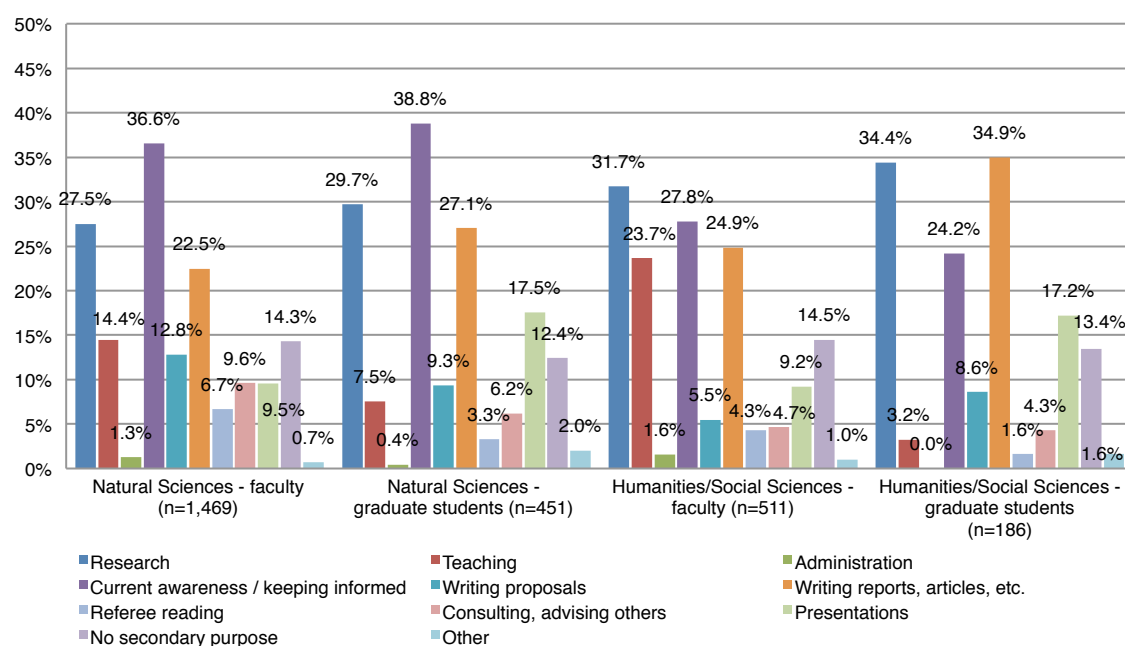


Figure 5-2 Purpose of reading articles
(secondary purpose—by disciplinary group and status)

5-4. Recognition of effects by reading articles

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

As a whole, the highest rate is found in “it narrowed/broadened/changed the focus” at 60.4%, followed by “it inspired new thinking/ideas” (46.5%) and “it improved the result” (27.6%). This tendency is identical with that was confirmed in the 2007 survey, showing that researchers’ purposes of article usage and its effects have not changed over the time (Table 5-7).

The three largest effects are common regardless of the disciplinary group or of the respondents’ status, but the rates of “it improved the result” in both faculty members and graduate students in Humanities/Social Sciences are more than 10 points higher than those in Natural Sciences. On the other hand, more faculty and graduate students in Natural Sciences find “it resolved technical problems” than those in Humanities/Social Sciences (Figure 5-3).

Seen by the age, the three largest effects remain identical in all groups, although the rate of the answer “it narrowed/broadened/changed the focus” among those over 60 is about 10 points lower than those in the others (Figure 5-4).

Utilization of articles in scholarly journals is generally evaluated favorably, and mal-effects like “it wasn’t helpful; it wasted my time” (2.0%) seem to be seldom experienced.

Table 5-7 Effects of reading articles (whole)

	Faculty	Graduate students	Other/unidentified	Total
It improved the result	553	178	21	752
	27.8%	27.8%	21.4%	27.6%
It narrowed/broadened/changed the focus	1,231	376	38	1,645
	62.0%	58.8%	38.8%	60.4%
It inspired new thinking/ideas	887	348	32	1,267
	44.7%	54.4%	32.7%	46.5%
It resulted in collaboration/joint research	72	17	3	92
	3.6%	2.7%	3.1%	3.4%
It resulted in faster completion	109	58	3	170
	5.5%	9.1%	3.1%	6.2%
It resolved technical problems	153	61	10	224
	7.7%	9.5%	10.2%	8.2%
It saved time or other resources	168	46	7	221
	8.5%	7.2%	7.1%	8.1%
It wasn't helpful; it wasted my time	32	12	2	46
	1.6%	1.9%	2.0%	1.7%
Other	94	19	4	117
	4.7%	3.0%	4.1%	4.3%
Total	1,986	640	98	2,724

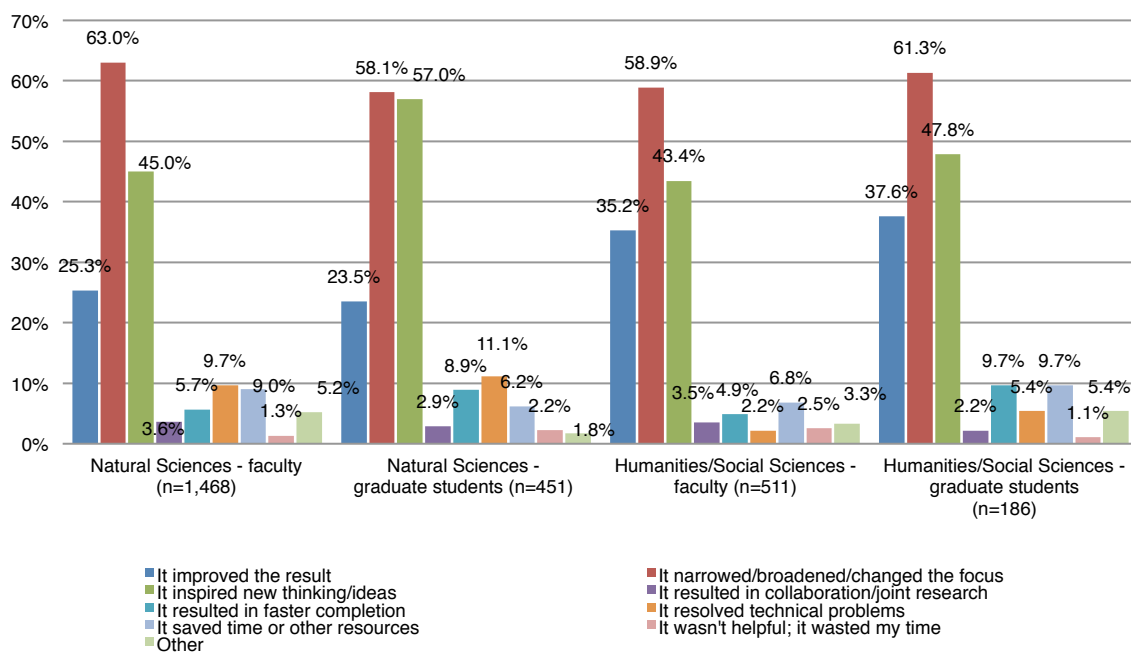


Figure 5-3 Effects of article usage (by disciplinary group and status)

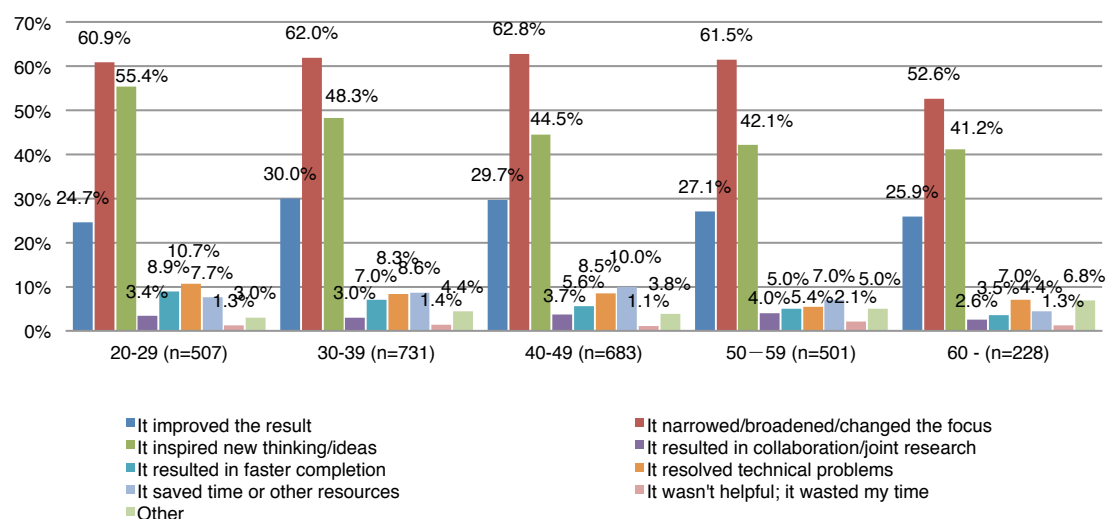


Figure 5-4 Effects of reading articles (by age group)

5-5. Importance of the article in achieving main purpose

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

85.7% of the whole either found the article they read either “absolutely essential” (29.4%) or “somewhat important” (56.3%), showing that used articles contributed to the achievement of their main purposes at an extremely high rate (Table 5-8). This tendency does not change even when seen by the disciplinary group and by the status (Figure 5-5). Considered along with the findings in the previous section, it shows that researchers recognize the large effects brought by reading articles, and that their usage of scholarly journals is serving them to a great extent in achieving their goals.

Table 5-8 Importance of article in achieving main purpose

	Faculty	Graduate students	Other/ unidentified	Total
Absolutely essential	568	199	28	795
	28.6%	31.1%	35.9%	29.4%
Somewhat important	1,136	351	34	1,521
	57.2%	54.8%	43.6%	56.3%
Ambivalent / No opinion	213	69	15	297
	10.7%	10.8%	19.2%	11.0%
Somewhat unimportant	60	20	1	81
	3.0%	3.1%	1.3%	3.0%
Not at all important	9	1	0	10
	0.5%	0.2%	0.0%	0.4%
Total	1,986	640	78	2,704

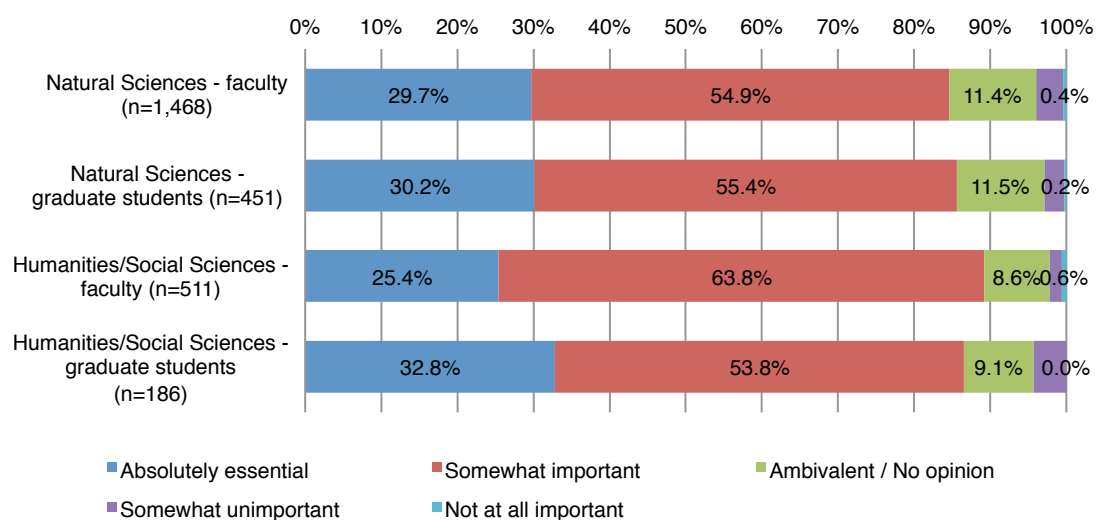


Figure 5-5 Importance of article in achieving main purpose
(by disciplinary group and status)

IV. Desires and Opinions

This chapter reviews the three free description questionnaire items concerning the respondents' desires and opinions. The questions read: "*What functions do you want in online journals? Please write in your opinion*" (Q16), "*Please write freely on issues and desires surrounding the use of academic information*" (Q23), and "*Please write freely of your desire and/or opinion concerning the future services of libraries*" (Q24). A question equivalent to Q16 did not exist in the 2007 survey; it was newly added this time.

Since the opinions and desires greatly varied, we categorized them for each questions. There were cases, however, where a response included multiple topics. When this happened, we divided the comment and placed the elements under their appropriate categories.

The original responses, with minimum editing for the unification of expressions and signs, are shown in a supplement volume.

6. Functions desired in online journals

Excluding those who wrote they did not have particular opinions, 1,710 respondents (43.6%) answered Question 16, "What functions do you want in online journals?" As Table 6-1 shows, we got desires and opinions from various angles.

Table 6-1 Functions desired in online journals

	Category	Number
I	Access environment	56
II	Open access	73
III	Pricing, contract	55
IV	Enlargement of available range	421
V	Improvement of system function	456
VI	Link between systems/articles	247
VII	Personalization	174
VIII	Interface	27
IX	Contents, file format	195
X	Others, general	114
Total		1,818

Desires concerning the "improvement of system function" (456) were heard the most often. This category includes "easier and speedier access," "easier search," "fuller search functions (more convenient or accurate search functions, keyword search using related words, fuller functions for full-text search, etc.)," "SNS-like functions," "RSS feed," and "author identification (by DOI etc.)."

The second most frequent comments concerned the "enlargement of available range" (421), including the issues such as "fuller back numbers," "larger variety of available journals" and "guarantee of access right to older articles." The "enlargement of available range," along with the opinions that do not directly concern the function such as "open access" (73), "access environment" (56) and "pricing, contract" (55), attest to the fact that users considered them as urgent issues.

The category “link between systems/articles” pertains to the issues that go beyond publishers and platforms and lead to the realization of cross-reference utilizing the lists of works cited, etc. The “contents, file format” (195) includes matters that directly concern the file itself such as “OCR accuracy,” “graphics resolution” and “transparent text PDF”; the category, at the same time, encompasses diverse contents like “naming conventions for downloaded files (use of DOI, etc.),” “unification of supplement information to PDF” and “Japanese translation.” As for “personalization” (174), many opinions and desires concerning “management of downloaded files” and “management of individual usage history” were voiced. In the “interface” (27), desires for “readability and usability” and “interface that enables reading electronic medium as it is” were seen.

Many of the voices categorized in “access environment” (56) desired remote access to electronic journals from home and while traveling. In the 2007 survey, more than a half of “desires for libraries and publishers” (950 out of 1,710) concerned remote access; such opinions showed a huge drop this time. This seems to be the result of the improvement in environment; many institutions, in the meantime, have introduced VPN (Virtual Private Network) connection etc.

7. Issues concerning the usage of academic and scholarly information and desires for libraries and publishers

967 respondents (24.7%) answered Q23, “Please write freely on issues and desires surrounding the use of academic information.” The contents of their opinions are categorized as Table 7-1 shows.

Table 7-1 Issues concerning the usage of academic and scholarly information and desires for libraries and publishers

	Category		Number
I	Collection		709
	1	Range of access	218
	2	Issues of contract and pricing	206
	3	Open access	63
	4	Digitization	82
	5	Digitization of out-of-print materials	25
	6	E-books	26
	7	Purchase with research fund, etc.	17
	8	General (including printed materials)	58
	9	Others	14
II	Search system and functions		55
III	Usage guide and support		31
IV	Contents		22
V	Copyrights		15
VI	Others (publisher)		19
VII	Others (library)		39
VIII	Others (general)		69
Total			959

Approximately three quarters (73.9%) of the responses were about the “collection” (709), showing that this is a large concern to many. When subdivided, “range of access” (218) concerning the number of e-journal titles, back numbers and Japanese journals and “issues of contract and pricing” (206) relating to the sharp rise in the price of subscription made up the vast majority. A structure that enables a swift acquisition of large number of materials necessary for the research seems in need. The category “open access” (63) may come under the same framework, but the direct references to it were limited. In “digitization” (82), desires for the digitization of materials that existed only in printed medium and of all books were frequent. The categories “digitization of out-of-print materials” (25) and “e-books” (26) are also related to “digitization.” Opinions in the “purchase with research fund, etc.” (17) were about the cases where the user wanted to pay for individual articles in non-subscribed journals from her/his research funds; they also include issues like simplified methods of payment, and the time lag that occurred when purchasing out of school budget. “General (including printed materials)” contains opinions about the necessity of printed version.

As for the categories other than “collection,” “search system and functions” (55) concerns the consolidation and enhancement of search functions such as OPAC, and “usage guide and support” (31) has desires for the enrichment of PR and guides from libraries and publishers and also for usage seminars. “Contents” (22) has voices concerning the quality of PDF, and “copyrights” (15) has voices desiring for a convenience safe under the present copyright system. Desires and opinions were indeed various, voiced from diverse angles.

The comments that could not be placed in any categories above were grouped into one of “Others (publishers)” (19), “Others (libraries)” and “Others (general)” (69) in accordance with their contents.

8. Desires and opinions concerning the future library services

899 respondents (22.9%) answered Q24, “Please write freely of your desire and/or opinion concerning the future services of libraries,” and Table 8-1 shows their answers grouped up into nine categories.

Table 8-1 Desires and opinions concerning the future library services

	Category		Number
I	Collection		523
	1	Electronic collection	302
	2	General (including printed materials)	172
	3	Remedy of information gap (national/regional license agreement, etc.)	19
	4	Open access	13
	5	Others	17
II	Usage guide and support		78
III	Service system		101
	1	Opening hours	23
	2	Period of loan	7
	3	Others	71
IV	ILL (including DDS and copying service)		54
V	Search system and websites, etc.		52
VI	Usage environment		56
	1	Usage environment inside the library	29
	2	Remote access	23
	3	Others	4
VII	Staff		24
VIII	Overall service		22
IX	Others		50
Total			960

As was the case with the previous section, “issues concerning the usage of academic and scholarly information and desires for libraries and publishers,” more than a half of the answers to this question concentrated on “collection” (523; 54.5%). Interest in “collection” is high probably because the library service for researchers, under the electronic environment, is practically limited to the offer of its collection. Comments categorized into the “electronic collection” (302) had similar contents discussed in the previous section. We placed the opinions concerning the coexistence of e-journals and printed medium as well as e-collections into the category “general (including printed materials)” (172); comments on the general enhancement and management of library collection, as well, are placed in this category. “Remedy of information gap (national/regional license agreement, etc.)” (19) includes voiced concern over the “information gap” among institutions brought about by the price increase of e-journals, along with desires for the license agreement common within the country or the region.

“Usage guide and support” (78) includes more active usage support and guide from the libraries. As for “service system” (101), though fewer when compared with students, faculty members also referred to longer “opening hours” (23) and “period of loan” (7), showing these elements are still important to them. “Others” (71) has opinions about the management and system of the library services.

“ILL (including DDS and copying service)” contains demands for a copying service that provides the copy in graphic files (PDF, etc.) and an ILL service where materials can be obtained from more institutions within and outside the country. This category also had comments on fees and waiting time. As in the previous section, “search system and websites, etc.” (52) concerns the improvement of searching function such as OPAC.

Within the “usage environment” (56), many thought it necessary to improve “usage environment inside the library” (29)—enlargement of study space for students, for example—and also to better “remote access,” which we have already discussed. As for the “staff” (24), many desired staff members with ample specialized knowledge.

V. Other Demographics

9. Scholarly achievements and research funds

9-1. Scholarly achievements

Q29 In the past two years, including those in press, how many:

Articles in refereed scholarly journals have you published?

Non-refereed articles have you published?

Chapters in books, proceedings, etc. have you published?

Entire books have you published?

Other (please specify)

Total

As Table 9-1 shows, faculty members in Natural Sciences published, on average, 5.79 refereed articles in scholarly journals in the past two years. Considering that the values of median, mode, and standard deviation are 4, 2 and 10.15, however, it seems that a relatively small number of respondents published many articles to push up the average. When all types of achievements, including non-refereed articles (mean=1.87), joint-authored books, proceedings and others (1.74) and single-authored books (0.12), are considered, the mean, median and mode are, respectively, 9.81, 6 and 4, indicating that faculty members in this group produced quite a lot besides refereed articles.

The mean number of refereed papers in scholarly journals published by faculty members of Humanities/Social Sciences is 1.48, much smaller than that of faculty members in Natural Sciences. The mode at 0, the median at 1, the 75th percentile at 2, and the standard deviation at 2.23 show most of the respondents in this group produced a limited number of refereed articles. The greatest number of their research outcome, on the other hand, was published in non-refereed journals. The mean, median and 75th percentile for such papers are, respectively, 2.60, 2, and 3.

As for the achievements by graduate students in doctoral programs, all types being combined, the mean numbers are 2.64 in Natural Sciences and 2.70 in Humanities/Social Sciences. Different from the faculty members, no conspicuous disparity is found between them.

Table 9-2 shows the number of publications only by faculty members, divided into disciplines. The numbers of refereed papers are large in Chemistry (mean 7.86; median 5), Medicine (7.82; 5), Physics (7.55; 5), Pharmacy (7.13; 5), and Animal Husbandry/Veterinary Medicine (6.88; 6). On the other hand, the mean numbers in Humanities and Social Sciences are low at 1.77 and 2.49, and the mode is 1 in both. It shows that the quantity of output greatly varies depending on the respondent's discipline.

The largest number of non-refereed papers is found in Social Sciences with the median at 2 (mean 2.93), followed by the disciplines with the median at 1, namely, General Fields (3.06), Medicine (2.99), Engineering (2.79) and Humanities (2.11). In the following 4 disciplines, the medians are all 0 and the means below 1: Pharmacy (mean 0.72), Biology (0.75), Physics (0.79) and Mathematics (0.93).

Concerning the number of achievements appeared as chapters in books (joint authorship) and proceedings, etc., the median values are 1 in the following 5 disciplines: Medicine (mean 3.06), General Fields (2.71), Dentistry (2.60), Social Sciences (1.97) and Humanities (1.35). In Medicine, Dentistry and Social Sciences, the 75th percentiles are 3.

The mean number of entire books is the largest in Social Sciences at 0.30, showing that achievements in book form are very limited in all disciplines.

Adding “other” to all above, Medicine exceeds all the other disciplines in the total number of achievements. This discipline shows the highest values in the average at 14.73, the median at 9, the mode at 10, the 25th percentile at 5 and the 75th percentile at 15. The mean numbers exceeded 10 in Engineering (11.03), Chemistry (10.65), Dentistry (10.53), and General Fields (10.33).

Table 9-1 Research achievement in past two years
(faculty members/graduate students)

		Natural Sciences									
		Faculty members					Graduate students				
		Articles in refereed scholarly journals	Non-refereed articles	Chapters in books, proceedings, etc.	Entire books	Total (inclusive of others)	Articles in refereed scholarly journals	Non-refereed articles	Chapters in books, proceedings, etc.	Entire books	Total (inclusive of others)
Frequency		2,124	2,124	2,124	2,124	2,124	729	729	729	729	729
Mean		5.79	1.87	1.74	0.12	9.81	1.42	0.62	0.42	0.07	2.64
Median		4	0	0	0	6	1	0	0	0	2
Mode		2	0	0	0	4	0	0	0	0	0
Standard deviation		10.15	4.73	4.50	0.65	15.45	3.04	2.01	1.50	0.66	5.10
Minimum value		0	0	0	0	0	0	0	0	0	0
Maximum value		220	100	65	12	340	50	25	20	15	100
Percentile	25	2	0	0	0	3	0	0	0	0	0
	50	4	0	0	0	6	1	0	0	0	2
	75	7	2	2	0	9	2	0	0	0	3

		Humanities/Social Sciences									
		Faculty members					Graduate students				
		Articles in refereed scholarly journals	Non-refereed articles	Chapters in books, proceedings, etc.	Entire books	Total (inclusive of others)	Articles in refereed scholarly journals	Non-refereed articles	Chapters in books, proceedings, etc.	Entire books	Total (inclusive of others)
Frequency		722	722	722	722	722	308	308	308	308	308
Mean		1.48	2.60	1.72	0.27	6.63	1.01	0.90	0.44	0.02	2.70
Median		1	2	1	0	5	1	0	0	0	0
Mode		0	0	0	0	3	0	0	0	0	0
Standard deviation		2.23	4.46	2.80	0.74	8.56	1.35	1.57	0.98	0.16	2.65
Minimum value		0	0	0	0	0	0	0	0	0	0
Maximum value		30	50	30	10	123	8	12	6	2	14
Percentile	25	0	0	0	0	3	0	0	0	0	1
	50	1	2	1	0	5	1	0	0	0	2
	75	2	3	2	0	7	2	1	1	0	4

**Table 9-2 Research achievement in past two years
(by discipline/faculty members only)**

Articles in refereed scholarly journals

		Medicine	Dentistry	Pharmacy	Agriculture	Animal husbandry/Veterinary medicine	Biology	Physics	Geosciences & Others	Chemistry	Engineering	Mathematics	General Fields	Complex & New fields	Social Sciences	Humanities
Frequency		132	104	69	170	66	205	119	103	229	486	70	247	109	429	293
Mean		7.82	6.34	7.13	5.61	6.88	4.71	7.55	4.59	7.86	5.76	3.46	3.89	4.95	1.52	1.42
Median		5	4	5	4	6	3	5	3	5	4	3	2	3	1	1
Mode		2	0	5	2	2	2	5	2	3	2	1	2	4	0	0
Standard deviation		19.37	14.96	6.24	9.31	5.92	8.12	7.59	4.69	11.57	11.10	3.39	4.86	5.74	2.49	1.77
Minimum value		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maximum value		220	150	30	110	30	100	40	30	100	200	20	40	35	30	13
Percen- tile	25	2	2	3	2	2	2	2	2	3	2	1	1	2	0	0
	75	10	7	10	6	10	5	10	5	9	7	5	5	5	2	2

Non-refereed articles

Mean		2.99	1.31	0.72	1.06	1.59	0.75	0.79	1.99	1.23	2.79	0.93	3.06	1.72	2.93	2.11
Median		1	0	0	0	0	0	0	1	0	1	0	1	1	2	1
Mode		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Standard deviation		7.97	3.20	1.36	1.95	4.02	1.90	1.66	2.91	3.32	6.48	1.75	5.98	2.68	4.57	4.26
Minimum value		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maximum value		80	25	5	15	22	20	10	20	26	100	10	50	21	50	50
Percen- tile	25	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
	75	3	1	1	2	2	1	1	3	1	3	1	4	2	3	3

Chapters in books, proceedings, etc.

Mean	3.06	2.60	1.33	1.41	1.05	0.74	0.99	0.96	1.42	2.03	0.60	2.71	1.72	1.97	1.35
Median	1	1	0	0	0	0	0	0	0	0	0	1	0	1	1
Mode	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Standard deviation	5.62	5.55	3.71	3.31	1.68	1.28	1.73	1.51	3.08	5.77	1.60	6.53	3.44	3.02	2.41
Minimum value	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maximum value	30	40	30	30	10	10	8	10	25	65	10	60	20	25	30
Percen- tile	25	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	75	3	3	2	2	2	1	2	1	2	2	0	2	2	3

Entire books

Mean	0.27	0.12	0.09	0.11	0.26	0.09	0.08	0.03	0.09	0.08	0.26	0.18	0.15	0.30	0.23
Median	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mode	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Standard deviation	1.27	0.43	0.33	0.58	1.28	0.39	0.36	0.30	0.39	0.48	0.85	0.91	0.45	0.85	0.48
Minimum value	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maximum value	10	3	2	5	10	3	2	3	3	8	4	12	3	10	3
Percen- tile	25	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	75	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Total (inclusive of others)

Mean	14.73	10.53	9.28	8.41	9.92	6.51	9.46	7.60	10.65	11.03	5.33	10.33	9.21	7.16	5.84
Median	9	5	8	6	8	4	7	6	6	7	4	6	6	5	4
Mode	10	3	5	<u>4</u>	<u>2</u>	4	5	4	3	2	4	5	5	<u>3</u>	3
Standard deviation	31.40	18.10	9.29	12.50	8.58	9.61	8.85	7.15	14.40	18.71	4.80	12.15	8.97	9.25	7.38
Minimum value	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maximum value	340	165	65	137	42	110	50	55	113	320	21	76	42	123	59
Percentile	25	5	3	4	3	4	2	4	3	4	2	3	3	3	2
	75	15	14.5	12.5	10	12	8	12	9	11	13	7.25	13	12	8

* Underline designates where multiple mode values appeared. The table shows only the smallest value.

9-2. Number of coauthors and sources of research funds

9-2-1. Number of coauthors

Q30 For the last refereed scholarly article that you published how many co-authors did you have, if any?

As Table 9-3 shows, the total number of refereed papers produced by all respondents is 2,678. Among these, 249 (9.3%) are single-authored and the rest are coauthored. Single-authorship is rare in Natural Sciences, taking up only 3.7% among faculty members and 2.0% among graduate students; on the other hand, it is the most common form of achievement in Humanities/Social Sciences (44.1% among faculty members and 48.5% among graduate students). Single-authorship and co-authorship with only one more person occupy more than 70% of achievements in this disciplinary group.

Table 9-3 Number of coauthors

Number of coauthors	Natural Sciences		Humanities/Social Sciences		Others	Total
	Faculty members	Graduate students	Faculty members	Graduate students		
0	69	8	123	48	1	249
Single-author	3.7%	2.0%	44.1%	48.5%	4.8%	9.3%
1	138	30	70	25	2	265
	7.3%	7.5%	25.1%	25.3%	9.5%	9.9%
2	213	52	38	5	2	310
	11.3%	13.0%	13.6%	5.1%	9.5%	11.6%
3	298	74	20	6	4	402
	15.9%	18.5%	7.2%	6.1%	19.0%	15.0%
4	315	66	11	3	6	401
	16.8%	16.5%	3.9%	3.0%	28.6%	15.0%
5	291	47	5	4	2	349
	15.5%	11.7%	1.8%	4.0%	9.5%	13.0%
6	206	48	2	1	1	258
	11.0%	12.0%	0.7%	1.0%	4.8%	9.6%
7	100	20	3	1	3	127
	5.3%	5.0%	1.1%	1.0%	14.3%	4.7%
8	76	14	2	0	0	92
	4.0%	3.5%	0.7%	0.0%	0.0%	3.4%
9	40	11	1	1	0	53
	2.1%	2.7%	0.4%	1.0%	0.0%	2.0%
10+	132	31	4	5	0	172
	7.0%	7.7%	1.4%	5.1%	0.0%	6.4%
Total	1,878	401	279	99	21	2,678
	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Table 9-4 shows the mean, median, maximum and standard deviation of the number of authors (coauthors + 1) by discipline. The mean number in physics stands out at 24.03, but this is due to the 8 cases where more than 100 authors are involved. Presumably these papers are concerned with High-energy Physics (accelerator), a research field known for its large number of coauthors.

Table 9-4 Distribution of number of authors (by discipline)

	Frequency	Mean	Median	Maximum	Standard deviation
Medicine	155	7.83	7	24	3.63
Dentistry	102	7.16	7	13	2.14
Pharmacy	91	6.92	6	14	2.77
Agriculture	173	6.01	5	35	3.46
Animal Husbandry/ Veterinary Medicine	100	6.83	7	19	2.82
Biology	220	6.87	6	179	12.08
Physics	148	24.03	5	501	81.48
Geosciences & Others	112	6.22	5	57	6.54
Chemistry	253	5.38	5	24	2.52
Engineering	506	4.75	5	23	2.16
Mathematics	57	2.79	2	12	1.79
General Fields	249	4.46	4	17	2.21
Complex & New Fields	113	5.03	5	12	2.62
Social Sciences	245	2.71	2	31	2.91
Humanities	134	2.25	1	31	3.32

The median values of Medicine, Dentistry and Animal Husbandry/Veterinary Medicine are 7 and that of Biology is 6, relatively higher than in other disciplines. Physics, though the mean number is exceptionally large, has the median at 5, showing that the cases with numerous coauthors are relatively few. The median value in Humanities is 1, and 81 (60.4%) respondents out of 134 specified that their last papers were single-authored.

9-2-2. Research funds

Q30-2 How was the research that produced the article funded? Check all that apply.

Figure 9-1 shows the responses concerning research funds divided by the disciplinary group and by the respondent's status. Among the faculty members of Natural Sciences, government grant (e.g. grant-in-aid for scientific research) is the most frequent (64.2%) and "as part of my role at my university (not specifically funded)" follows (46.7%). Other sources of funds, university-provided grant (14.1%), foundation grant (9.3%) and industry or contract (8.4%) remain within a small rate. Although graduate students in Natural Sciences show more or less the same tendency with faculty members, the rates of government grant (52.4%) and individual research allowance (i.e. "as part of my role at my university (not specifically funded)") (42.2%) are a little lower.

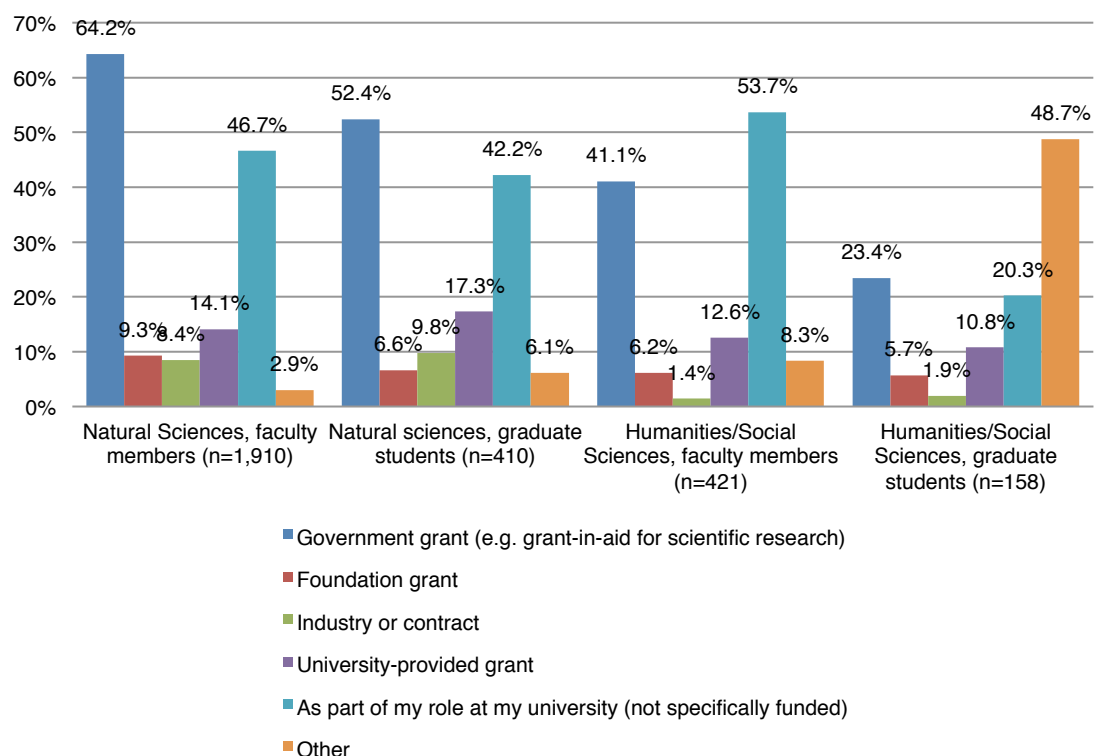


Figure 9-1 Research funds for recent outcome
(by disciplinary group and status)

The most frequent fund for the faculty members of Humanities/Social Sciences is individual research allowance (53.7%), and government grant (e.g. grant-in-aid for scientific research) (41.1%) follows. Nearly a half of graduate students in this group, different from their counterparts in the other group, rely on other sources (48.7%). Choosing the “other” for this question, most of them explained that they paid their own expenses or that they did not have any grants.

Table 9-5 limits the subjects to faculty members and shows the sources of research funds for recent scholarly articles by the discipline. The rates of government grant, such as grant-in-aid-for scientific research, are higher in Natural Sciences as evidenced in Pharmacy (81.0%), Biology (78.6%), Mathematics (76.3%), Physics (75.9%) and Chemistry (74.4%). Foundation grants are somewhat high in Pharmacy (19.0%), Chemistry (16.3%) and Biology (13.4%), and grants and contracts from/with corporations are relatively frequent in Engineering (13.8%) and Complex & New Fields (13.4%). The percentages of specifically funded university grants are generally in their 10s, excluding Dentistry (37.0%) and Animal Husbandry/Veterinary Medicine (25.0%). The non-specific research funds at universities exceed 50% not only in Humanities (58.8%) and Social Sciences (50.0%) but also in Geosciences & Others (59.2%), General Fields (50.0%) and Dentistry (50.0%).

Table 9-5 Sources of research funds for recent outcome
(by discipline/faculty members only)

	Medicine	Dentistry	Pharmacy	Agriculture	Animal Husbandry/ Veterinary Medicine	Biology	Physics	Geosciences & Others
Government grant (e.g. grant-in-aid for scientific research)	82 68.9%	46 50.0%	51 81.0%	95 62.5%	33 51.6%	147 78.6%	85 75.9%	57 58.2%
Foundation grant	13 10.9%	2 2.2%	12 19.0%	18 11.8%	2 3.1%	25 13.4%	6 5.4%	3 3.1%
Industry or contract	10 8.4%	3 3.3%	7 11.1%	16 10.5%	3 4.7%	7 3.7%	3 2.7%	1 1.0%
University-provided grant	19 16.0%	34 37.0%	5 7.9%	20 13.2%	16 25.0%	20 10.7%	13 11.6%	12 12.2%
As part of my role at my university (not specifically funded)	41 34.5%	46 50.0%	18 28.6%	67 44.1%	35 54.7%	76 40.6%	48 42.9%	58 59.2%
Other	5 4.2%	6 6.5%	1 1.6%	3 2.0%	2 3.1%	3 1.6%	4 3.6%	2 2.0%
Total	119	92	63	152	64	187	112	98

	Chemistry	Engineering	Mathematics	General Fields	Complex & New Fields	Social Sciences	Humanities
Government grant (e.g. grant-in-aid for scientific research)	160 74.4%	259 58.6%	45 76.3%	109 54.8%	54 55.7%	105 43.0%	68 38.4%
Foundation grant	35 16.3%	43 9.7%	0 0.0%	9 4.5%	9 9.3%	18 7.4%	8 4.5%
Industry or contract	23 10.7%	61 13.8%	2 3.4%	12 6.0%	13 13.4%	5 2.0%	1 0.6%
University-provided grant	24 11.2%	57 12.9%	5 8.5%	31 15.6%	11 11.3%	32 13.1%	21 11.9%
As part of my role at my university (not specifically funded)	90 41.9%	235 53.2%	22 37.3%	106 53.3%	46 47.4%	122 50.0%	104 58.8%
Other	6 2.8%	8 1.8%	3 5.1%	8 4.0%	5 5.2%	18 7.4%	17 9.6%
Total	215	442	59	199	97	244	177

9-3. Awards

Q31 In the past two years, have you received any awards or special recognition for your research or other profession-related contributions?

Figure 9-2 limits the subject to faculty members and shows by the discipline the numbers and rates of respondents who received awards or special recognition in the past two years. More than a third in Pharmacy (36.2%) answered that they received awards and special recognition, by far the highest in all disciplines. The rates exceeds 20% in Complex & New Fields (22.0%), Chemistry (21.9%), Engineering (21.9%) and General Fields (21.5%), but quite low in Humanities (4.1%), Mathematics (5.7%) and Social Sciences (6.6%).

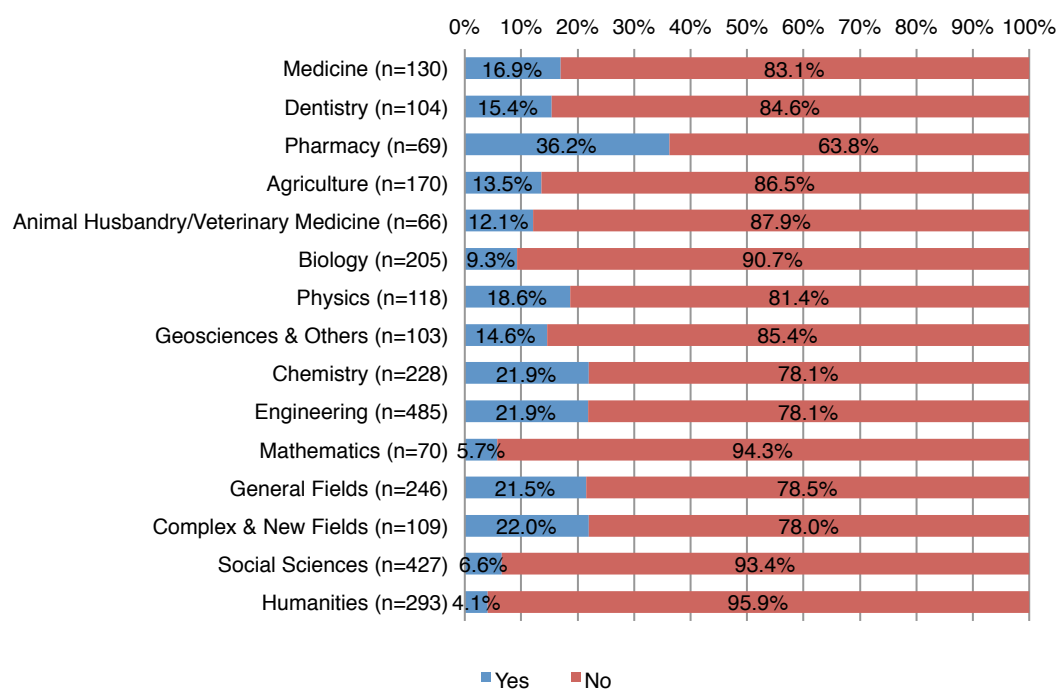


Figure 9-2 Awards and special recognition in past two years
(by discipline/faculty members only)

10. Personal subscription to scholarly journals

Q 32 How many personal subscriptions to professional journals do you receive, including those obtained as a member of a professional society? (Personal subscriptions are those that are personally addressed to you at your home, office, or lab.)

- a. Subscriptions paid by myself*
- b. Subscriptions purchased by grant or other source for personal use*
- c. Subscriptions purchased by grant or other source for shared use*
- d. How many of these are electronic subscriptions?*

Table 10-1 shows the result concerning the purchases of scholarly journals that are not through institutional subscriptions. As a whole, 53.9% of respondents are subscribing to one or more journals at their personal expenses. Graduate students of Humanities/Social Sciences are the most frequent subscribers with the subscription rate of 63.1% and the mean number of journal titles at 2.03. Their counterparts in Natural Sciences, on the other hand, are the least frequent with the rate of 44.8% and the mean number of titles at 1.02. As for the faculty members, the subscription rate is 54.9% and the mean number of journal titles is 1.99 in Natural Sciences, and in Humanities/Social Sciences the figures are 56.9% and 2.35 respectively. There are no discernable differences between them.

Faculty members of Humanities/Social Sciences are a lot more prominent in spending grant or other sources to purchase journals for their personal use (purchase rate 51.4%; mean number of titles 2.56) than faculty members of Natural Sciences (28.6%; 1.08). As a whole, journal purchases for shared use, paid by grant or other sources, are quite uncommon at 4.0%; no large differences are confirmed even when the data are grouped up by the discipline or the status. Furthermore, electronic-only subscriptions in these personal purchases are found to be quite limited, taking up only 9.7% of the whole.

When compared with the responses to the same question in the 2007 survey (Table 10-2), purchase rates at respondents' own expenses shrank from 65.9% to 53.9%, and those paid by grant or other sources grew from 13.2% to 26.3%. Although the difference in respondents hinders a simple generalization, there is a possibility that the spread of electronic journals may have changed the ways researchers purchase journals for their personal use. As for the purchases for shared use paid by grant or other sources and the electronic-only purchases, meanwhile, have not changed much.

Table 10-3 limits the subjects to faculty members, groups them up into disciplines, and shows their journal subscriptions at their own expenses. The mode values are 0 in all disciplines, but the rate of subscribers and the mean number of titles are high in Dentistry (71.2%; 3.79), Geosciences & Others (68.0%; 2.32) and Medicine (60.8%; 3.12). On the other hand, they are low in Mathematics (37.1%; 0.70) and Physics (40.7%; 1.02), evidencing large variations depending on the disciplines.

Table 10-1 Number of personal subscriptions to scholarly journals

	Subscription at personal expense					Subscription paid by grant or other sources				
	Natural Sciences		Humanities/Social Sciences		Total	Natural Sciences		Humanities/Social Sciences		Total
	Faculty members	Graduate students	Faculty members	Graduate students		Faculty members	Graduate students	Faculty members	Graduate students	
Frequency	2,118	725	720	306	3,921	2,118	725	720	306	3,921
Rate of subscribers	54.9%	44.8%	56.9%	63.1%	53.9%	28.6%	5.1%	51.4%	3.9%	26.3%
Mean	1.99	1.02	2.35	2.03	1.87	1.08	0.16	2.56	0.10	1.10
Median	1	0	1	2	1	0	0	1	0	0
Mode	0	0	0	0	0	0	0	0	0	0
Standard deviation	3.14	1.58	5.16	3.18	3.42	2.38	0.95	5.59	0.70	3.12
Percentile	25	0	0	0	0	0	0	0	0	0
	75	3	2	3	3	1	0	4	0	1

	Subscription for shared use paid by grant or other sources					Electronic-only subscription included				
	Natural Sciences		Humanities/Social Sciences		Total	Natural Sciences		Humanities/Social Sciences		Total
	Faculty members	Graduate students	Faculty members	Graduate students		Faculty members	Graduate students	Faculty members	Graduate students	
Frequency	2,118	725	720	306	3,921	2,118	725	720	306	3,921
Rate of subscribers	3.7%	4.7%	5.3%	2.3%	4.0%	12.7%	7.2%	6.9%	3.3%	9.7%
Mean	0.11	0.27	0.24	0.14	0.17	0.35	0.27	0.25	0.14	0.30
Median	0	0	0	0	0	0	0	0	0	0
Mode	0	0	0	0	0	0	0	0	0	0
Standard deviation	0.83	2.30	1.42	1.75	1.40	2.55	2.24	3.05	1.28	2.51
Percentile	25	0	0	0	0	0	0	0	0	0
	75	0	0	0	0	0	0	0	0	0

Table 10-2 Number of personal subscriptions to scholarly journals (2007 survey)

	Subscription at personal expense					Subscription paid by grant or other sources				
	Natural Sciences		Natural Sciences		Total	Natural Sciences		Natural Sciences		Total
	Faculty members	Graduate students	Faculty members	Graduate students		Faculty members	Graduate students	Faculty members	Graduate students	
Frequency	1,313	1,064	171	227	2,890	1,313	1,064	171	227	2,890
Rate of subscribers	68.0%	59.7%	76.0%	76.7%	65.9%	18.2%	6.2%	26.8%	4.4%	13.2%
Mean	3.12	2.10	3.11	3.70	2.77	0.68	0.17	1.37	0.11	0.47
Median	2	1	2	2	1	0	0	0	0	0
Mode	0	0	0	0	0	0	0	0	0	0
Standard deviation	13.77	23.11	3.12	20.09	17.83	1.90	1.06	2.41	0.62	1.60
Percentile	25	0	0	1	0	0	0	0	0	0
	75	4	2	5	3	0	0	2	0	0

	Subscription for shared use paid by grant or other sources					Electronic-only subscription included				
	Natural Sciences		Natural Sciences		Total	Natural Sciences		Natural Sciences		Total
	Faculty members	Graduate students	Faculty members	Graduate students		Faculty members	Graduate students	Faculty members	Graduate students	
Frequency	1,313	1,064	171	227	2,890	1,313	1,064	171	227	2,890
Rate of subscribers	7.5%	7.0%	8.8%	3.1%	6.9%	15.1%	7.2%	6.4%	3.5%	10.3%
Mean	0.32	0.37	0.75	0.15	0.34	0.32	0.17	0.40	1.37	0.35
Median	0	0	0	0	0	0	0	0	0	0
Mode	0	0	0	0	0	0	0	0	0	0
Standard deviation	1.70	3.39	4.23	1.03	2.59	1.18	1.26	3.70	19.58	5.67
Percentile	25	0	0	0	0	0	0	0	0	0
	75	0	0	0	0	0	0	0	0	0

Table 10-3 Number of subscriptions at personal expenses
(by discipline/faculty members only)

	Medicine	Dentistry	Pharmacy	Agriculture	Animal Husbandry/ Veterinary Medicine	Biology	Physics	Geosciences & Others
Frequency	130	104	69	170	66	205	118	103
Rate of subscribers	60.8%	71.2%	44.9%	59.4%	53.0%	57.6%	40.7%	68.0%
Mean	3.12	3.79	1.35	2.51	2.02	1.70	1.02	2.32
Median	2	3	0	1	1	1	0	2
Mode	0	0	0	0	0	0	0	0
Standard deviation	3.69	3.97	1.90	4.60	2.75	2.08	1.75	2.28
Minimum value	0	0	0	0	0	0	0	0
Maximum value	15	22	6	50	11	11	12	11
Percentile	25	0	0	0	0	0	0	0
	75	5	6	3	4	3	2	4

	Chemistry	Engineering	Mathematics	General Fields	Complex & New Fields	Social Sciences	Humanities
Frequency	228	485	70	246	109	427	293
Rate of subscribers	53.5%	58.6%	37.1%	33.1%	57.8%	55.0%	59.7%
Mean	1.64	1.83	0.70	1.69	2.61	2.40	2.28
Median	1	1	0	0	2	1	1
Mode	0	0	0	0	0	0	0
Standard deviation	2.11	3.07	1.27	2.98	4.76	6.17	3.17
Minimum value	0	0	0	0	0	0	0
Maximum value	10	50	7	20	34	100	30
Percentile	25	0	0	0	0	0	0
	75	3	3	1	2	3	3

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Sato, Sho	Faculty of Social Studies, Doshisha University
Sato, Yoshinori	Faculty of Letters, Tohoku Gakuin University
Takeuchi, Hiroya	Faculty of Letters, Chiba University
Tutiya, Syun	National Institution for Academic Degrees and University Evaluation
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