

Students' Patterns of Library Use and Their Learning Outcomes

Haruki Nagata (Graduate School of Library and Information Science, University of Tsukuba, Japan)

Akira Toda (Bunkyo University Shonan Library, Japan)

Päivi Kytömäki (Oulu University Library, Finland)

Abstract

This study examines students' use of academic libraries and tries to clarify what educational outcomes are achieved in relation to their patterns of library use. The authors conducted three focus group interviews and three surveys in Japanese and Finnish universities from 2004 to 2006 and obtained findings which may contribute to the research on library outcomes assessment.

Three types of common user groups ('learners group', 'extended use group', and 'place and PC use group') are identified by cluster analysis of the survey data. Using the library for its material or for research purposes, as the learners group does, is the use that is most likely to have a direct connection to students' educational outcomes. However, another use pattern, strolling among the bookshelves, is notable because this study shows strong links between it, and educational outcomes and motivation for students' learning.

Introduction

With the universalization of higher education, universities and colleges are expanding their educational fields to appeal to students with a greater variety of interests and are trying out various innovations in their educational programs, including the incorporation of new teaching methods. Accompanying these changes is the demand for accountability on the part of institutions as to their educational quality and effectiveness. Academic libraries, in this context, are assessed on how well they are aligned with the roles their parent institutions undertake. The results of assessment of such institutions and their libraries are pertinent as evidence in support of accountability.

Since what is being investigated is their quality and effectiveness, the assessment should focus on, whether students perceive them to be valuable; whether the study environment is well established; what educational outcomes students attain; and to what degree academic libraries contribute to student outcome achievements. Outcomes assessment of this kind does not look at the output performance of the library. Instead, using a term from systems methodology, it examines the activity from 'an upper-level perspective' (Peter Checkland, 1981). The development of methods for outcomes assessment has been challenging. As views from various stakeholders are involved in the assessment from an upper-level perspective, the stance from which to assess, the targets to be assessed, and the measures to be used, all involve difficult issues.

The difficulty, however, does not diminish the necessity. There has been considerable effort made in the field of library and information services towards this end, and various methods have been proposed. This study follows on from such efforts.

1. Students' library use and their educational outcomes (earlier studies)

It is generally agreed that library use is indeed beneficial (or even indispensable) for students to achieve their educational outcomes. But to prove that it really does so, or to what degree it contributes to students' attainment of educational outcomes is not at all easy. Ethelene Whitmire (2002), for example, examined the relation between library resources and services and students' educational outcomes through multiple regression analysis, utilizing the data collected by the CSEQ (College Student Experience Questionnaire) and the NCES (National Center for Education Statistics). Two assumptions underlie her study: "(1) undergraduates attending institutions with large amounts of academic library resources and services would participate in more academic library activities and (2) undergraduates attending institutions with large amounts of academic library resources and services would report greater gains in critical thinking". Three sets of independent variables were defined as 1) background characteristic variables, (gender; race; age), 2) college experience variables (grade-point averages; class year; enrollment status; student-faculty interactions; engagement writing activities; active learning activities; number of term papers written; hours spent studying per week), and 3) academic library variables (resources; services). The dependent variables were defined as 1) library use (usage as a place; use of indexes to journal articles; developing a bibliography for term papers; use card catalog or computer; ask a librarians for help; reading in the reserve or reference section; check out books; checked citations in material read; reading a basic reference; found materials in browsing stacks), and 2) self-reported gains in critical thinking skills (ability to think analytically and logically; ability to put ideas together, see relationships, similarities and differences between ideas; ability to learn on your own, pursue ideas, and find information you need).

The analyses showed, however, that library resources and services had almost no influence over undergraduates' use of library or their self-reported gains in critical thinking skills. Although this was a study that hinted at a way to measure the contribution of academic libraries to undergraduates' educational outcomes, it fell short of proving a positive relationship. In order to investigate this connection further, Toda and Nagata (2007) conducted a paper survey in 2003 mailed to the former students of Bunkyo University Koshigaya campus (no. of respondents: 340; return rate: 33.7%), focusing on the relations between their library usage and learning outcomes while they were students.

The hypotheses that framed this research were:

(1) there would be a positive correlation between "library use" (questionnaire items: use of study-related materials; use as a place to study; use in groups; use of library catalog; use of periodical articles database; consulting librarians to search materials; browsing through stacks; reading materials unrelated to classes) and "benefits of library use" (finding information and knowledge looked for; new perspectives and thoughts; encounter with books that would not have happened elsewhere; sense of fulfillment in reading interesting books; place to study; intellectually stimulating ambience; information systems unavailable to individuals; knowledge and skills to search materials and information),

(2) there would be a positive correlation between "benefits of library use" and "learning outcomes" (questionnaire items: general knowledge; specialized knowledge; skills to search and utilize needed information; skills for investigation and reflection; other particular qualifications/experiences/skills intended to be acquired during undergraduate years), and

(3) those who evaluated favorably the "benefits of library use" with respect to the variables indicated in hypothesis (2) would also highly evaluate the "degree of library contribution" (questionnaire items correspond with those for "learning outcomes")

Concerning the relationship between "library use" and "benefits of library use," the

analyses indicated positive correlations between 23 of 64 combinations of variables. Correlations between some of these were quite positive. As for the hypothesis (2), positive correlations were found between 16 of 40 combinations. A clear difference was confirmed in the examination of the hypothesis (3). In the positive correlative combinations of “library use” and “benefits of library use,” the respondents who marked high the “benefits of library use” also evaluated the “degree of library contribution” higher than those who did not. Thereby, it was affirmed that “library use,” “benefits of library use” and “learning outcomes” are related and that the library contributes to this relationship. In other words, the grounds for the assessment of academic library usage in its contribution to students’ learning outcomes are prepared. The results obtained from this study put the research a step forward from Whitmire.

2. Purposes and overview of this study

As could be surmised from the study by Toda and Nagata (2007), there is no uniformity in students’ use of the library. The study also showed that the “benefits of library use” and “learning outcomes” attained are somehow related to the ways in which students use the library. Focusing on this point, the current study attempts to understand students’ use of academic libraries and clarify what educational outcomes are achieved in relation to their patterns of library use. Student expectations and demands of the library are reflected in their library usage, and if these are related to certain educational outcomes, the results of this study may be useful to promote certain types of library use that are more efficient in attaining desired outcomes. Also, if it is possible to predict the level of outcomes affected by the identified types of library use, this process can be examined further to develop into a method of outcomes assessment.

First, focus group interviews were conducted in Mie University as a preliminary investigation to understand students’ library use. The transcripts were analyzed and developed into questionnaire items that would measure their use of the library. The first paper survey followed. But since we were not able to conduct the paper survey in Mie University, but in Keio University, we compensated for this change by incorporating data from a set of focus group interviews conducted afterwards with students who had participated in the paper survey into our interpretation of the results. Thus, this study conducted both focus group interviews and a paper survey, and the analyses are based on the combination of these.

At the outset we expected our research survey would conclude with Mie and Keio Universities. The survey at Keio University, however, brought some interesting findings, and we conducted extra surveys at Oulu University in Finland and Nagoya University in Japan to investigate these findings further. Though all our surveys took place at universities, the first paper survey dealt with the students majoring in new academic fields who used a branch library. In choosing the 2nd and 3rd survey sites we made sure they were the main libraries. Nagoya University is a mainstream university in Japan, and Oulu University is a site where quite standard results were acquired when two of the authors conducted a library service quality survey in the past (Nagata, 2004). The focus group interviews at Oulu Universities were conducted before the survey. Although this did not bring about corrections in the uniform basic part of questionnaire items, the focus group results at Oulu were also referred to in the analyses of the paper survey. Table 1 shows the surveys conducted for this study.

The authors and a collaborator at Oulu University interviewed students in groups of 4 to 8

for the focus group interviews. Questions and issues concerning the students' library use were prepared in advance, and the interviewees voiced their opinions and discussed the issues put to them. The interviews and surveys were conducted in Japanese in Japan, and Finnish in Finland.

Table 1 List of FGIs and surveys conducted

	FGI	paper survey no. of respondents (return rate)	month/year conducted
1	Mie University	2	2004.12
2	Keio University	2 (afterward)	2005.7-9
3	Oulu University	2 (beforehand)	2005.12-2006.2
4	Nagoya University	489(21.6%)	2006.6

* At Oulu University, the survey was conducted both on paper and on the web. The number indicates the sum of respondents through both media.

The structure of paper survey items are outlined below. Except for the part that was web-based, all surveys were paper-based and administered to students visiting the library.

3. The context of library use

The focus group interviews revealed various types of students' library use. Some thought the library was indispensable for their study, and others used it as a place where they could rest, chat with friends or just to kill time. As for the library resources, some utilized them only for class assignments and others also for their own pleasure, their reading guided by their own whims. There were some who never checked out library materials, and others whose sole purpose in visiting library was to use the computers.

Though each of the libraries included offers various kinds of services, mostly students make choice according to their own convenience or need. Joan C. Durrance and Karen E. Fischer (2005) pointed out the contextual approach to library outcomes. User's activities are surely defined by the context s/he is in, but if that is the case, what kinds of contexts surround the students using academic libraries? Durrance and Fischer specified the *contextual elements* associated with the user, such as needs, attitudes, perceptions and so on, but why and how these elements influence the user's activities still waits further clarification.

On the other hand, according to the Bettman model (1979), based on recent information processing theory of consumer choice, the consumer has a certain goal, and in order to attain this goal s/he utilizes stored memory to evaluate and synthesize the information, and then select certain behavior. That is to say, in this model, the consumer perceives external information through his/her sensory register, pays attention and tries to understand it, while at the same time combining it with the long-term memory, to evaluate, determine and re-structure, and finally to link it to his/her own behavior.

Although the focus group interviews identified varied student behavior concerning library use, their transcripts would remain merely a description of various phenomena without an analysis of the elements that drive these behaviors. Referring to the above mentioned two studies, the current study established three elements of usage context: *a) user's motive*, *b) user's library skills* as her/his long-term memory, and *c) other related elements*. Also, based on our assumption that students' learning outcomes and their library usage are related, the paper survey was structured based on the model shown in Figure 1. Though the arrows point one-way in the figure, the outcomes are fed back to the contexts.

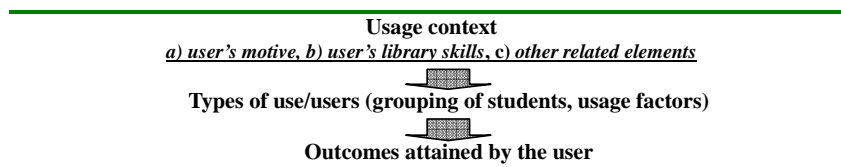


Figure 1 Model of students' library use and outcomes

The questionnaire for the three sets of the paper survey was composed of six basic sets of questions with some optional ones added depending on the survey site. The basic sets are composed of (1) characteristics of the respondents, (2) frequency of library use, (3) attendance at library use education, (4) motivations for library use, (5) types of library use, and (6) outcomes of library use. The optional additions were students' understanding level of coursework, class grades, degree of satisfaction with library services, and a free comment field. The number of the sets of questions was ten at the most. Each element in usage context corresponds to one or more questions respectively. The element *a*) corresponds to the question (4), the element *b*) to the questions (2) and (3), and the element *c*), though not necessarily specific, to the question (1). To the element *c*), however, environmental factors need to be included as will be explained in the next section. There was a little improvement administered in the questionnaire after the first survey, but it remained basically the same.

4. Grouping of students according to their types of library use

The first paper survey was conducted at Keio University Shonan Fujisawa Campus Library. The students' responses concerning their library use, varying from chatting to using PCs, were put through cluster analyses, and four groups showed up—1) a learners group, 2) a strollers group, 3) an extended use group, and 4) a place and PC user group. Figure 2 shows the library usage patterns of these groups. On the horizontal axis are the indicators for usage patterns. The topmost group utilized library resources for learning tasks, and they accounted for 66.2 % of all respondents. The next group came to the library from time to time to look for (browse) interesting books and occupied 7.6 % of the total. The third group, 6.4 %, showed the highest rate in using the library as a place to chat with friends. With this group, the library was a place to use in groups or to use PCs rather than for its resources. The fourth group tended to come to the library to use it as a place and to use PCs. This group, the second largest, made up 15.6 % of all respondents.

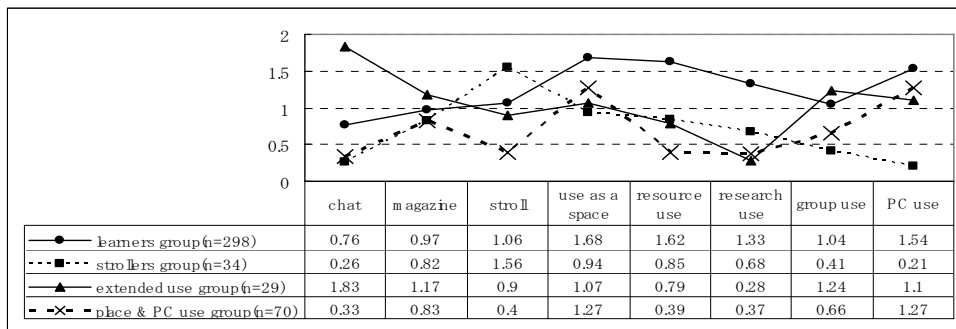


Figure 2 User groups at Keio University

The first group (learners), the third (extended use group, in other words, socializers) and the fourth group (place and PC users) are easily identified in everyday library settings and thus they were easy to understand. The second group, the strollers group, however, took us by surprise, although we found the concept was conceivable as a possibility. One such student commented in the focus group interview, “I come to the library, check the new arrivals, go to the third floor, and then come down each floor browsing books. I don’t come to the library with a specific purpose. Rather, it’s more random, just looking for some good books. That’s how I use the library.” It should be mentioned here that the students included in this group, as stated later, generally indicated high educational outcomes.

In order to examine this group further, two subsequent surveys were conducted. The results at Oulu University and Nagoya University are shown in Figures 3 and 4. In comparison with the results acquired from these two universities, the strollers group found in Keio University was not perceived as something universal. Oulu University, furthermore, showed another group, separate from the learners group, who showed high interest in the overall resources offered by the library. This group is labeled resource users.

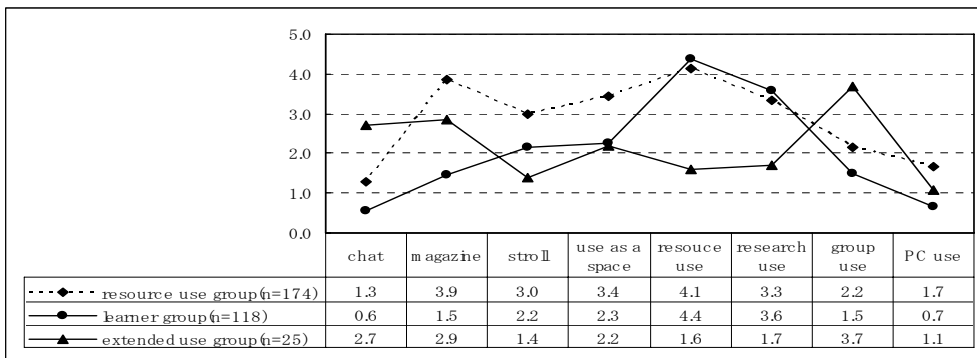


Figure 3 User groups at Oulu University

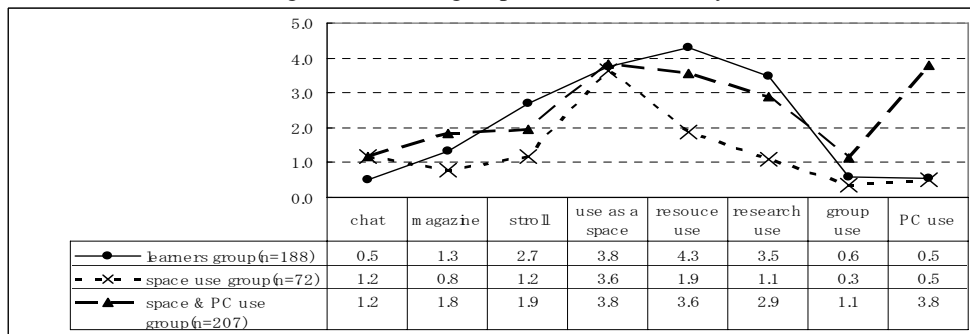


Figure 4 User groups at Nagoya University

The cluster analyses showed some groups common to all three universities. The learners group appeared everywhere showing high scores in their use of the library for materials, for research and as a place. There were some differences within this group. Usage as a place was somewhat lower at Oulu University and PC usage was high at Keio University. The second common group was the extended use group (socializers group) who scored high on usage of the library as a place to chat and gather but low on the usage for materials and for research. Nagoya University did not have this group. There was a wide gap in the use of PCs between Oulu University and Keio University.

The other common group was the place and PC users. Oulu University lacked this group, and there was a slight difference between Nagoya University and Keio University in the usage of the library for materials and for research.

Also, among the eight indicators established under the question for students' types of library use, the PC use and the group use were greatly affected by environmental factors. Their usage of PCs depended heavily on the facilities offered by the library, and the group use depended on how group assignments were dealt with at each university. These, as *c) other related elements* of the user's context, greatly influenced the results.

5. Patterns of library use and student outcomes

The results obtained were put through correlation analyses to determine the relationship between the type of library use and outcomes. Table 2 shows the result of it, grouped by the university.

Table 2 Correlations between type of use and outcomes

outcomes		technical/ specialist knowledge	general knowledge	new perspec- tives	emotional fulfillment	critical thinking	skill to find informa- tion	fun of study/ learning	habit of learning by yourself
type of use									
Keio University	chat				.121*				
	magazines				.162**				
	stroll	.282**	.316**	.325**	.222**	.197**	.097*	.233**	.120*
	use as a place		.105*			.166**	.176**	.205**	.317**
	resource use	.406**	.276**	.236**		.210**	.305**	.355**	.254**
	research use	.332**	.247**	.258**		.129**	.283**	.282**	.210**
	group use					.113*	.136**	.098*	.128**
	PC use								
Oulu University	chat	-.133*							
	magazines		.204**		.229**	.123*		.153**	.214**
	stroll	.202**	.479**	.423**	.439**	.357**	.270**	.327**	.302**
	use as a place							.149**	.143*
	resource use	.525**	.373**	.371**		.270**	.331**	.188**	.253**
	research use	.458**	.352**	.315**		.255**	.384**	.139*	.210**
	group use							.130*	
	PC use							.123*	.157**
Nagoya University	chat	-.117*				.096*			
	magazines		.188**	.098*	.096*	.182**	.103*		
	stroll	.162**	.398**	.438**	.361**	.306**	.161**	.316**	
	use as a place					.105*	.134**	.111*	.115*
	resource use	.487**	.295**	.334**	.135**	.305**	.387**	.322**	.158**
	research use	.411**	.249**	.351**	.161**	.290**	.373**	.314**	.204**
	group use	.103*		.113*		.169**	.149**		
	PC use						.108*		.110*

** Two-tailed P values < 0.01 were considered statistically significant

* Two-tailed P values < 0.05 were considered statistically significant

The items in the figure corresponds with the measures placed under the question, “What do you think you have gained by using the library?”: 1) Technical or specialist knowledge in your main subject, 2) General knowledge, 3) New aspects or new perspectives, 4) Emotional fulfillment, 5) Critical thinking, 6) Information Literacy (know how to find information), 7) Fun of study/learning, 8) Developed the habit of learning by yourself. Table 2 shows the correlation coefficients of over 0.4 between uses for resource and research and the acquisition of technical or specialist knowledge at almost all universities, demonstrating high correlativity between them. Strolling among stacks also highly correlated to the acquisition of 2) General knowledge, 3) New perspectives and 4) Emotional fulfillment.

To view this result more concisely we tried to explore its constructive concepts. Factor analyses brought out three concepts (factors): 1) extended use factor (use for chat, group usage, PC use; Keio University had the use of general magazines in place of the group usage), 2) study use factor (material use, research use; Keio University also had the use as a place), 3) stroll use factor (strolling among stacks and use of magazines; Keio University lacked the latter). We found the stroller group only in Keio University, but stroll use as a factor (i.e. constructive concept) is explored in all universities.

Next, correlation analyses were done with the factor scores of these usage patterns and those of student outcomes. Table 3 shows the result of these.

Table 3 Correlation coefficients between library usage patterns and outcomes

use factors		technical/ specialist knowledge	general knowledge	new perspec tives	emotional fulfill- ment	critical thinking	skill to find informa- tion	fun of study/ learning	habit of learning by yourself
Keio Univ.	extended use				.189**		.122*		
	study use	.403**	.294**	.269**		.231**	.345**	.387**	.323**
	stroll use	.346**	.346**	.352**	.251**	.199**	.183**	.280**	.123*
Oulu Univ.	extended use	-.118*						.142*	
	study use	.543**	.456**	.444**	.139*	.333**	.397**	.221**	.290**
	stroll use		.317**	.219**	.312**	.206**	.161**	.227**	.278**
Nagoya Univ.	extended use					.133**	.107*		
	study use	.518**	.324**	.385**	.165**	.343**	.425**	.361**	.187**
	stroll use	.244**	.429**	.433**	.321**	.366**	.245**	.327**	

** Two-tailed P values < 0.01 were considered statistically significant

* Two-tailed P values < 0.05 were considered statistically significant

Though the patterns of use vary greatly depending on the university, the study use factor and the stroll use factor showed high correlation between 1) Technical or specialist knowledge, 2) General knowledge, 3) New perspectives, and 6) Information Literacy (know how to find information). Other than these, a certain degree of correlativity was confirmed in 5) Critical thinking, 7) Fun of study/learning 8) Developed the habit of learning by yourself.

6. Discussion

Just because using the library as a place, for instance, does not involve resource

utilization, sometimes it is not considered a proper use. The focus group interviews, however, clarified students' reasons for such use (e.g. "it gives more motivation to study than at home") and the Table 2 shows that students perceive this type of library use somewhat positively as an act that led to "Fun of studying/learning" and "Developed the habit of learning by yourself."

Using the library for its materials or research purposes is the most likely usage that has a direct connection to students' achievement of educational outcomes. Thus there is a clear need for libraries to promote this kind of usage. The types of library use that is immediately beneficial for students to achieve relevant educational outcomes, however, is not necessarily predictable, as seen in the example of using the library merely as a place. The most notable of such unpredicted usage is probably that of students routinely strolling among the stacks. This particular group was found in Keio University library and could not be identified in other sites, but as shown in Table 3 stroll use are found in all university and this usage pattern points to the strong correlations between this activity and students' achievement of educational outcomes in other universities, too. Students are aware that the library is contributive to them when they use it in this manner.

The act of strolling among stacks is also noteworthy in its voluntary attitude. Seen in the light of student motives as a contextual element, the correlation coefficients of students' stroll use of library show strong links to some motives: 'acquire general knowledge', 'read interesting books' and 'refresh the mind'. On the contrary, using library for searching information (research use), for example, remained weakly co-related with a students' motives. What is more, the correlation coefficients of research use are about the same strength as a quite non-voluntary motive, e.g. 'assigned by teacher'.¹ This would seem to indicate that voluntary attitude plays a large role in positive type of use and then the achievement of educational outcomes. Be that as it may, it is crucial for the development of outcomes assessment to understand students' types of library use in detail, including not only naturally envisaged uses like study and research purposes, but also unpredictable ones like strolling.

In this study, the third context of usage, "*c) other related elements,*" remained somewhat ambiguous. This element covered a wide range area, starting with student's majors, other background characteristics, conditions at each library, and educational methods practiced at each university. Also, the use of PCs and the group usage varied greatly in this study depending on the library. The availability of computers within the library seems to have greatly influenced the survey results. Group use also seems to have been affected by whether group studies were encouraged in the university and whether students could easily engage in this kind of study activity in the library.

In the future, as academic libraries further develops their services, especially as the supplier of place, as information commons or learning commons, this may bring considerable changes in the patterns of students' library use.

7. Conclusion

Although outcomes assessment might be used for the fulfillment of accountability, its original purpose is to explore how the academic library functions in order to better contribute to students' educational outcomes. In this study, premised on this purpose, three research surveys were conducted.

The first half of this attempt was focused on understanding students' usage. This trial of capturing proper way of library use was quite straight forward, given the general acceptance of the roles of the academic library. But the results were not completely free of ambiguity, and

need to be examined further for clarification. Also, securing greater objectivity in measuring student outcomes remains a task to be addressed. In this study the assessment of outcomes depended on students' self-evaluation, but more objective assessments, possibly including assessments by the teachers, need to be incorporated in the future. The appraisal of library services, however, needs to be done by its service receivers. The difficult task before us is to find out how to connect the educational outcomes and the assessment of the library services. It is hoped that this study has moved the research of outcomes measures a step forward.

At the closure of this paper, we would like to express our heart-felt thanks to all the respondents of our surveys, the staff at Media Center at Keio University Shonan Fujisawa Campus, Oulu University Library, and Nagoya University Library, all of whom contributed greatly to this study.

Notes

¹ In relation to another context, the user's library skills, more Keio University students grouped as "learners" participated in some form of library use education activity (e.g. a series of lecture classes on database use), but more strollers group students at the same university followed "teachers' in-class tips for library use."

References

- Bettman, J. R. (1979). *An Information Processing Theory of Consumer Choice*. Reading, MA: Addison-Wesley Pub. (Advances in Marketing Series)
- Checkland, P. (1981) *Systems Thinking, Systems Practice*. New York: J. Wiley.
- Durrance, J. C., & Fisher, K. E. (2005). *How Libraries and Librarians Help*. Chicago: ALA.
- Nagata, H., Sato, Y., Gerrard, S. & Kytömäki, P. (2004). The dimensions that construct the evaluation of service quality in academic libraries. *Performance Measurement and Metrics*, 5(2), 53-65.
- Toda, A., & Nagata, H. (2007). Gakusei no toshokan riyo to gakushu seika : daigaku toshokan ni okeru autokamu hyouka no kenkyu. [Students' library use and their learning outcomes: A study on outcomes assessment in college and university library.]. *Journal of the Japan Society of Library and Information Science*, 53(1), 17-34.
- Whitmaire, E. (2002). Academic library performance measures and undergraduates' library use and educational outcomes. *Library & Information Science Research*, 24, 107-28.