



Factors that influence the use of library resources by faculty members

Use of library
resources

91

Stella Korobili

*Department of Library and Information Science, Technological Educational
Institution of Thessaloniki, Thessaloniki, Greece*

Irene Tilikidou

*Department of Marketing, Technological Educational Institution of
Thessaloniki, Thessaloniki, Greece*

Antonia Delistavrou

*Department of Marketing, Technological Educational Institution of
Thessaloniki, Thessaloniki, Greece*

Received 21 July 2005
Reviewed 29 August 2005
Revised 13 September 2005
Accepted 28 November
2005

Abstract

Purpose – To examine the use of library resources, focusing on e-sources, by the members of the faculty of a higher educational institute in Thessaloniki, Greece; to reveal the factors which influence the effective use of sources for academic duties; and to provide reliable information to both the administration and the library of the institute, with the aim of the improvement of library services.

Design/methodology/approach – A census survey, using a structured questionnaire, among the faculty of the Technological Educational Institute of Thessaloniki was conducted to examine the frequency of use of resources, mainly e-sources, and to reveal the impact of demographic or academic situational characteristics, the assumed positive influence of academic productivity, perceived usefulness of resources and access to e-sources on the use of e-sources as well as the assumed negative influence of barriers and computer anxiety on the use of e-sources.

Findings – The great majority of the faculty of TEI uses printed sources more than e-sources, but they also use e-sources quite frequently. Use is mostly of books, websites and printed journals. It was also found that the use of e-sources is higher in the School of Business Administration and Economics among those who hold a PhD degree and among younger members of the faculty. Also, the results indicated that the use of e-sources is positively influenced by the respondents' perceived usefulness of resources, the convenience of access to the sources and their academic productivity. The examination of the computer anxiety rating scale (CARS) provided evidence that the less anxious the faculty feel about PCs, the more frequent users they become.

Research limitations/implications – Further research is needed to measure how faculty interact with information, what kind of electronic sources they prefer, what search strategies they use, as well as whether their information needs are satisfied. This research needs to be duplicated to other universities in Greece to determine whether the results can be generalized for Greek academic faculty.

Practical implications – University administrations need to improve library facilities, to include more workstations for access to electronic sources, as well as to improve the marketing and communication of these e-sources.

Originality/value – This research tries to fill a gap in the literature, which has underemphasized so far the need for assessing and measuring the use of library resources in Greek academic libraries and the examination of the factors that influence this use.

Keywords User studies, Electronic media, Resources, Information, Stress, Academic libraries

Paper type Research paper



Introduction

The final report of the American Library Association Presidential Committee on Information Literacy (1998) emphasizes the impact of the information age on all people and the need for everybody to become information literate. The mission of academic

libraries is to create a learning environment in which faculty and students are provided with a variety of library resources and ultimately, become competent users. However, the assessment of the use of resources in each academic institution is very complicated. Administrators as well as the library need to know whether faculty and students do make use of the resources of the library and whether the use of these resources genuinely helps students with their assignments and faculty with their teaching and research responsibilities. Finally, they need to identify the factors that affect this use. This research information could be the most reliable basis for administrators and library to take the optimum measures of a broader and more effective use of library resources.

Studies regarding the use of library resources by faculty and/or students are found in the literature. However, most of the recent studies deal with the use of the Internet and/or the other electronic sources of the library (Applebee *et al.*, 2000; Teo, 2001; Adika, 2003; Uddin, 2003), as well as with computer anxiety (Weil and Rosen, 1995; Ajayi *et al.*, 2001; Durndell and Haag, 2002; North and Noyes, 2002; Gordon *et al.*, 2003). Academic research in Greece has neglected the subject so far – that is, the need for assessing and measuring the use of library resources has been underemphasized in Greek academic libraries.

In an effort to add knowledge to the subject, the authors conducted a study among the faculty of a Greek academic institution. With the continued rapid growth of electronic sources in Greek libraries, it is vital to understand the factors that play an important role in their use. Frequency of use of electronic sources is a commonly used measure and perhaps, it is a way to distinguish active users of resources from those that are potential users or non-users (Abels *et al.*, 1996; Applebee *et al.*, 1997). However, it is known that many members of Greek faculty make more extended use of printed sources than electronic sources (Korobili *et al.*, 2002). Therefore, the research by the authors was driven by the belief that a more complete understanding of information behavior may be gained by identifying a more integrated set of factors that affect the use of resources (and more specifically of e-sources) by faculty members.

This study aims to examine whether frequency of use can be described on the basis of demographic or academic situational characteristics and also, whether the use of information e-sources is influenced by academic productivity, perceived usefulness of resources, as well as access to e-sources. It is also examined what are the barriers to the effective use of e-sources and what influence computer anxiety exerts in this regard.

Review of the literature

The technological changes found in the library have moved faculty and students from using printed sources to using e-sources, and more specifically the Internet, as a major source of information. There is a large body of literature that focuses on the use of e-sources, especially on the Internet. The results of a user survey at the University of Hong Kong Libraries (Woo, 2005) showed that 68.8 per cent of the respondents prefer to use journals online compared to 31.2 per cent who prefer to use printed journals. It has been identified that discipline has a major influence on usage patterns and preferences, and that faculty members in science or agriculture tend to use the Internet more intensively than faculty members of humanities or social sciences (Lazinger *et al.*, 1997; Bar-Ilan *et al.*, 2003). Age also plays an important role in usage; the younger the faculty members are, the more they use electronic sources (Bar-Ilan *et al.*, 2003). It

has also been reported that men are heavier users of the Internet and they make most use of the more complicated services (Busselle *et al.*, 1999; Teo, 2001; Cheong, 2002). Bar-Ilan *et al.* (2003) also found that gender and academic rank have only a minor influence on the usage of e-sources and the Internet.

As for specific services, many studies have identified that e-mail is considered to be the most important service because it increases cooperation with colleagues (Applebee *et al.*, 1997; Kaminer, 1997; Lazinger *et al.*, 1997). According to Heimlich (2003, p. 9), Web use for various activities reveals interrelationships of use: the greatest is the level of relationship among use of the Web for searching for information, finding resources and e-mailing. Furthermore, he found that those who use the Web at home for work report a greater use of the Internet for a variety of tasks compared with those who use the Web primarily at work. There are also studies which investigate whether faculty who use electronic sources and/or the Internet achieve greater scholarly productivity. It has been found that there is a positive relationship between the frequency of use of technology and publications (Cohen, 1996).

Perceived usefulness of the Internet is considered to be an important influence on Internet use (Abels *et al.*, 1996; Kaminer, 1997; Busselle *et al.*, 1999; Teo, 2001; Shih, 2003). Ray and Day (1998) found that limited time and lack of effective information retrieval skills are the main barriers to using e-sources. Conversely, faster access to information was noted as the main advantage of electronic sources. Bar-Ilan *et al.* (2003) found that speed, accessibility and searchability were seen as the main advantages while the main disadvantages were lack of access, lack of coverage and low readability. Heimlich (2003) who used a scale for barriers which included ~13 such barriers found that for users “information overload” had the highest mean score of 2.475, followed by “trustworthiness of information” with a mean score of 2.277.

Finally, there are studies that investigate the computer anxiety of students and faculty using the computer anxiety rating scale (CARS). Weil and Rosen (1995) used the CARS to measure anxiety about present or future interactions with computers or computer related technology. Among the issues addressed in the computer anxiety rating scale questionnaire are:

- (1) anxiety related to machines themselves;
- (2) their role in society;
- (3) computer programming;
- (4) computer use; and
- (5) problems with computers and technology (Gordon *et al.*, 2003).

It has been found that women reported greater computer anxiety and lower computer self-efficacy than men (Yaghi and Abu-Saba, 1998; Durndell and Haag, 2000; Chou, 2003) while a number of studies found no significant difference in the mean scores of CARS by gender (Anderson, 1996; McLlroy *et al.*, 2001; North and Noyes, 2002). Weil and Rosen (1995) examined technological sophistication and the level of technophobia using, among other instruments, CARS-C, a slightly modified scale of CARS. They concluded that there is no worldwide consensus on who are more computer anxious – males or females.

It has also been stated in the literature that users who have less computer and technology experience have more computer anxiety (Weil and Rosen 1995; Yaghi and Abu-Saba, 1998; Smith and Caputi, 2001). In Weil and Rosen’s (1995, p. 121) study,

Greece appears to show similar levels of technophobia to other European countries, but differs considerably in its limited computer experience.

Research objectives

In light of the aim of this study and the review of the literature, the following research objectives were set:

- (1) to explore the frequency with which academics use resources and more specifically e-sources, as well as the impact of selected demographics and academic situational factors upon this use;
- (2) to examine the assumed positive influence of academic productivity, perceived usefulness and convenience of access upon the use of e-sources; and
- (3) to examine the assumed negative influence of barriers and of computer anxiety upon the use of e-sources.

Methodology

In order to accomplish the above set of research objectives, a census survey was conducted among all members of the faculty of a higher college, namely the Technological Educational Institute (TEI) of Thessaloniki. The population comprised ~350 academics and the response rate obtained was above 55 per cent. The procedure resulted in 197 usable questionnaires, which was judged a large enough sample for generalization. The instrument of primary data collection was a structured questionnaire, containing 70 variables in total.

The first part of the questionnaire contained the following demographic and situational variables of the respondents: gender, faculty in five categories (Schools of Agricultural Technology, Business Administration and Economics, Food Technology and Nutrition, Health and Medical Care and Technological Applications), rank in five categories (Part-timer, Lecturer, Assistant Professor, Associate Professor and Professor), education level according to their last degree in four categories (TEI, University, Master and PhD), years of experience in four categories (<5, 6–15, 16–25 and >25 years) and last, a question regarding academic productivity in eight categories (i.e. publications, books, references and the like).

The second part of the questionnaire contained the main dependent variable use of resources. The variable consisted of ten items all measured on a five-point frequency scale from “1=Less than an hour per week” to “5=more than 10 hours per week” while “not at all” counted for 0. It also contained two questions regarding the perceived usefulness of printed sources and usefulness of e-sources in relation to six academic activities. These questions were measured in a seven-point scale of importance from “1=unimportant” to “7=very important”; two questions about the way each academic uses the resources (printed and electronic) in three categories (Alone, With Librarians’ Assistance and With Colleagues’ assistance) and a question regarding the convenience of the respondents’ access to the e-sources in four categories (In the office, At home, In the library and In a computer lab), measured this on a five-point scale from “not at all” to “very much”.

The third part of the questionnaire included two multi-item constructs: an eight-item construct to examine the barriers the faculty face in information retrieval. It tries to identify what are the perceived barriers that affect the faculty’s use of e-sources. Last, the CARS (Heinssen *et al.*, 1987), which consists of 19 items. CARS has been

previously used, indicating strong evidence of internal consistency (Yaghi and Abu-Saba, 1998; Anderson, 1996). Barriers and CARS in this study were measured on a five-point Likert scale from 1=very much disagree to 5=very much agree. The lower the score in each scale, the lower the level of the respondents' perception of barriers and computer anxiety respectively. The first variable (Barriers) resulted in a Cronbach's (1951) alpha of 0.8086 while the second one (CARS) in an alpha of 0.8529; both indicated "exemplary" reliability according to Robinson *et al.* (1991, p. 13).

Results

Descriptive statistics indicated that the 78.2 per cent of the sample were men while 21.8 per cent women. The majority of the respondents (43.7 per cent) belonged to the School of Technological Applications. Part-timers made up 6.6 per cent of the sample, Lecturers 32 per cent, Assistant Professors 17.3 per cent, Associate Professors 23.9 per cent and Professors 20.3 per cent. 37.6 per cent hold a graduate degree, 23.9 per cent a master's degree and 38.6 per cent a PhD. The majority (47.2 per cent) reported a working experience of 16–25 years while there was a considerable percentage (37.6 per cent) with experience of over 26 years. As to the respondents' academic productivity such as publications in journals or conference proceedings, books, references and so forth, 19.3 per cent claimed 1–5, 12.7 per cent 11–20, 13.2 per cent 31–50 while there were 22.3 per cent of the respondents who do not claim any.

With regard to the use of resources, the categorical variable indicated that 38.0 per cent of the respondents spend up to 10 h of their weekly time in all information retrieval activities, 43.0 per cent 11–20 h, 12.8 per cent 21–30 h and 4.5 per cent >31 h while 1.7 per cent do not use library resources. For details about each item included in the Use of Resources, see Table I. It was also found by descriptive statistics (means) that printed sources are more often used by academics: books – mean=2.20 and journals – mean=2.07. Among electronic sources, website visiting was viewed the most favourably (2.15), followed by e-mail (1.78), e-journals (1.26), downloading (1.21) and then e-books (1.02). It seems that the online catalogue (0.66) as well as discussion groups (0.42) are almost never used by anyone.

Academics declared that with regard to teaching and administrative duties, printed sources are more important to them than e-sources while for all other duties, e-sources are perceived to be of more usefulness (Table II). Almost all the respondents (92.9 per cent) use printed sources and most of them (76.4 per cent) e-sources with no help. It is important to notice that with regard to electronic sources, the respondents who need help prefer to seek advice from a colleague (14.7 per cent) than approach library staff

	Not at all	<1	1–3	4–6	7–10	>10	Total	Missing	Total
Downloading programs	32.5	27.4	28.4	3.6	3.6	1.5	97.0	3.0	100.0
Databases	28.9	28.9	23.4	9.6	2.0	4.1	97.0	3.0	100.0
Books	8.6	18.3	35.0	23.4	6.1	6.6	98.0	2.0	100.0
Printed journals	8.6	21.3	38.6	18.8	6.6	4.6	98.5	1.5	100.0
Visiting websites	14.7	17.8	30.5	15.7	10.2	8.6	97.5	2.5	100.0
Electronic books	45.2	21.8	15.2	6.1	3.0	2.5	93.9	6.1	100.0
Electronic journals	34.5	26.9	20.3	6.1	5.1	3.0	95.9	4.1	100.0
E-mail	24.4	23.4	22.8	12.7	4.6	9.6	97.5	2.5	100.0
Discussion groups	70.6	13.2	7.6	2.0		1.0	94.4	5.6	100.0
Online library catalog	54.3	21.8	15.2	2.0	1.0		94.4	5.6	100.0

Table I.
Use of resources

(6.1 per cent). The descriptive statistics also indicated that the sample finds access to electronic resources in the office and at home more convenient (with means 2.74 and 2.70 respectively) than in the library or in a lab (1.42 and 1.35).

With regard to Barriers, the mean score (22.87) indicates a rather moderate level of encountering problems when using electronic resources. It seems that the main barrier is the time necessary for exploring the resources and retrieving the information needed (mean 3.30 and 3.18 respectively), and then the retrieval of records with high recall/low precision (3.19) followed by the speed and capacity of computers (2.97) and retrieving records relevant to information need (2.93) (Table III).

The CARS provided a mean of 38.66, indicating a rather low level of anxiety. The relatively higher item means are those concerned with the fear of destroying a large amount of information by hitting the wrong key (2.89), or difficulty in understanding the technical aspects of computers (2.76) (Table IV).

Analysis of the results

In an effort to focus on e-sources, the variable Use of E-sources was created containing eight out of ten items of the Use of Resources variable. The variable Use of E-sources was used in the analysis of the results. As the main variables of this research have been measured in continuous scales and the independent in categorical scales, the One-way ANOVA was selected (Churchill, 1995, p. 813) to provide evidence of statistically significant differences in the main variables across the categories of each demographic and situational characteristic. It was found that men obtained a higher mean in Use of E-sources ($p < 0.10$), lower means in Barriers ($p < 0.05$) and Computer Anxiety ($p < 0.10$) than women did. It was also found ($p < 0.05$) that academics with the School of Business Administration and Economics are those who obtained the relatively higher means in Use of E-sources and academics with the School of Health

Table II.
Perceived usefulness
of resources

	Printed sources		E-sources	
	Mean	Standard deviation	Mean	Standard deviation
Teaching	5.54	1.66	5.11	1.92
Administrative duties	3.40	2.16	3.03	2.17
Locating funding and donations	2.88	2.09	3.69	2.45
Contacts for scientific and educational tasks	4.04	2.12	5.24	1.99
Research	4.91	2.16	5.52	2.04
Current scientific information	5.25	2.01	5.75	1.79

Table III.
Barriers encountering
when using e-sources

	Mean	Standard deviation
I face problems in locating the most appropriate information resource	2.53	0.99
I have problems accessing the Internet	2.36	1.08
I face problems with the speed and the capacity of computers	2.97	1.09
Too much time necessary to retrieve the needed information	3.18	0.97
Too much time necessary to explore the information resources	3.30	0.98
I face problems to retrieve records relevant to my information need	2.93	1.01
I retrieve records with high recall and low precision	3.19	1.02
Lack of knowledge of search techniques to retrieve information effectively	2.44	1.07

and Medical Care are those who obtained the relatively higher means in Barriers. With regard to the respondents' Last Degree, it was found ($p < 0.05$) that those holding a PhD obtained higher means in Use of E-sources and Usefulness of E-sources, a lower mean of CARS and higher mean of Access (almost equal with those holding a master's degree). With regard to the Years of Experience, it was found that faculty with < 15 years of experience obtained higher means in Use of E-sources and in Access ($p < 0.05$) while those with more Years of Experience (> 26 years) obtained a higher mean in CARS ($p < 0.10$) (Table V).

Pearson's parametric correlation was then utilized to indicate the significance, the direction and the strength of the relationships between pairs of variables. It was found that statistically significant relationships at $p < 0.01$ exist between the variable Use of E-sources and each one of the following variables: Usefulness of E-sources ($r = 0.470$ indicating a positive, moderate relationship), Access ($r = 0.426$ indicating a positive, moderate relationship) and CARS ($r = -0.496$ indicating a negative, moderate relationship). Statistically significant positive, weak relationships were found at $p < 0.05$ between Use of E-sources and each one of Usefulness of Printed Sources ($r = 0.179$) and Academic Productivity ($r = 0.157$).

Multiple regression (the stepwise method) was then applied to the variable Use of E-sources versus Academic Productivity, Usefulness of Printed Sources, Usefulness of E-sources, Access, Barriers and CARS. The analysis revealed that the interactive effect of CARS, Usefulness of E-sources and Access is able to predict the 38.9 per cent (adjusted R^2) of the variance in use (Table VI).

	Mean	Standard deviation
I feel insecure about my ability to interpret a computer printout	2.39	1.10
I look forward to using a computer	1.82	0.96
I do not think I would be able to learn a computer programming language	2.36	1.07
The challenge of learning about computers is exciting	1.95	0.86
I am confident that I can learn computer skills	1.83	0.70
Anyone can learn to use a computer if they are patient and motivated	1.62	0.57
Learning to operate computers is like learning any new skill – the more you practice, the better you become	1.50	0.57
I am afraid that if I begin to use computers, I will become dependent upon them and lose some of my reasoning skills	2.24	1.00
I am sure that with time and practice, I will be as comfortable working with computers as I am in working with a typewriter	1.91	0.83
I feel that I will be able to keep up with the advances happening in the computer field	2.17	0.84
I dislike working with machines that are smarter than I am	1.94	0.87
I feel apprehensive about using computers	1.96	0.87
I have difficulty in understanding the technical aspects of computers	2.76	1.17
It scares me to think that I could cause the computer to destroy a large amount of information by hitting the wrong key	2.89	1.20
I hesitate to use a computer for fear of making mistakes that I cannot correct	2.06	0.87
You have to be a genius to understand all the special keys contained on most computer terminals	1.87	0.79
If given the opportunity, I would like to learn about and use computers	2.19	1.04
I have avoided computers because they are unfamiliar and somewhat intimidating to me	1.86	0.78
I feel computers are necessary tools in both educational and work setting.	1.30	0.53

Table IV.
Computer anxiety rating scale

Table V.
Analysis of variance of
the main variables
across demographics
and situational
characteristics

	Gender	N	Mean	Standard deviation	Mean square	F	Sig.
Use of e-sources	Men	139	10.08	6.82	161.348	3.612	0.059
	Women	40	7.80	6.18	44.670		
	Total	179	9.57	6.73			
Barriers	Men	148	22.42	5.54	134.201	4.692	0.032
	Women	41	24.46	4.57	28.600		
	Total	189	22.86	5.40			
CARS	Men	147	38.05	9.17	241.910	3.074	0.081
	Women	43	40.74	7.76	78.696		
	Total	190	38.66	8.92			
Use of e-sources	School						
	Business	16	12.44	5.86	123.499	2.851	0.025
	Agriculture	26	11.19	8.73	43.317		
Barriers	Food Technology	22	8.32	6.24			
	Engineering	86	9.85	6.02			
	Health	30	6.67	6.60			
Use of e-sources	Total	180	9.56	6.72			
	Business	26	23.19	5.51	86.412	3.111	0.017
	Agriculture	26	23.65	5.66	27.773		
Barriers	Food Technology	22	24.41	4.52			
	Engineering	86	21.48	5.35			
	Health	30	24.77	4.98			
Use of e-sources	Total	190	22.87	5.39			
	Last degree						
	TEI	50	7.44	6.43	23.061	7.168	0.000
University	21	6.48	5.95	40.882			
Barriers	Master	38	9.32	6.22			
	PhD	71	12.08	6.58			
	Total	180	9.56	6.72			

(Continued)

		N	Mean	Standard deviation	Mean square	F	Sig.
Usefulness of e-sources	TEI	51	25.75	10.12	395.582	4.783	0.003
	University	20	25.60	8.62	82.709		
	Master	39	27.31	9.50			
	PhD	73	31.33	8.20			
	Total	183	28.29	9.37			
Access	TEI	46	7.15	3.86	37.223	2.713	0.048
	University	14	5.93	3.38	13.720		
	Master	24	8.58	3.44			
	PhD	51	8.55	3.75			
	Total	135	7.81	3.77			
Computer anxiety	TEI	52	40.71	8.04	326.273	4.317	0.006
	University	21	41.52	8.98	75.580		
	Master	44	39.45	7.54			
	PhD	73	35.89	9.65			
	Total	190	38.66	8.92			
Use of e-sources	Experience						
	<5 years	12	12.50	6.17	171.717	3.998	0.009
	6-15 years	16	13.94	5.41	42.951		
	16-25 years	86	9.26	7.19			
	>26 years	66	8.35	5.95			
Access	Total	180	9.56	6.72	40.064	2.934	0.036
	<5 years	9	11.11	4.17	13.655		
	6-15 years	11	8.64	3.04			
	16-25 years	66	7.38	3.95			
	>26 years	49	7.59	3.36			
Computer anxiety	Total	135	7.81	3.77	195.984	2.523	0.059
	<5 years	12	37.67	9.19	77.682		
	6-15 years	16	34.00	8.10			
	16-25 years	91	38.25	9.39			
	>26 years	71	40.39	8.10			
Total	190	38.66	8.92				

Use of library resources

Table V.

Table VI.
Multiple regressions

Model	Variables entered	Adjusted <i>R</i> square	Unstandardized coefficients <i>B</i>	Standardized coefficients beta	<i>t</i>	Sig.	Tolerance	VIF
3	(Constant)	0.389	12.251		3.655	0.000		
	CARS		-0.264	-0.359	-4.366	0.000	0.779	1.284
	Usefulness of e-sources		0.176	0.265	3.081	0.003	0.712	1.405
	Access		0.308	0.183	2.199	0.030	0.764	1.308
3	<i>Variables excluded</i>			<i>Beta In</i>				
	Usefulness of printed Resources			-0.085	-0.909	0.366	0.604	1.656
	Barriers			0.097	1.176	0.242	0.775	1.290
	Academic productivity			0.022	0.286	0.776	0.925	1.081

In an effort to gain more information than what the classical statistical techniques could provide, K-means cluster analysis was applied to the items included under Use of E-sources. K-means clustering classifies cases into relatively homogeneous groups, indicating distinctly for each group the degree of involvement in the behaviour under examination (Malhotra, 1999, p. 610). A three clusters' solution indicated that 48.73 per cent of the sample (cluster 1) obtained the lower cluster centres in comparison to the other two clusters, 30.96 per cent (cluster 2) obtained average cluster centres and 11.67 per cent (cluster 3) obtained the relatively higher cluster centres in all items of Use of E-sources. The three clusters were named light users, average users and heavy users, respectively (Table VII).

Discussion

Although the other previous relevant studies reviewed focused on e-sources, this study incorporated printed and electronic sources, including internet use. The decision to include printed sources in the research design was documented by results indicating that a considerable portion of faculty still rely on printed sources. Although the possibility exists, as always in self-reported surveys, for an over-reporting tendency in the measurement of use, the findings indicated a worthy level of use of library resources, even of e-sources, among faculty. Generalization from the relevant findings should be performed with caution, however, because almost half the population of the TEI did not participate in the survey. A reasonable assumption might be that most of these people are not acquainted with library sources. Among the respondents, the K-means clustering indicated three groups of users that were named light, average and heavy users respectively. Although heavy users are in the great minority of the sample (11.67 per cent), the interpretation of the cluster centres (in terms of the frequency of use) reveals that these people are involved with information retrieval for about 4–6 h per each electronic source, per week. They are for the greater part engaged in websites, e-mail and e-journals.

In this study, men were found to be more frequent users of e-sources as in the studies by Busselle *et al.* (1999), Cheong (2002) and Teo (2001). Faculty within the School of Business Administration and Economics are heavier users of all the sources while Lazinger *et al.* (1997) note that faculty members in science and agriculture tend to use the internet more intensively than faculty members in humanities and social sciences. Among e-sources, website visiting was found to be the most favourable for the whole sample, followed by e-mail – although in other studies (Lazinger *et al.*, 1997; Applebee *et al.*, 1997; Kaminer, 1997), e-mail is considered by faculty members the most important Internet service.

	Cluster 1 (96 cases) centre	Cluster 2 (61 cases) centre	Cluster (23 cases) centre
Programs downloading	0.70	1.31	2.83
Databases	0.76	1.74	2.78
Website visiting	1.18	2.87	3.96
Electronic books	0.34	1.15	3.00
Electronic journals	0.56	1.39	3.39
E-mail	0.73	2.64	3.61
Discussion groups	0.11	0.54	1.13
Online library catalog	0.21	1.05	1.26

Table VII.
K-means cluster analysis

The impact of the perceived Usefulness of E-sources and convenience of Access upon Use of E-sources is considered to be reasonable. The relevant findings are consistent to an extent with the findings in the literature (Abels *et al.*, 1996; Busselle *et al.*, 1999; Adika, 2003; Uddin, 2003). Furthermore, it might be argued that one of the main barriers demonstrated was the time needed to explore information sources, which is in line with the findings of Applebee *et al.* (1997, 2000). It has to be noted though that the construct of Barriers was not found to be a significant influential factor on use of e-sources. This finding might be attributed to the weakness of the construct in terms of face validity although the internal consistency of the construct was found to be exemplary. Most of the items included are probably not very well understood by the respondents. For example, it is not well accepted that faculty do not retrieve records with high recall and low precision and also that they do not lack of search techniques.

Although the CARS estimation might be perceived as an under-evaluation of the reality among the entire faculty of the TEI, the significant role of CARS in the research design was verified. The results of multiple regression indicated clearly the importance of CARS in the interactive effect of the included variables upon use (especially use of e-sources). It is interesting to note the impressive percentage (almost 40 per cent) of variance in use that can be explained by the interactive effect of CARS, Usefulness of E-sources and Access. And further in this study, women reported greater computer anxiety than men, just as in previous studies (Durnell and Haag, 2002; Chou, 2003; Tiamiyu, Ajayi and Olatokun, 2002). Faculty with a PhD and less years of experience were found to be less computer anxious although a previous study (Chou, 2003) found that educational level (degree) made no difference in the degree of Internet anxiety. With regard to respondents with more years of experience, our findings are consistent with the study of Busselle *et al.* (1999), in which it was found that younger males heavier are users of the Internet.

Conclusions and implications

This article presents results of a study on the use of all library resources by the faculty members of all the departments of the TEI of Thessaloniki. It was found that the great majority of the faculty of TEI use printed sources to a greater extent than other sources but they also use e-sources quite frequently. They make most use of books, websites and printed journals. It was also found that the Use of E-sources is higher in the School of Business Administration and Economics among those who hold a PhD degree and among younger members of the faculty. Also, the results indicated that the Use of E-sources is positively influenced by the respondents' perceived usefulness of sources, the convenience of access to the sources and their academic productivity.

Respondents seem to experience a moderate level of encountering problems when using electronic sources while the relevant variable (Barriers) did not provide a statistically significant relationship with the Use of E-resources. With regard to the CARS data, evidence was provided that the less anxious the faculty member feels about PCs, the more frequent users they become. The CARS was found to be the stronger, negative influential factor upon the Use of E-sources. Moreover, multiple regression revealed that almost 40 per cent in the variance of Use of E-sources can be predicted by the interactive effect of CARS, Usefulness of E-sources and convenience of Access. K-means clustering provided a segmentation scheme of the frequency of the use of e-sources indicating three distinct groups of users among the TEI faculty. The

three groups of users differ clearly in terms of the time spent each week retrieving information from each e-source.

An optimum strategy for the college to help the development of the library should take into consideration the results of this study. The administration does need to improve library facilities and include more workstations for access to e-sources, as well as to improve the marketing and communication about e-sources. It is also necessary to include information literacy programs as similarly previously suggested by Lazinger *et al.* (1997), Applebee *et al.* (1997), Busselle *et al.* (1999), Adika (2003) and Uddin (2003) for other populations.

Most obviously, this research needs to be duplicated in other institutions in Greece to determine whether the results can be generalized for Greek academic faculty. It is vital to use a different methodological approach to examine the barriers encountered when using e-sources. Further research is needed to investigate how faculty actually interact with information, what specific electronic sources they visit more than others, what search strategies they use, as well as the extent to which their information needs are satisfied.

References

- Abels, E.G., Liebscher, P. and Denman, D.W. (1996), "Factors that influence the use of electronic networks and network services by science and engineering faculty in small universities and colleges", *Journal of the American Society for Information Science*, Vol. 47, pp. 146–58.
- Adika, G. (2003), "Internet use among faculty members of universities in Ghana", *Library Review*, Vol. 52 No. 1, pp. 29–37.
- Ajayi, A., Olatokun, W.M. and Tiarniyu, M.A. (2001), "Computer anxiety, phobia, obsession and work stress at the University of Ibadan, Nigeria: Part 1 – prevalence and correlates", *African Journal of Library, Archives & Information Science*, Vol. 11 No. 2, pp. 125–38.
- American Library Association Presidential Committee on Information Literacy (1998), "A progress report on information literacy: an update on the American Library Association Presidential Committee on Information Literacy: final report", available at: www.ala.org/ala/acrl/acrlpubs/whitepapers/whitepapersreports.htm [5 April 2002] (accessed 28 November 2005).
- Anderson, A.A. (1996), "Predictors of computer anxiety and performance in information systems", *Computers in Human Behavior*, Vol. 12 No. 1, pp. 61–77.
- Applebee, A.C. *et al.* (2000), "Australian academic use of the Internet: implications for university administrators", *Internet Research: Electronic Networking Applications and Policy*, Vol. 10 No. 2, pp. 141–9.
- Applebee, A.C., Clayton, P. and Pascoe, C. (1997), "Australian academic use of the Internet", *Internet Research: Electronic Networking Applications and Policy*, Vol. 7 No. 2, pp. 85–94.
- Bar-Ilan, J., Peritz, B.C. and Wolman, Y. (2003), "A survey on the use of electronic databases and electronic journals accessed through the web by the academic staff of Israeli universities", *The Journal of Academic Librarianship*, Vol. 29 No. 6, pp. 346–61.
- Busselle, R., Reagan, J., Pinkleton, B. and Jackson, K. (1999), "Factors affecting internet use in a saturated-access population", *Telematics and Informatics*, Vol. 16 No. 1–2, pp. 45–58.
- Cheong, W.H. (2002), "Internet adoption in Macao", *Journal of Computer-Mediated Communication*, Vol. 7 No. 2, available at: www.informatik.uni-trier.de/~ley/db/indices/a-tree/c/Cheong:Weng_Hin.html (accessed 28 November 2005).

- Chou, C. (2003), "Incidences and correlates of Internet anxiety among high school teachers in Taiwan", *Computers in Human Behavior*, Vol. 19, pp. 731–49.
- Churchill, G.A., Jr (1995), *Marketing Research*, 6th ed., The Dryden Press, Orlando, FL.
- Cohen, J. (1996), "Computer mediated communication and publication productivity among faculty", *Internet Research: Electronic Networking Applications and Policy*, Vol. 6 No. 2–3, pp. 41–63.
- Cronbach, L. (1951), "Coefficient alpha and the internal structure of tests", *Psychometrika*, Vol. 31, pp. 93–6.
- Durndell, A. and Haag, Z. (2002), "Computer self efficacy, computer anxiety, attitudes toward the Internet and reported experience with the internet, by gender, in an East European sample", *Computers in Human Behavior*, Vol. 18, pp. 521–35.
- Gordon *et al.* (2003), "The factor structure of the computer anxiety rating scale and the computer thoughts survey", *Computers in Human Behavior*, Vol. 19, pp. 291–8.
- Heimlich, J.E. (2003), "Environmental educators on the web: results of a national study of users and nonusers", *The Journal of Environmental Education*, Vol. 34 No. 3, pp. 4–11.
- Heinssen, R., Jr, Glass, C. and Knight, L. (1987), "Assessing computer anxiety: development and validation of the computer anxiety rating scale", *Computers in Human Behavior*, Vol. 3, pp. 49–59.
- Kaminer, N. (1997), "Scholars and the use of internet", *Library and Information Science Research*, Vol. 19 No. 4, pp. 329–45.
- Korobili *et al.* (2002), "Strategic planning as a tool for the development of the Library of TEI of Thessaloniki", *Journal of the TEI of Pireaus*, Vol. VII No. 1, pp. 17–36.
- Lazinger, S.S., Bar-Ian, J. and Peritz, B.C. (1997), "Internet use by faculty members in various disciplines: a comparative case study", *Journal of the American Society for Information Science*, Vol. 48 No. 8, pp. 508–18.
- Malhotra, N.K. (1999), *Marketing Research: An Applied Orientation*, 3rd ed., Prentice Hall, Englewood Cliffs, NJ.
- McLroy, D., Bunting, B. and Tierney, K. (2001), "The relation of gender and background experience to self-reported computing anxieties and cognitions", *Computers in Human Behavior*, Vol. 17, pp. 21–33.
- North, A.S. and Noyes, J.M. (2002), "Gender influences on children's computer attitudes and cognitions", *Computers in Human Behavior*, Vol. 18, pp. 135–50.
- Ray, K. and Day, J. (1998), "Student attitudes towards electronic information resources", *Information Research*, Vol. 4 No. 2, pp. 1–13.
- Robinson, J.P., Shaver, D.R. and Wrightsman, L.S. (1991), *Measures of Personality and Social Psychological Attitudes*, Academic Press, San Diego, CA.
- Shih, H. (2003), "Extended technology acceptance model of Internet utilization behaviour", *Information & Management*, Vol. 41, pp. 719–29.
- Smith, B. and Caputi, P. (2001), "Cognitive interference in computer anxiety", *Behaviour and Information Technology*, Vol. 20 No. 4, pp. 265–73.
- Teo, T.S.H. (2001), "Demographic and motivation variables associated with Internet usage activities", *Internet Research: Electronic Networking Applications and Policy*, Vol. 11 No. 2, pp. 125–37.
- Tiamiyu, M.A., Ajayi, A. and Olatokun, W.M. (2002), "Computer anxiety, phobia, obsession and work stress at the University of Ibadan, Nigeria: Part 2 – evaluation of a model", *African Journal of Library, Archives & Information Science*, Vol. 12 No. 1, pp. 1–14.
- Uddin, M.N. (2003), "Internet use by university academics: a bipartite study of information and communication needs", *Online Information Review*, Vol. 27 No. 4, pp. 225–37.

- Weil, M.M. and Rosen, L.D. (1995), "The psychological impact of technology from a global perspective: a study of technological sophistication and technophobia in university students from twenty-three countries", *Computers in Human Behavior*, Vol. 11 No. 1, pp. 95–133.
- Woo, H. (2005), "The 2004 user survey at the University of Hong Kong Libraries", *College & Research Libraries*, Vol. 66 No. 2, pp. 115–35.
- Yaghi, H.M. and Abu-Saba, M.B. (1998), "Teacher's computer anxiety: an international perspective", *Computers in Human Behavior*, Vol. 14 No. 2, pp. 321–36.