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Information Gathering Practices Of Engineering Faculty Members:An Emphirical Study

K Sadagoban[a], M Tamizhchelvan[b], S Gopalakrishnan[c], S Gopalakrishnan[d]

Chief Librarian, Nandha Engineering College, Erode, Tamilnadu, India
Email: sadagoplib@redifffmail.com,
[b]Deputy Librarian, Gandhigram Rural Institute-Deemed University,
Gandhigram, Dindigul, Tamilnadu, India
Email:tamizhchelvan@gmail.com
[c]Asst. University Librarian (Retd), MIT, Anna University, Chennai, Tamilnadu, India
Email: gopallong@gmail.com
[d]Head-Resource Centre, National Institute of Fashion Technology,
Taramani, Chennai, Tamilnadu, India
Email: gopusg@yahoo.com

Abstract:

Information Gathering practices ofengineering faculty in the Erode district has been ascertained. The faculties from seven randomly selected engineering institutions were provided with structured questionnaires. Out of the 350 questionnaires distributed 267 were responded and the response rate works out (76.3%).92.5% of respondents were Assistant Professor, 6.37% Associate Professor and 1.12% belongs to Professors.The emphasizes were for preparing notes for taking classes, attending conference, symposium, seminar etc and desirable sources were not available in the central library.Based on the information gathering practices the faculties were grouped in to three different types of users such as Shy nature, Blathers and Inquisitive users.

Keywords: Engineering faculty; Information behaviour, Information gathering practices, Information-seeking,Information needs; Qualitative studies

1. Introduction

Information gathering among the professionals are as follows:

- Ways to keep informed about new techniques and methods being employed in their field.
- The application of the information to specific work-related activities (such as new products that could be used for specific projects).

- To prepare various communications, such as written reports, plans or proposals, journal articles or interpersonal communication in the form of information presentations, consultation or advice.
- Requiring information necessary for professional development or continuing education.

The type of information sources consulted and the information-seeking behaviour of engineers were based on characteristics, work role and associated tasks. (Pinelli,1991, King *et al.*, 1994)).Behavioural information seeking model (Ellis &Haughan, 1997), Information Seeking and Using model (ISU) (CheukWai-Yi, 1998) general model of Professionals' Information Seeking (Leckie et al., 1996)) and digital information seeking model (Gopalakrishnan and Gopalakrishnan, 2007), (Gopalakrishnan et al., 2010) are the few.

Faculties are the backbone in any professional educations.Faculty is the sources of knowledge sharing in way of learning and teachingfor the professionalstudents' community. Therefore it becomes essential to gather information by the faculties especially in professional education.

2. Review of Literature

Engineers use information primarily to reproduce physically encoded information with documentation as a by-product for the product manufactured. However there exist vacuum in effective dissemination, production and acquisition of scientific and published technical information (Leckie*et al*, 1996).

Engineers' information-seeking behaviour was crucially depending not only on documents but also on people and experimentation as sources of information. Since the engineering information is not available in textural unless warranted to document it by spending their time to record their information. (Anderson et al., 2001), Case.,2002, 2007), Fidel and Green., 2004), Gralewska-Vickery., 1976), Hertzum., 2002), Hertzum and Pejterson., 2000), Holland et al., 1991) and Ward., 2001).

It is felt by the engineering professionals that there exist numerous gaps in electronic information access and retrieval system including online database, internet etc. concerning the availability of suitable information. (Hurd, Weller and Curtis., 1992); Kraaijenbrink, 2007).

The level of complexity combined with the degree of importance and urgency, and the question of whether the information need is anticipated or unexpected may affect the information seeking activity undertaken by the engineering professionals (Ingwersen and Jarvelin., 2005,Vakkari, 1998,Bystrom, 2005).

Information literacy Programmes (Bhatti, Rubina, 2013) and guidance in use of library resources and services (Pareek, 2013) with the help of professional staff are expected among the engineering faculty members. Lack of awareness of resources especially digital information resources (Adio and Arinola. 2012), use of ICT in information seeking and gathering process (Khan, Shakeel Ahmed, Bhatti, Rubina and Khan, Ghalib.,2011) are the limitations in information seeking among the faculty

members. Majid et al., 2012) found that the basic purposes of seeking information is primarily for academic purpose rather than that of enriching the knowledge. Even Siddiaui, 2011) stated that the successful operation of any library and information centres depends to a large extent on the choice of their collections. The choice of the collection should meet the need and requirements of the end users.

3. Objectives:

Objectives of the analysis are given below:

- To explore the purpose of information gathering by faculty members
- To ascertain the problem and counted during information gathering
- To list the importance of information gathering practices
- To identify the cluster group information gather nature of engineering faculty

4. Hypotheses

- There exists multifarious opinion in information gathering by faculty members
- There exist barriers in information gathering among the faculty members.
- Their exist different types of users group in engineering faculty also

5. Methodology:

The Information Gathering practices were analysed based on purpose, problems and barrier. For this purpose a structured questionnairewere administrated among the faculty members working in seven engineering and management institute. Among the 350 questionnaire distributed 267 responded the respondents rate is 76.3%. The data thus collected were analysed using SPSS software further.The study has also adopted the Matrix of Change and factor analysis. The demographic details of the respondents are shown in table 1.

Table 1: Designation and Gender of the Respondents

S.No.	Description	Respondents	Percentage
Designation			
1	Assistant Professor	247	92.5
2	Associate Professor	17	6.4
3	Professor	3	1.1
Gender			
1	Male	140	52.40
2	Female	127	47.60

Out of 267respondents, 247 (92.5%) were belonged Assistant Professor, 17(6.4%) belongs to Associate Professors and 3 (1.1%) belongs to Professors. Further 52.4% belongs to male and 47.6% belongs to female.

6. Data analysis and Interpretation

The information gathering practices were evaluated based on triode concept of purpose, problems and barriers.The purpose enables to identify the reasons for gathering information. The problems enabled to classify the faculty users and their nature in collecting the information. The barrier enables to suggest the precautionary step to taken by the library and information centers to facilitate the engineering faculties for the free flow of collecting the required information.

6.1 Reliability Test

Reliability is concerned with consistency of a variable. There are two identifiable aspects of this issue: external and internal reliability. Nowadays, the most common method of estimating internal reliability is Cronbachs alpha (α). The formula used is

$$\alpha = \frac{K}{K-1}\left(1 - \frac{\sum_{i=1}^{K}\sigma_{Y_i}^2}{\sigma_X^2}\right) \qquad (1)$$

A commonly accepted rules for describing internal consistency using Cronbachs alpha (Cronbach, Lee and Shavelson 2004) are $\alpha \geq 0.9$ (Excellent), $0.9 > \alpha \geq 0.8$ (Good), $0.8 > \alpha \geq 0.7$ (Acceptable), $0.7 > \alpha \geq 0.6$ (Questionable), $0.6 > \alpha \geq 0.5$ (Poor) and $0.5 > \alpha$ (Unacceptable).

The responses were administrated to reliability test and Cronbach alpha were ascertained. The triode concepts taken up for the study, number of variables for each concept and the Cronbach alpha value were shown in Table 2.

Table 2. Reliability Analysis – alpha value

S.No.	Concepts	No. of Variables	Alpha value
1	Purpose	7	0.6698
2	Problems	12	0.8535
3	Barriers	8	0.8727

The Cronbach alpha values for all the three groups were higher than 0.7 and 0.9. This indicates that the variables thus taken up for the study were acceptable to excellent.

6.2 Purpose

The reason for information gathering by the faculty members were ascertained based

on sevenvariables on a five point scale such as “more often”, “often”, “sometimes”, “rarely” and “never”. The opinions were shown in table 3. The meanand standard deviation were calculated based on the opinion. The same is shown in table 3. The ranks are assigned based on means and standard deviations.

Table 3: Purpose of information gathering

Sl. No	Purpose	More often	Often	Some times	Rarely	Never	Mean	Std	RANK
1	To prepare for class teaching	158 (59.2%)	72 (27%)	23 (8.6%)	7 (2.6%)	7 (2.6%)	4.37	0.88	1
2	To write and publish papers(research)	62 (23.2%)	98 (36.7%)	77 (28.8%)	20 (7.5%)	10 (3.7%)	3.68	1.06	4
3	To give lecture in conference, symposium, seminar etc.	70 (26.2%)	80 (30%)	66 (24.7%)	37 (13.9%)	14 (5.2%)	3.58	1.36	5
4	For recreational purpose	60 (22.5%)	72 (27%)	61 (22.8%)	47 (17.6%)	27 (10.1%)	3.34	1.63	7
5	To guide students’ project	82 (30.7%)	114 (42.7%)	51 (19.1%)	13 (4.9%)	7 (2.6%)	3.94	0.93	3
6	To keep up-to-date on subjects of interest	110 (41.2%)	115 (43.1%)	28 (10.5%)	12 (4.5%)	2 (0.7%)	4.19	0.73	2
7	To prepare questions and answers	48 (18%)	74 (27.7%)	88 (33%)	41 (15.4%)	16 (6.0%)	3.36	1.26	6

It can be seen from the table 3that first preference was given for preparing the class notes. It is followed by ‘To keep up-to-date on subjects of interest’,‘To prepare questions andanswers’, and‘To guide students’ project’. The least preferenceswere given for ‘to publish papers’ and ‘recreational purpose’.

6.3 Matrix of Change (MOC)

Matrix of Change is a software program, which helps to identify critical interactions among two or more processes. In particular, it deals with issues such as how the changes precede, the order in which changes take place and whether the system is stable and coherent.

Specifically, Matrix of Change contributes to understanding issues of feasibility, sequence, location, pace, interest, etc. Further, it presents a way to capture connections between practices. It graphically displays both reinforcing and interfering organizational processes.

Matrix of Change system, a four-fold process viz., systematic means to judge the practices; interactions among practice and transition; provides feedback on change and provides process interaction such as pace; sequence and feasibility, consists of

three matrices such as current organizational practices; desired collection; and transitional state that bridges these two matrices.The use of Matrix of Change has been employed between barriers and attitude (Brynjolfsson, Austin Renshaw, and Van Alstyne, 1997);Tamizhchelvan, Ramesh Babu and Gopalakrishnan,2012).

6.3.1 Purpose of Information Gathering Vs. Library Resources

Users'Information Seeking Behaviour depend library resources and servicers. In order to identify the engineering faculty information gathering practice, Matrix of Change was employed for Purpose of Information Gathering practices and Library Resources. The library resources were grouped into formal source and informal sources. The list of formal and informal sources was not complete. But it is felt that these sources taken up were sufficient to compare with the purpose of information gathering. The requirements were purely situation-specific.

This technique enables to measure the transition from users needs. The six step processes have been adopted to identify the extent of change of matrix between purpose, formal source and informal source.

STEP 1: Identify Critical Processes

The users' need and Library Resources are taken as a critical process. The user requirements and Library Resources are divided into constituent parts.

STEP 2: Horizontal and Vertical Matrix

Users' requirements developed Horizontal triangular matrix and Library Resources developed a vertical triangular matrix as shown in ***Fig. 1***. These matrices identify the complementary and competing practices. Complementary process reinforces one another, whereas competing process works as cross disciplinary.

A grid connects each process in an interference matrix, and at the junction of each grid plus sign (+) designates complementary and minus sign (-) indicates competing process.

STEP 3: Identifying the transition interactions

A subset of transition matrix illustrates important interaction between users' requirements and Library Resources.

STEP 4: Users' opinions on Library Resources

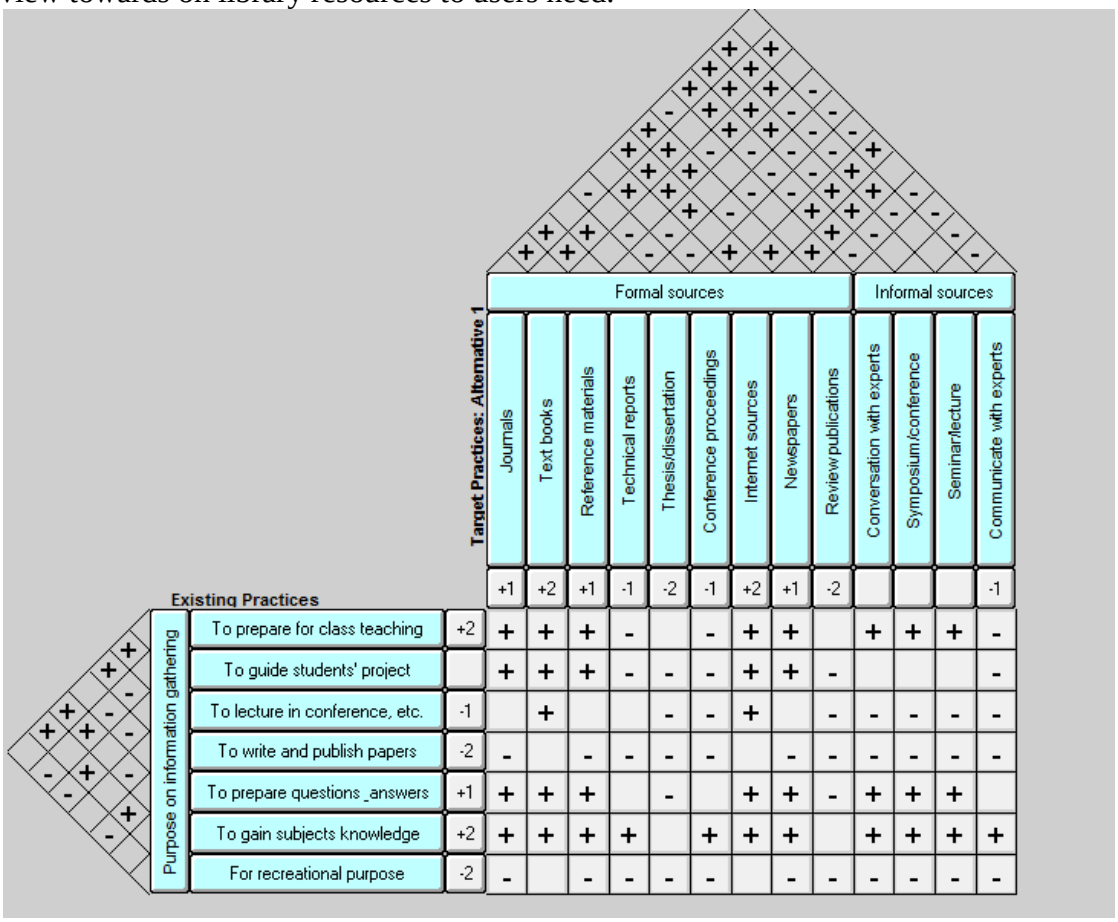
The various standards by Library and information professionals with respect to users need have been determined. In this process, Likerts five point scale, anchored at zero is used for the purpose of analysis as "+2 More often", "+1 Often", "0 Sometimes", "-1 Rarely" and "-2 Never"

STEP 5: Linking three matrices together

In this step, the three matrices namely Vertical matrix, Horizontal matrix, Transition matrix has been combined together.

STEP 6: Determining the Net result

The idea of using this technique is to gauge extent of transition takes from the Users' view towards on library resources to users need.



Matrix Interaction	**Importance to job**
'+' Positive Impact	+2 more often, +1 often
' ' Mediocre Impact	0 sometimes, -1 rarely, -2 never
'-' Negative Impact	

Fig. 1 Values for Horizontal and Vertical Matrix

The matrix of change, a proto-type design for identifying relation between purpose, formal and informal sources, facilitates to infer the following:

- "To prepare for class teaching", "To gain subject Knowledge" were shown positive impact and used sources more oftenfor purpose of information gathering.
- "To prepare questions-answer" indicated as positive impact as well as often and "to guide students' project" was indicated as mediocre as well as sometimes.
- Negative impact was shown for "recreational purpose", "to write and publish

paper" and "to lecture in conferences". The sources are never referred for the first two and rarely for the third.

- In the case of formal sources, text books and internal resources are more often used by the engineering faculties. However, journals; reference materials and news papers were often used by the engineering faculty members.
- Similarly, in the case of informal sources conversation with experts, symposium/conferences and seminars/lectures were sometimes used for information gathering by engineering faculties.
- "To gain subject knowledge", the engineering faculty more often refers all formal and as well as informal sources. They refer sometimes the thesis/ dissertation and review publications.
- "To prepare for class teaching" the engineering faculty more often refers all formal sources except technical reports, conference proceedings. These resources indicate negative impact in information gathering whereas mediocre impact on Theses and dissertation.

6.4 Barriers

The barriers encountered by the engineering faculties during information gathering has been identified using eight variables in a five point scale such as *Strongly agree, Moderately agree, Agree, Disagree, Moderately disagree, and Strongly disagree*. The mean, standard deviation were calculated and the ranks were assigned based on mean and standard deviation. The correlation technique has also used to identify the relation between variables. The variables, rank, mean, standard deviation and correlation value were shown in table 4.

Table 4 Barriers in information gathering (Mean, standard deviation, rank and correlation technique values)

S. No	Descrition	Rank	Mean	Std.	1	2	3	4	5	6	7	8
1	Information Explosion	8	2.23	1.255	1							
2	Absence of subject wise (classification) criteria	5	2.70	1.235	.643**	1						
3	Lack of searching knowledge	1	2.93	1.236	.479**	.517**	1					
4	No segregation between free and chargeable resources	3	2.85	1.311	.470**	.560**	.578**	1				

5	No immediate deletion of inapplicable/ non-available website addresses	4	2.79	1.344	.466**	.586**	.581**	.688**	1			
6	Financial barrier	2	2.91	1.326	.310**	.422**	.427**	.455**	.506**	1		
7	Institutional limit	6	2.65	1.399	.388**	.454**	.356**	.394**	.461**	.558**	1	
8	Slow access speed	7	2.51	1.366	.313**	.334**	.312**	.323**	.385**	.463**	.547**	1

**. Correlation is significant at the 0.01 level (2-tailed).

All the variables are significant at 99% level. The variables are positively correlated. The correlation value ranges between 0.310 and 0.643. The mean value ranges between 2.23 and 2.93 in a five point scale. The mean value lies between disagree and agree. This indicates the barriers are not having much impact in information gathering by the engineering faculty. "Lack of searching knowledge" has been indicated as first preference. It is followed by "financial barrier" and "No segregation between free and chargeable resources". Least preferences were given for "Information explosion" and "Slow access speed".

6.5 Identifyingthe Nature of Faculty User

In order to identify the nature of faculty user, they were asked to responded to a set of questions indicating the problems on a five point scale such as *Strongly agree, Moderately agree, Agree, Disagree Moderately disagree, Strongly disagree.* Principle component analysis method has been used for identifying the nature of faculty users. Identifying the nature of user based on component analysis has been employed by Baskaran, Ramesh Babu and Gopalakrishnan., 2012), Balakrishnan et al., 2014) and Gopalakrishnan, Gopalakrishnan and Pattabiraman., 2014). Rotated component matrix were calculated for the variables for identifying the groups and the same is shown in Table 5.

Table 5 Rotated Component Matrix for problems

S. No	Description	Shy nature	Blather	Inquisitive
1	Lack of awareness about using library	.760		
2	Unwilling to serve by library staff	.794		
3	Non display of new arrivals	.814		
4	Deficiency in hardware/software	.689		
5	Desirable sources are not available		.847	
6	Take more time for searching		.776	
7	Absence of rack index		.442	
8	Information areobsolete		.559	
9	Information is enormous			.771
10	Do not know about mode of usage of catalogue (OPAC)			.579
11	Network problem			.565
12	Lack of training/help in using internet			.499
	Eigenvalues	2.998	2.063	1.920
	Cumulative % of variance	24.984	42.172	58.174

a Rotation converged in 5 iterations.

Table 6 Eigen value for component variables.

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
Variables	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	4.666	38.884	38.884	4.666	38.884	38.884	2.998	24.984	24.984
2	1.276	10.631	49.514	1.276	10.631	49.514	2.063	17.188	42.172
3	1.039	8.660	58.174	1.039	8.660	58.174	1.920	16.002	58.174
4	.872	7.268	65.442						
5	.754	6.287	71.729						
6	.704	5.865	77.594						
7	.640	5.335	82.930						
8	.588	4.903	87.833						
9	.412	3.436	91.268						
10	.407	3.396	94.664						
11	.344	2.863	97.527						
12	.297	2.473	100.000						

Table 7 Component Transformation Matrix

Component	1	2	3
1	.717	.495	.491
2	-.634	.756	.164
3	-.290	-.429	.855

As can be seen from the table 5, the variables are grouped into three components. Eigen values were calculated for the same variables. The first three factors have Eigen values greater than one. "1" was the criterion for retention of a factor, which indicates that only the first three factors are to be extracted. It can be seen from table 6 that the variances were more evenly distributed in the rotated sum of the squared loading (24.984%, 17.188%,and 16.002%respectively; Cumulative variance ratio 58.174%), which shows that the three factors are interpretable. The component transformation matrix table also indicates three factors are interpretable. The three components were extracted and named as "Shy nature user","Blathers"" and "Inquisitive user"

Further, the number of engineering faculties under each category has been identified and the same is shown in Table 8

Table8: Type of user

S.No	Description	User	%
1	Shy nature	69	25.8%
2	Blathers	99	37.1%
3	Inquisitive	99	37.1%
Total		**267**	**100%**

Majority of the engineering faculties are inquisitive users (37.1%) and Blathers (37.1%). 25.8% of engineering faculty members are shy nature. The demographic details and the nature of user has been identified and the same is shown in Table 9.

Table 9: Type of user and demographic details

S.No	Description	Shy nature	Blathers	Inquisitive	Total
GENDER					
1	Male	33 12.4%	57 21.3%	50 18.7%	140 52.4%
2	Female	36 13.5%	42 15.7%	49 18.4%	127 47.6%
AGE					
1	>30	46 17.2%	75 28.1%	70 26.2%	191 71.5%
2	31-40	18 6.7%	23 8.6%	26 9.7%	67 25.1%
3	41 and above	5 1.9%	1 0.4%	3 1.1%	9 3.4%

QUALIFICATION					
1	UG	3 1.1%	5 1.9%	6 2.2%	14 5.2%
2	PG	40 15.0%	62 23.2%	66 24.7%	168 62.9%
3	MPhil	22 8.2%	31 11.6%	27 10.1%	80 30.0%
4	PhD	4 1.5%	1 0.4%	0 0.0%	5 1.9%
DESIGNATION					
1	Asst Professor	62 23.2%	92 34.5%	93 34.8%	247 92.5%
2	Associate Professor	4 1.5%	7 2.6%	6 2.2%	17 6.4%
3	Professor	3 1.1%	0 0.0%	0 0.0%	3 1.1%
EXPERIENCE					
1	> 5 years	50 18.7%	77 28.8%	72 27.0%	199 74.5%
2	6 to 10 years	11 4.1%	17 6.4%	22 8.2%	50 18.7%
3	11 to 15 years	5 1.9%	4 1.5%	5 1.9%	14 5.2%
4	more than 15 years	3 1.1%	1 0.4%	0 0.0%	4 1.5%

Out of 69 (25.8%) respondents 33 (12.4%) male and 36(13.5%) female are shy nature. Majority of them are below 30 years of age group (46, 17.2%). The remaining, 18 belong to the age group of 31 to 40 and 5 belongs to above 41 years. Almost 62 (23.2%) respondents belong to Assistant professors. Out of remaining 7, three belongs to Professor and 4 belong to Associate Professor. Majority of the respondents (61, 22.8%) are below 10 years of experience.

In the case of “blathers” nature of information gathering group, 57(21.3%) belongs to male and 42 (15.7%) belongs to female. 75(28.1%) belongs to the age group of below 30 years and 23 (8.6%) are between 31 and 40 where as one respondent belong to the age group of above 40. 92 (34.5%) belongs to Assistant Professors and 7 (2.6%) belongs to Associate Professors. In this category 94 (35.2%) respondents are having less than 10 years of experience.

In “Inquisitive” nature of information gathering group, 50(18.7%) belongs to male and 49 (18.4%) belongs to female. 70(26.2%) respondents belongs to the age group of below 30 years and 26 (9.7%) belongs to the age group of 31 to 40 where as three belongs to the age group of above 40. 93 (34.8%) belongs to Assistant Professors and only 6 (2.2%) belongs to Associate Professors. In this category 94 (35.2%) respondents are less than 10 years of experience.

The inquisitive users naturally use the information resources for academic purposes in both formal and informal way. "Blathers" nature of information gathering has effectively utilizing the resources naturally since they are making a comparative study of the sources with their library resources. Therefore it is essential to take care of shy nature engineering faculty members and prepare them for information gathering.

7. CONCLUSION

The prefered information sources of the engineering faculties are in the form of text books, periodicals; reference sources etc. and is also connected with internet to provide updated digital format. The updating of knowledge for learning processes of faculties are attending conference, seminar and symposium, reading newspaper or news letter, reading latest books, current issues of journals and communicating with their colleagues and experts. The purposes behind gathering information of faculty are preparing notes for taking classes, giving lecture in conference, symposium, seminar etc., providing guidance to students, writing article for journal publication through their personal collections, libraries and internet. Based on the information gathering practices the faculties were grouped in to three different types of users such as Shy nature, Blathers and Inquisitive users.

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