

Concept of Push Technology applied in an Engineering College Library in Kolkata**Amitabha Pramanik**Librarian, Asutosh College, 92, S. P. Mukherjee Road,
Kolkata-700026, W. B. India

Abstract: This paper discusses an experimental study on the application of Push Technology in the field of information science. The findings and their implications are represented based on data collected between 14th November 2008 and 24th March 2009. For this study, a group of faculty members from various departments of Guru Nanak Institute of Technology (GNIT) were selected and Push Technology was applied for sending relevant information from web resources (like IEL online journal articles) to the concerned faculty members. The system that was set up compiled information from several online resources and sent them directly to the user's desktop from a central server through Internet. It was maintained by two profiles: I) Patron Profile and II) Information Profile. One database was utilized for information matching purpose by the help of MS Excel, where a list of user's detail criteria—i.e., their working field of subjects as well as their other interested fields of subject area—was maintained. After sixteen weeks we observed an increasing rate of acceptance of relevant information by all patrons from 15.4% to 76.1%. On the basis of this experimental study we advocate the application of Push Technology in other types of academic and research libraries in West Bengal.

Keywords: Pull Technology, Push Technology, SDI, Web casting**Introduction**

The library is the heart of an academic or technical institute. During the last three decades, there have been radical changes in concepts and technological support for library organization and services. One new innovation is Push Technology. This may be considered as a cyber version of classical Selective Dissemination of Information (SDI). However, in academic libraries, Push Technology is not known to be in much use.

In recent years, a large number of engineering and technical colleges have been established in West Bengal. Guru Nanak Institute of Technology (GNIT) located at 157/F, Nilgunj Road, P.O. Panihati, Kolkata 700114, W.B., India, is one of the major private engineering colleges. This work is based on an experimental pilot project using Push Technology principles to serve the teachers of GNIT.

Push Technology in the field of information science

Since their advent in the 1950s, attempts have been made to use computers for library and information services. One of the first services for which automation was attempted was Current Awareness Service (CAS). H. P. Luhn proposed in 1961 a method of using computers to provide automated CAS. He christened this method as Selective Dissemination of Information (SDI). Luhn expressed this in the following manner: "The SDI is that service within an organisation which concerns itself with the channeling of new items of information, from whatever source, to those points within the organisation where the probability of usefulness, in connection with current work or interests, is high" [1].

Librarians have been providing CAS for many years. The basic premise of automated CAS was to harness the computer for tracking information of interest to library users through regular search of a specific dataset of information based upon a pre-determined user profile. When new items matching the user interests were added to the database, these would be printed out and sent to the user. In addition, the practice of undertaking regular online searches on behalf of their users is something that librarians have undertaken since the inception of the World Wide Web. It is effectively 'Pull Technology', even though we never knew it as such until 'Push Technology' came along. Pull Technology is very much in evidence today. Internet users make use of search engines like 'Google' or 'Yahoo!' to browse through information on the World Wide Web, moving from page to page in order to decide which data to download. The distinguishing characteristic of Pull Technology is that users have to make a conscious effort to connect online and then 'pull' or extract files down onto their computer. In contrast, the key distinguishing feature of Push Technology is that users are automatically sent tailored information matching pre-defined criteria. The aim is to help users by searching for relevant and meaningful information on their behalf, rather than them having to spend the time and effort. Push Technology is a cousin to the dynamic updating technology which first appeared in the Netscape browser in 1995. The idea behind dynamic updating is that there are situations in which it is desirable to continuously update the web browser windows with dynamic, i.e., constantly changing information. It rapidly gained popularity since its emergence in April 1996. Nearly around the same

time, PointCast announced its PointCast network, which became extremely popular as well.

The initial enthusiasm for Push Technology was driven by the deficiencies of the current Internet ‘pull’ model. Web pages vary in quality and most of them are often useless. The Internet is certainly a good mechanism for disseminating information, but it is not good at enabling users to quickly identify relevant information. Indeed, before they can pinpoint a useful and relevant piece of information, users may well have had to first undergo a frustrating and time-consuming trial through the million results that come up on any particular search term. Rather than having to connect online and conduct a lengthy search for specific information, Push Technology offers a solution in which users would automatically be sent relevant information to their desktop.

Push Technology enables users to remain up-to-date with information on the Internet and/or on an intranet through delivery of content at regular intervals.

Scope and coverage

Engineering education is expanding rapidly at private sectors in West Bengal—especially at Kolkata—since the job market for engineering and technology students are currently quite lucrative due to the boom in the IT (Information Technology) sector. Therefore engineering and technological education is now gaining importance in West Bengal.

Most of the engineering colleges spend a huge amount each year as subscription for e-journals. However, it has been found that the students as well as the faculty are often not aware of the e-resources. Push Technology may help in proper utilization of these valuable e-resources.

To apply Push Technology concept in the GNIT Library, we created two main profiles at the beginning of this study: ‘Information Profile’ and ‘Patron’s profile’. For Information Profile we used ‘AICTE – IEL online journals’ which covers 172 international journals. For the Faculty Profile we reached out to ten (10) permanent faculties from various departments (viz., Computer Science and Engineering (CSE), Electronics and Communication Engineering (ECE), Electrical

Engineering (EE), Information Technology (IT), Food Technology (FT), and Applied Electronic and Instrument Engineering (AEIE)) of GNIT who regularly use journals for their research work.

Objectives of the work

The main objective of this work is to understand the problems related to use of e-resources in the library of Guru Nanak Institute of Technology. It is to identify the availability of information from e-resources regarding the various departments of engineering as like CSE, ECE, AEIE, EE, IT, and FT. It aims to identify the actual need of e-resources of the particular user (ten members of faculty in the case of the present study). It also examines the usability of the e-journals available on IEEE online e-journals subject fields under the syllabus of the different engineering subjects. It also investigates the satisfaction level of the user with the application of Push Technology and whether this technology is suitable to a college library.

Methodology

We created two main profiles at the start of this study—Patron’s Profile (PP) and Information Profile (IP). For the Patron’s Profile we selected through the interview method those faculty members of GNIT who regularly use e-resources from the college library and—although interested in new technologies—face a lot of problems. Push Technology concept is applied in the GNIT Library by the help of MS Excel for database creation purpose. A comparative study of the analyzed result obtained by this method helped us in understanding the importance of this method in an engineering college library. Finally, we prepared a summary of faculty feedback and suggested suitable ways to develop and implement Push Technology facilities.

Structure of the Project Scheme

Currently, most of us retrieve information from the Internet by using search engines, i.e. we search for relevant pages and then ‘pull’ that information to our computers. Although we are familiar with such search methods, it is often time consuming. For pulling and pushing information in the library for the patrons via web, we intend to undertake the steps shown in Figure 1 below:

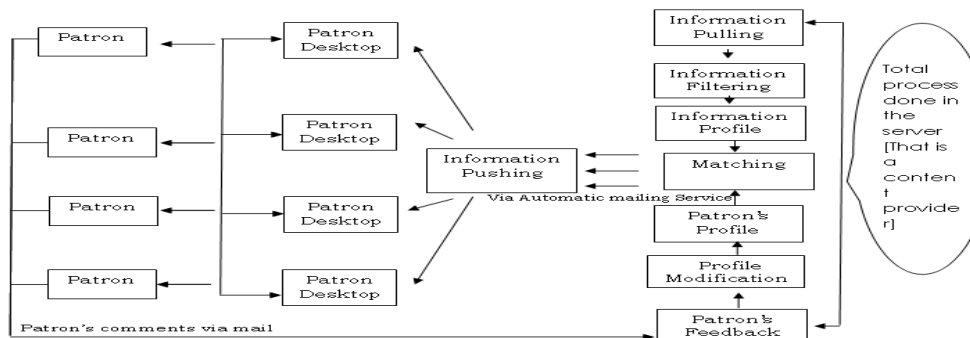


Fig 1: Structure of the project scheme in the Library

Steps of creation

We created a small electronic library consisting of MS Excel, MS Word, one Google Mail account, Portable Document Format files, Hypertext Markup Language files and PowerPoint presentation—taking from each category.

The following diagram demonstrates the algorithm involved:

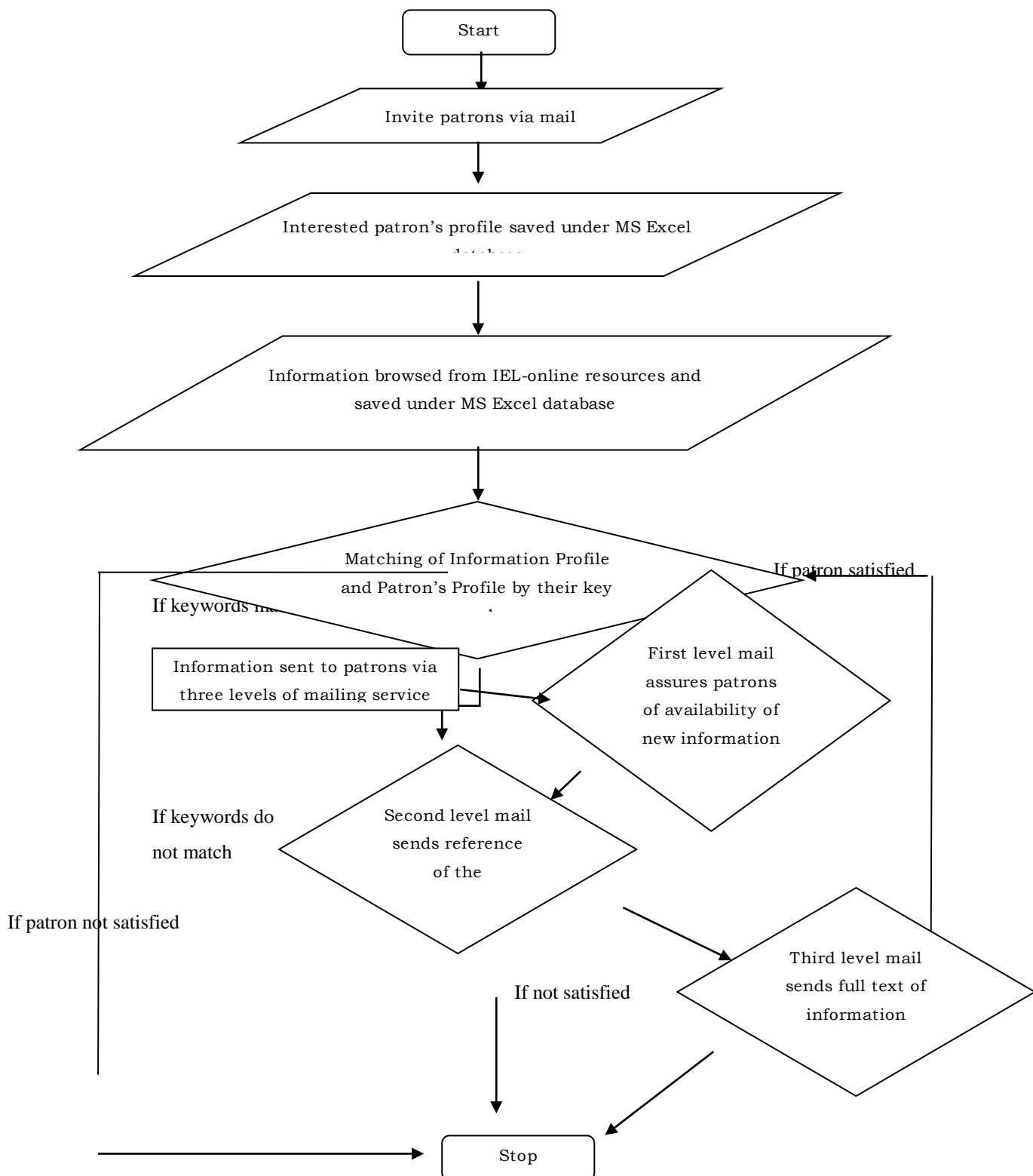


Fig 2: Flow chart of information pushing process

Details about browsing information

We browsed related information as per patron's subject interest from IEL online resources and saved it under particular heads and their departments. For that purpose, we have created seven folders for the various departments in which all downloaded information is saved (in *.pdf or *.htm file formats). The details are presented in Table 1 below:

Table 1: List of .pdf and .html files

Sl. No.	Name of the Folders	No of file Coverage	No. of *.pdf file	No. of *.html file
01.	CA	205	175	30
02.	AEIE	195	168	27
03.	CSE	192	170	22
04.	ENG	110	95	15
05.	PHY	105	92	13
06.	EE	170	138	32
07.	ECE	178	146	32

Findings and discussion

Detailed discussions including the findings about this concept in the library of GNIT are represented based on data collected between 14th November 2008 and 24th March 2009.

Profiles of patrons

We have selected a total of ten (10) patrons (faculty) from various departments of GNIT for the present study. For details, refer to Table 2 below:

Table 2: List of ten patrons from various department of GNIT

Sl. No.	Name of Patron	Department	Designation	Areas of Interest
01.	Mr. Animesh Kar	CA	Asst. Professor & HOD, CA	Software Engineering, Web Mining, Opinion Mining, Programming Language and Methodologies, Configuration Management, Semantic Parser.
02.	Dr. Indrajit Bose	ASH	Asst. Professor	Communication, Teaching and research, Teaching Methods and Pedagogy.
03.	Ms. Paromita Banerjee	AEIE	Lecturer	Biomedical Sensor, Electric Crystal Modeling, Dental Implant Stability Measurement.
04.	Ms. Suparna Maiti	AEIE	Lecturer	Pressure Measurement
05.	Dr. Santanu Kr. Sen	CSE	Professor & HOD, CSE	Computer Networking, Operating System, System Administration, Neural Networks, Artificial Intelligence
06.	Mr. Sudip Kuila	AEIE	Sr. Lecturer	Neural Network, Fuzzy Logic, Telemedicine.

Sl. No.	Name of Patron	Department	Designation	Areas of Interest
07.	Mr. Prabal Deb	EE	Asst. Professor & HOD	Industrial Application System, Power Engineering, Electrical Machines,
08.	Mr. Malay Dhar	CSE	Lecturer	Natural Language Processing
09.	Ms. Sharmistha Dey	ASH	Lecturer	Bose Einstin Condensation, Linear Dynamics, Critical Phenomena, Solid State Physics, Statistical Mechanics
10.	Ms. Baisakhi Das	CSE	Lecturer	Image Processing, Water Marking.

Information delivery system

Information is downloaded from the IEL online resources and delivered via mail to the patron's desktop once it matches specific keywords. For this purpose, we have created a Google Mail account (Gmail account): gnitlibrary@gmail.com.

For the purpose of running this process, we can undertake three levels of mailing service.

Under the three levels of mailing service, it was mentioned that the patron can browse the subject-related information that was being sent. At the beginning of the study, the rate of browsing percentage was very low. After three weeks it was observed that the rate of browsing percentage has increased.

This is detailed in Table 3 below:

Table 3: List of weekly information delivery report (at interval of 4 weeks)

Sl. No.	List of Weeks	Name of Patron	No. of information delivery via mail	No. of relevant information (Mentioned by their feedback messages)	No. of those information which are not relevant	
01.	1st Week	01	Mr. Animesh Kar	06	01	05
		02	Dr. Indrajit Bose	05	00	05
		03	Ms. Promita Banerjee	07	02	05
		04	Ms. Suparna Maiti	04	01	03
		05	Dr. Santanu Kr. Sen	07	01	06
		06	Mr. Sudip Kuila	05	00	05
		07	Mr. Prabal Deb	05	01	04
		08	Mr. Malay Dhar	04	01	03
		09	Ms. Sharmistha Dey	05	01	04
		10	Ms. Baisakhi Das	04	00	04
02.	4th Week	01	Mr. Animesh Kar	07	02	05
		02	Dr. Indrajit Bose	06	01	05
		03	Ms. Promita Banerjee	08	03	05
		04	Ms. Suparna Maiti	05	01	04
		05	Dr. Santanu Kr. Sen	07	03	04
		06	Mr. Sudip Kuila	05	01	04
		07	Mr. Prabal Deb	06	02	04
		08	Mr. Malay Dhar	05	01	04

Sl. No.	List of Weeks	Name of Patron	No. of information delivery via mail	No. of relevant information (Mentioned by their feedback messages)	No. of those information which are not relevant
		09 Ms. Sharmistha Dey	05	01	04
		10 Ms. Baisakhi Das	04	01	03
03.	8th Week	01 Mr. Animesh Kar	09	04	05
		02 Dr. Indrajit Bose	08	03	05
		03 Ms. Promita Banerjee	10	05	05
		04 Ms. Suparna Maiti	06	03	03
		05 Dr. Santanu Kr. Sen	08	03	05
		06 Mr. Sudip Kuila	06	02	04
		07 Mr. Prabal Deb	07	03	04
		08 Mr. Malay Dhar	07	03	04
		09 Ms. Sharmistha Dey	06	03	03
		10 Ms. Baisakhi Das	07	03	04
04.	12th Week	01 Mr. Animesh Kar	10	06	04
		02 Dr. Indrajit Bose	09	05	04
		03 Ms. Promita Banerjee	11	08	03
		04 Ms. Suparna Maiti	08	05	03
		05 Dr. Santanu Kr. Sen	07	03	04
		06 Mr. Sudip Kuila	07	03	04
		07 Mr. Prabal Deb	08	04	04
		08 Mr. Malay Dhar	07	03	04
		09 Ms. Sharmistha Dey	07	04	03
		10 Ms. Baisakhi Das	06	03	03
05.	16th Week	01 Mr. Animesh Kar	14	10	04
		02 Dr. Indrajit Bose	11	09	02
		03 Ms. Promita Banerjee	16	12	04
		04 Ms. Suparna Maiti	10	08	02
		05 Dr. Santanu Kr. Sen	09	07	02
		06 Mr. Sudip Kuila	06	04	02
		07 Mr. Prabal Deb	07	06	01
		08 Mr. Malay Dhar	06	04	02
		09 Ms. Sharmistha Dey	07	06	01
		10 Ms. Baisakhi Das	06	04	02

The process of execution of Push Technology has been shown in the weekly information delivery report. This is only an example to demonstrate how the system works. In reality, several dialogues, discussions and verbal queries were made regarding the patrons' feedback via e-mail as well as through oral communication. Then, to run the process smoothly, information was retrieved from various sources (IEL online journals) on the basis of these queries and then delivered to patrons through e-mail regularly.

Feedback messages

We received several feedback messages from the patrons informing us of their actual need—the type of information they want. These messages helped us in better understanding their requirements and the quality of service rendered to them.

These messages are detailed in Table 4 below:

Table 4: List of patron's messages received via e-mail

Sl. No.	Name of Patron	Department	Date of Received	Messages
01	Mr. Animesh Kar	CA	18/11/08	"....Please continue in sending information additionally on Software Engineering also. This new system introduced by you it is really helpful for me...."
02	Dr. Indrajit Bose	ASH	17/11/08	"...the articles specially on Teaching Methods...please continue...."
03	Ms. Promita Banerjee	AEIE	21/11/08	"I'm really happy with the current information. I require also information on Electric Crystal Modeling...."
04	Ms. Suparna Maiti	AEIE	18/11/08	"....the information which are most important. Continue in sending."
05	Dr. Santanu Kr. Sen	CSE	20/11/08	"....Require information on Artificial Intelligence also."
06	Mr. Sudip Kuila	AEIE	26/11/08	"....I have needed information on fuzzy logic, so please send more information on my topic."
07	Mr. Prabal Deb	EE	24/11/08	"Information on Industrial Application System is important one. Continue in sending. Thank you."
08	Mr. Malay Dhar	CSE	28/11/08	"Article on NLP is my core topic, need more materials. Thanks."
09	Ms. Sharmistha Dey	ASH	20/11/08	"Information received. Needed more information on Bose Einstin Condensation...."
10	Ms. Baisakhi Das	CSE	26/11/08	"....for providing information on Image Processing. Continue sending more details."
11	Mr. Animesh Kar	CA	28/01/09	"....send materials on Opinion mining also."
12	Dr. Indrajit Bose	ASH	21/01/09	"Information received on communication, teaching and research. I need more important article on this subject."
13	Ms. Promita Banerjee	AEIE	12/01/09	"Received information on Biomedical Sensor. I like to more details on the subject...."
14	Ms. Suparna Maiti	AEIE	16/01/09	"Information received. Send more information...."
15	Dr. Santanu Kr. Sen	CSE	20/01/09	"Important information on system administration from you...."
16	Mr. Sudip Kuila	AEIE	24/12/08	"All information need serve my purpose. Please send information on Neural Network...."
17	Mr. Prabal Deb	EE	28/01/09	"More information on Industrial Application System helpful. Please send information on Electrical Machines."
18	Mr. Malay Dhar	CSE	22/01/09	"Thank you for providing important article."
19	Ms. Sharmistha Dey	ASH	06/01/09	"Important information received. Please send information on Solid State Physics & Linear Dynamics."

Sl. No.	Name of Patron	Department	Date of Received	Messages
20	Ms. Baisakhi Das	CSE	02/01/09	"Detail information received very important for me. Please send information on water marking. Thanks."
21	Mr. Animesh Kar	CA	09/03/09	"Its important information from you specially the opinion mining one. If possible continue to send materials on opinion mining information regularly....."
22	Dr. Indrajit Bose	ASH	12/02/09	"Current article sent by you well help me. Please continue in sending more articles on the subject. Try to send articles on Pedagogy."
23	Ms. Promita Banerjee	AEIE	18/02/09	"Beyond my expectations, the information sent by you. Please continue....."
24	Ms. Suparna Maiti	AEIE	04/03/09	"The information is important one. Please provide more information....."
25	Dr. Santanu Kr. Sen	CSE	10/03/09	"All information from you on both subjects area very important. Appreciate your effort on this system. Continue and try to cover all my subjects as available....."
26	Mr. Sudip Kuila	AEIE	20/03/09	".....for the information continue in sending...."
27	Mr. Prabal Deb	EE	18/03/09	"Information on both areas from you is important. System introduced very useful....."
28	Mr. Malay Dhar	CSE	26/02/09	"Last articles was very important, please continue sending process."
29	Ms. Sharmistha Dey	ASH	03/03/09	"All information from you are very important. Please let me have more information....."
30	Ms. Baisakhi Das	CSE	10/03/09	".....for the information provided very useful. Hope you will continue in sending the same....."
31	Dr. Santanu Kr. Sen	CSE	20/03/09	"The papers that you have sent are praise worthy and these relate to our dept....."

Weekly delivery report

Each week, the library sent information to the patrons' desktop after matching keywords provided by the patrons with the keywords already downloaded from IEL online resources and saved in the MS Excel sheets.

Table 5 below presents data collected from the abovementioned matching:

Table 5: List of information matching percentage (as per weekly report)

Date of information Browsing	No. of Information Browsing	No. of Information Matching	% of Information Matching
14-11-2008	52	08	15.4
20-11-2008	62	12	19.4
28-11-2008	61	14	22.9
05-12-2008	58	16	27.6
15-12-2008	70	21	30
24-11-2008	68	22	32.3
02-01-2009	72	28	38.9
12-01-2009	74	32	43.2
22-01-2009	70	33	47.1
30-01-2009	72	35	48.6
09-02-2009	74	38	51.3
18-02-2009	80	44	55
26-02-2009	78	44	56.4
06-03-2009	82	50	60.9
17-03-2009	90	62	68.9
24-03-2009	92	70	76.1

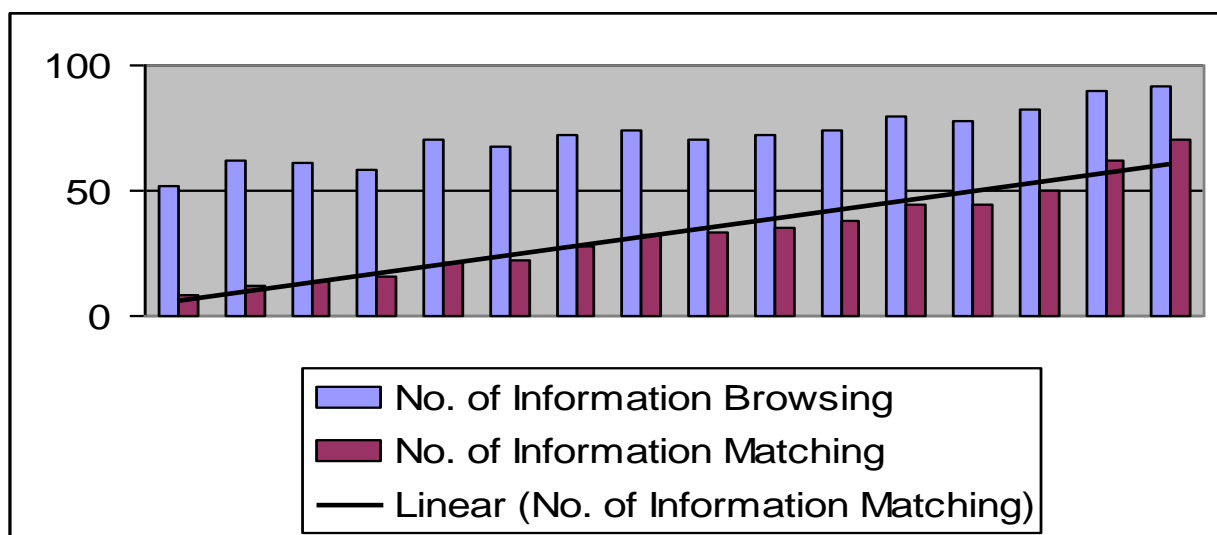


Fig 3: Increasing rate of information matching from 14-11-2008 to 24-03-2009

Comparison between first week and last week of information delivery report

Table 6: Comparative report of information delivery between Week 1 and Week 16

Sl. No.	Name of Patrons	Report of First week			Report of Last (16th) Week		
		No. of Information Delivery	No. of Relevant Information	% of Relevant Information	No. of Information Delivery	No. of Relevant Information	% of Relevant Information
01.	Mr. Animesh Kar	06	01	16.7	14	10	71.4
02.	Dr. Indrajit Bose	05	00	Nil	11	09	81.8
03.	Ms. Promita Banerjee	07	02	28.6	16	12	75
04.	Ms. Suparna Maiti	04	01	25	10	08	80
05.	Dr. Santanu Kr. Sen	07	01	14.3	09	07	77.8
06.	Mr. Sudip Kuila	05	00	Nil	06	04	66.7
07.	Mr. Prabal Deb	05	01	20	07	06	85.7
08.	Mr. Malay Dhar	04	01	25	06	04	66.7
09.	Ms. Sharmistha Dey	05	01	20	07	06	85.7
10.	Ms. Baisakhi Das	04	00	Nil	06	04	66.7

From Table 6 above, we observe that information flow rate of 'pushing' by the librarian shows a clear progress from the 1st to the 16th week. For the ten participants (patrons), percentage of received information increased from 14.3 to 25 in the 1st week to 66.7 to 85.7 in the 16th week. Figures 4 and 5 below represent the data in graphical form, where the comparative increase becomes apparent. Percentage of patrons' feedback message increased as well.

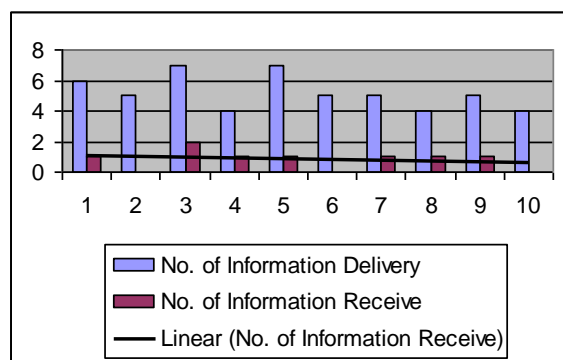


Fig 4: Information Delivery Report of 1st Week

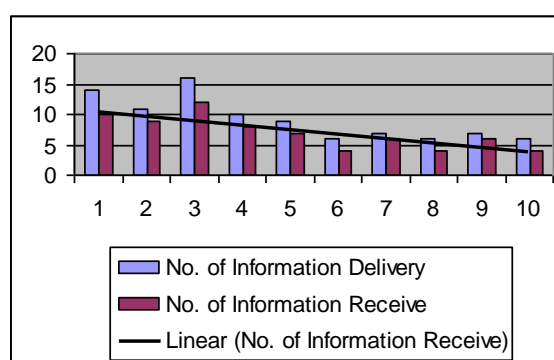


Fig 5: Information Delivery Report of 16th Week

From the above statistics we understand that the application of Push Technology concept in the GNIT Library was much effective, which was proved by the increasing rate of feedback messages received from patrons. For GNIT Library, this progress report is important for information delivery purpose from IEEE Electronic Library (IEL) and similar other online resources. A more automatized system is further envisaged to broaden the scope of the service. The system may also be implemented in other academic libraries to support research and training.

Conclusion

Developments and changes in the field of information profession have been too rapid in recent years. But the underlying factor of satisfying information needs of users is still the focal point of libraries. The present study in the application of Push Technology in an engineering college library opened an authentic method which can be described as a cyber version of Selective Dissemination of Information (SDI). An engineering college library is the best place for proper utilization of this technology. As technology advances more and more rapidly, both teachers and students spend an increasing amount of time in information seeking—both for business and for leisure. In this study, only teachers were accommodated in Patron's Profile. But there is a wide scope for including students as well, so that they can benefit from this technology for their project work.

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