

Use of Search Engines by the Students of National Institute of Technology, Meghalaya: A Study

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ABSTRACT

There are many ways a person can satisfy an information need. Increasingly the Internet has become a key information source and people find information online by browsing the WebPages or using the different search engines in the Internet. Search Engines are one of the tools that help in resource discovery in the World Wide Web. One may say that user satisfaction depends much upon the search strategies deployed by the user. But at the same time it also depends upon the quality of search engine used for information retrieval. Today, there are many search engines used for resource discovery with lots of customization possibilities including refining and sorting. The study is aimed at analyzing the use of six popular search engines (i.e. Google, Yahoo, MSN (Bing), Altavista, Infoseek and Ask) and their impacts among the students of National Institute of Technology Meghalaya.

Keyword: Internet, Search engines, Google, Yahoo, AltaVista, World Wide Web, National Institute of Technology Meghalaya

Introduction:

The Internet is an ocean of all kinds of information in which making any query into such a huge information reservoir is extremely difficult. According to the WorldWideWebSize.com, the Indexed Web contains at least 1.52 billion pages and the Dutch Indexed Web contains at least 183.44 million pages as of 28th November 2013. Sifting through this massive information database and finding just what you are looking for is tricky. To get the most out of the Internet, one needs to know how and who (or what) to ask for directions (Kingoof, 1997).

Search Engine as Outlet for Boundless Information:

In order to overcome the difficulty in retrieving information from Internet, several companies and institutions have developed various search aids called as search engines, which are widely used to find information on the Internet. They are freely available to anyone with Internet access, and there are no search restrictions. To use a search engine one has to enter a string of keywords and/or topics according to the particular engine's query structure, click the search/find button, and wait for the results. Sometimes we find nothing, sometimes we find millions of related matches, and occasionally we find the most relevant matches listed first.

The What of Search Engine:

Search engines are sophisticated utilities designed expressly to find information on the Internet. According to Biradar & Kumar (2008), search engine is a tool, which helps in retrieving information from the Internet. It is programmed in such a way that it indexes the Web and accordingly builds their databases. When a query has entered in the search engine, it checks its index with the query. Then relevant matches are retrieved and returned as hits or search results. In other words search engine acts as a searchable index of Web pages of the world. Chakravarty (2012) defined search engine as a program that searches documents for specified keywords and returns a list of the documents where the keywords were found. He further argued that search engine is just a general class of programs; the term is often used to specifically describe systems like Google, Yahoo, Alta Vista and others that enable users to search for documents on the World Wide Web.

The How of Search Engine:

One of the main components of search engine is a robot, which is called Web Crawler (or Spider). Web crawler is a kind of computer program that browses the Web in a methodical, automated way (Hu et al., 2001). This process is called Web Crawling or spidering. Search engines use spidering to provide up-to-date information. The most important aim of web crawler is copying all visited web pages for later searches to make next searches faster. Web crawlers can also used for automating maintenance task on a web site like checking links or validating code. Also web crawlers are used to collect specific information from Web pages (Batzios et al., 2007). There are two types of search engines: first type is the search index which is a vast catalog made up of every word taken from all the web pages searched by crawler. Google is an example for this kind of search engine (Schwartz, 1998). Other type is the web directory which is compiled by real people who organize web pages into categories and subcategories and they lets user to search very effectively. Yahoo is a kind of web directory and a good example for this kind of search engines. Most popular search engines are combination of these two principles (Cooper, Milner & Worsley, 2000).

Choices of Search engines:

With more than 200 search engines available online and this number is still growing, choosing the right one (or ones) is important. Different search engines require

different search strategies to retrieve information on the Internet. Searchers' ability to find the information on the Internet is a function of how precise his/her queries are and how frequently he/she uses search strategies for different search engines. These issues play a very important role in retrieving relevant information on the Web. There are several effective ways to use special operators and search strategies to target the result (Biradar & Kumar, 2008). Students in the Institute of higher learning required up-to-date information to do their assignments and at the same time prepare for their exams. The study is done to find out the awareness, usage, criteria and opinions of the student of National Institute of Technology, Meghalaya on the popular six search engines i.e. Google, Yahoo, Alta Vista, Infoseek, Bing and Ask.

The Aim of the Study:

The main aim of the study is to find out which search engine among the six search engines (i.e. Google, Yahoo, Alta Vista, Infoseek, Bing and Ask) is the most favourite/used one among the students of the National Institute of Technology Meghalaya. The study also attempts to find answers to the following questions:

1. What are the search engine usage frequencies of students?
2. What are the students' criteria for search engine preference?
3. What are the students' opinions about search engines?
4. What are the differences between search engines?
5. What search strategies do students prefer most?

Scope and Limitation:

The study is confined to the infrastructure facilities and the usage of Search Engines by the BTech students of the National Institute of Technology, Meghalaya.

National Institute of Technology, Meghalaya

The National Institute of Technology (NIT), Meghalaya is one among the thirty NITs in India established as an Institute of National Importance with full funding support from the Ministry of Human Resource Development, Government of India. NIT Meghalaya took birth in 2010 and started functioning from its temporary campus in Shillong in 2012. Its permanent campus is being set-up at Sohra (Cherapunjee). Its vision is to make significant contribution to the World of Knowledge and Technology and the Development of the State, the Region and the Nation as a whole. The mission of the Institute is to impart quality education in the fields of Engineering, Science and Technology at Undergraduate as well as Postgraduate levels with special attention to encourage innovation and creativity in these fields and to engage in creation of knowledge and development of technologies through effective research programs. Having started with the B. Tech. programme in three disciplines i.e. Computer Science Engineering, Electronic & Communication Engineering and Electrical & Electronic Engineering in 2010, in addition to these the Institute also add two more disciplines i.e. Civil Engineering and Mechanical Engineering and the Doctoral programmes in the above disciplines in 2013.

Research Methodology

A detailed questionnaire was designed and circulated among the BTech students of the National Institute of Technology, Meghalaya. The questionnaire consisted of 3 parts. Part 1 aimed to collect personal information from the respondents with 3 questions. This part aimed to gather general information of the students. Part 2 of the questionnaire consisted of 4 questions and it is focused on gathering information about Internet usage of the respondent student. This part brought information about why and how students are using the Internet. Part 3 of the questionnaire was about Search Engine usage and it consisted of 9 questions. This part reveals which Search Engine is the most used one among the students of NIT Meghalaya. In addition, this part gathers information about the students' criteria for Search Engine Preferences, search options, features of search results, usage of search results and the usefulness of search engines by the students of NIT Meghalaya.

Sample Frame:

A sample frame is defined by Neuman (2006) as a list of cases in a population or the best approximation of a given population. The table below presents the sample frame used in the study.

Table 1: National Institute of Technology Meghalaya Student Population (370)

Questionnaires							
Department(s)	Gender		Level of Study (BTech)				Sample Size
	M	F	1 st	2 nd	3 rd	Final	
Computer Science Engineering	12	8	5	5	5	5	20
Electrical & Electronic Engineering	12	6	5	3	5	5	18
Electronic & Communication Engineering	12	8	5	5	5	5	20
Civil Engineering	12	5	17	-	-	-	17
Mechanical Engineering	12	2	14	-	-	-	14
Total	60	29	46	13	15	15	89

Data Analysis and Interpretation:

The responses to the questionnaires that were handed out to the students of National Institute of Technology Meghalaya are organized, compiled, analyzed and interpreted using SPSS 12.0. Frequency, mean, standard deviation, one sample t-test and percentage methods were used during the analysis process. Mean difference is categorised from 1 to 6 as always used and don't like.

Responses:

The responses of the students of National Institute of Technology Meghalaya to the questionnaires is summarized in Table 2 below. Guided by the sample frame, the study sought to sample respondents in accordance with the numbers set in the sample frame. The response rate of the students is 100%.

In table 3 we can see that around 79 students (88.76%) know how to read and write in both English and Hindi where as only 10 students (11.24%) can read and

write only in English. It is also discovered that all the students right from the 1st year to the final year are between the age group of 18 years to 22years old.

Table 2: Questionnaires responses by the Students of National Institute of Technology Meghalaya

Student Target Sample	Male	Female	Total	Response No.	Response Rate
CSE Department	12	8	20	20	100%
EEE Department	12	6	18	18	100%
ECE Department	12	8	20	20	100%
CE Department	12	5	17	17	100%
ME Department	12	2	14	14	100%
Overall Student Target Sample	60	29	89	89	100%

Table 3: Language Known * Gender* Age Crosstabulation

Language Known	Gender	Age	Total
		18 yrs to 22 yrs	
English	Male	6	6
	Female	4	4
	Total	10	10
Both(English & Hindi)	Male	54	54
	Female	25	25
	Total	79	79
Total	Male	60	60
	Female	29	29
	Total	89	89

Internet Usage:

Table 4 & Table 5 indicates that 77 (86.52%) of the students used the Internet daily where as only 8 (8.98%) & 1 (1.12%) of the students were using the Internet at least once a week and once a forth night. It is also noted that 3 (3.37%) of the students rarely used the Internet.

Table 4: Department * Internet Usage Frequency Crosstabulation

Department	Internet Usage Frequency				Total
	Daily	At Least once a week	At least once a fortnight	Rarely	
Computer Science Engineering	17	3	0	0	20
Electronic & Communication Engineering	18	2	0	0	20
Electrical & Electronic Engineering	17	1	0	0	18
Civil Engineering	13	2	1	1	17
Mechanical Engineering	12	0	0	2	14
Total	77	8	1	3	89

Purpose of Internet Usage:

Table 6 shows that 88 (98.8%) of the students are using the Internet for Education, followed by 74 (83.1%) for news, 65 (73%) for entertainment, 57 (64%) for sports and the least sought after information from the Internet is health tips i.e. 30 (33.7%).

Table 6: Purpose for using the Internet

	Education	Entertainment	News	Health Tips	Sports
No. of Student Who used Internet for:	88	65	74	30	57
No. of Student Who do not used Internet for:	1	24	15	59	32
Total	89	89	89	89	89

Facilities of Internet:

From Table 7, analysis showed that 81 (91%) of the students are availing the Internet facilities from Hostel/Home, 69 (77.5%) are availing the Internet from the computer centre of the institute, 26 (29%) from the Internet Cafe and 24 (26.9%) are availing the Internet from the Institute Library.

Table7. Availing Internet Facility

	Institute Library	Computer Centre	Hostel/Home	Internet Cafe
No. of Student Who Avail Internet facilities at:	24	69	81	26
No. of Student Who do not Avail Internet facilities at:	65	20	8	63
Total	89	89	89	89

Use of Search Engine:

Table 8, shows that 73% of the students are using the Search Engine frequently, 24.7% are using the Search Engine sometimes and only 2.2% are rarely using the search engine.

From table 9, the most used search engine by the students is Google (100%) then followed by Yahoo (82%), Ask (67.4%), AltaVista (66.3%), Bing (61.8%) and the least used search engine is Infoseek (51.7%).

Table 8: Search Engine Usage Frequency

	Frequency	Percent	Valid Percent	Cumulative Percent
Frequently	65	73.0	73.0	73.0
Sometimes	22	24.7	24.7	97.8
Rarely	2	2.2	2.2	100.0
Total	89	100.0	100.0	

Table 9: Most used Search Engine

	Google	Yahoo	Bing	Altavista	Infoseek	Ask
No. of students who use the S.E.	89 (100%)	73 (82%)	55 (61.8%)	59 (66.3%)	46 (51.7%)	60 (67.4%)
No. of students who do not use the S.E.	0	16	34	30	43	29
Total	89	89	89	89	89	89

Usage Frequency of the Six Search Engines:

According to Table 10, 97.8% of students always use Google and only 1.1% used it either sometimes or rarely. This makes Google the most famous search engine for the students of NIT Meghalaya. With respect to Yahoo, 49.4% of students use Yahoo sometimes, 10.1% rarely use Yahoo where as 4.5% of students always use and 3.4% use Yahoo with another search engine if they cannot find what they are looking for. On the other hand, results indicate that Bing has never been used by 33.7% of students and only 13.5% of students used it rarely. Similarly, to Bing, result also indicates that 38.2% of students never use and only 19.1% rarely used AltaVista. The other search engine Infoseek have never been used by 37.1% of students and 7.9% said that they don't like the search engine where as only 5.6% of students rarely used Infoseek. On the other hand, result also indicates that 25.8% of students rarely used Ask for searching information from the web. Furthermore, 9% of students sometimes use Ask where as 4.5% of students always use and 3.4% use Ask with another search engine if they cannot find the information they are looking for and only 6.7% stated that they don't like Ask.

Table 10: Usage Frequency of the Six Search Engines:

Frequency of Use	Google	Yahoo	Bing	AltaVista	Infoseek	Ask
Always Use	87 (97.8%)	4 (4.5%)	0 (0%)	0 (0%)	0 (0%)	4 (4.5%)
Use With Another SE	0 (0%)	3 (3.4%)	1 (1.1%)	0 (0%)	0 (0%)	3 (3.4%)
Sometimes	1 (1.1%)	44 (49.4%)	8 (9%)	0 (0%)	1 (1.1%)	8 (9%)
Rarely Use	1 (1.1%)	9 (10.1%)	12 (13.5%)	17 (19.1%)	5 (5.6%)	23 (25.8%)
Never Use	0 (0%)	7 (7.9%)	30 (33.7%)	34 (38.2%)	33 (37.1%)	16 (18%)
Don't Like	0 (0%)	6 (6.7%)	4 (4.5%)	8 (9.0%)	7 (7.9%)	6 (6.7%)
Total	89 (100%)	73 (82%)	55 (61.8%)	59 (66.3%)	46 (51.7%)	60 (67.4%)
Not Responding	0 (0%)	16 (18%)	34 (38.2%)	30 (33.7%)	43 (48.3%)	29 (32.6%)
Total	89	89	89	89	89	89

Differences between Search Engines:

According to the result of One Sample t-test for search engine usage of students, there is a significant difference between selections of SEs. Google is the one, which students always use with 1.06 mean differences. Beside Google, Yahoo is a search engine, which students sometimes use with 3.41 mean differences. Other search engines' means stacked between rarely used search engine or never used search engine. Ask, Bing and AltaVista are rarely used search engines with 4.03, 4.51 and 4.85 mean differences. On the other hand, Infoseek has never used search engine mean with 5.0 mean differences.

Table 11: One-Sample t-test for search engine usage frequencies among students

SEs	N	Mean	SD	Sig. (2-tailed)	T	95% Confidence Interval of the Difference	
						Lower	Upper
Google	89	1.06	.380	.000	26.209	.98	1.14
Yahoo	73	3.41	1.165	.000	25.022	3.14	3.68
Bing	55	4.51	.900	.000	37.154	4.27	4.75
Altavista	59	4.85	.638	.000	58.338	4.68	5.01
Infoseek	46	5.00	.596	.000	56.872	4.82	5.18
Ask	60	4.03	1.275	.000	24.501	3.70	4.36

Students Criteria for Search Engine Prefers:

There are some factors, which influence students in their preference of a search engine. These factors include homepage style, result page style, number of retrieved results, number of retrieved relevant results, popularity of a search engines and easy user interface (Cavus & Alpan, 2011). Figure 1 represents students' most important preference criteria for this study.

As Table 12 and Figure 1, the most important criterion for students is the speed of SE with 26.8% frequency. Precision/Relevant results are another important criterion and have 22.5% frequency. While number of results is important for 16.9% of students, user interface has 13.9% frequency and it is another important criterion for students that influence them for search engine preferring. 12.9% gives important of popularity of SE and result page style of SE has the lowest importance with 7% frequency for students.

Table 12: Criteria for SEs preferring

Criteria of SEs	Frequency	Percent	Valid Percent	Cumulative Percent
Speed	81	26.8	26.8	26.8
Precision/Relevant Results	68	22.5	22.5	49.3
Number of Results	51	16.9	16.9	66.2
User Interface	42	13.9	13.9	80.1
Popularity	39	12.9	12.9	93.0
Result Page Style	21	7.0	7.0	100.0
Total	302	100.0	100.0	

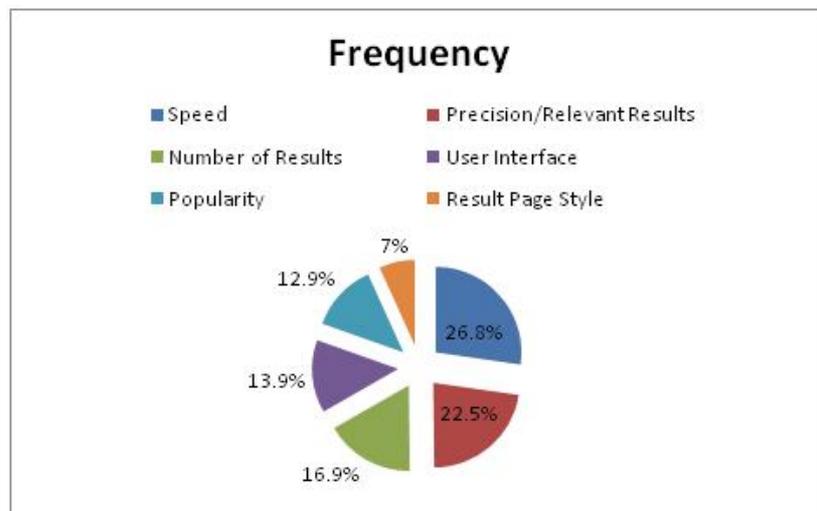


Fig. 1. Criteria for SEs preferring

Students' Opinions about SEs:

As seen in Figure 2, students satisfied with the speed of their favourite search engine is 96.6%. 82% of the students feel that their favourite search engine is updated daily where as 65.2% feel that their favourite search engine is user friendly. 57.3% of the students feel that the style of result page is very important for seeking information in their favourite SE. 52.8% of students feel that relevant/precise results and satisfaction for language support are the other two opinions that students feel about SE. 50.6% of students use E-mail support where as emphasizing of keywords helps 44.9% of students. Also 13.5 % students complain about retrieved irrelevant results and 12.4% students are discomfort from advertisements during search process.

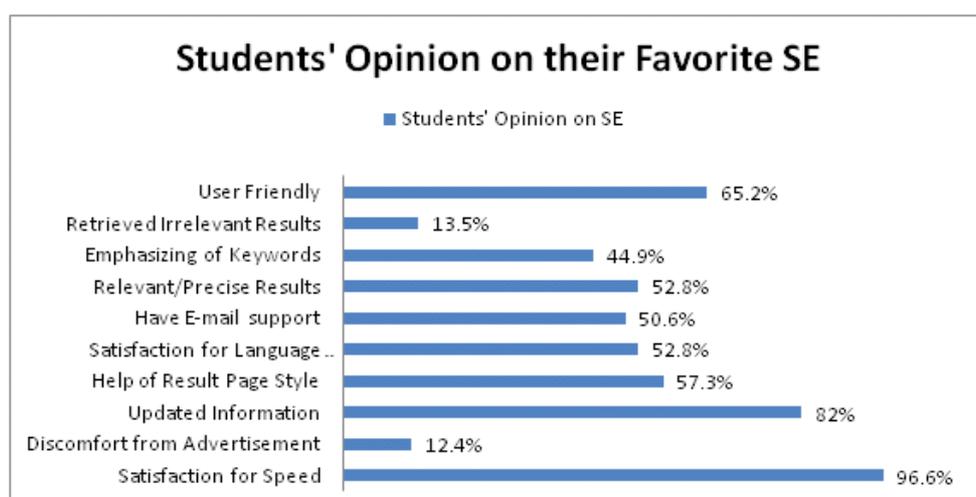


Fig. 2: Students' General Opinions for their favourite search engines

Students' most preferred search Strategy:

User satisfaction depends much upon the search strategies deployed by the user while searching information from the web. The figure below indicates the most preferred search strategy used by the students of NIT Meghalaya while searching information from the web using the search engines.

According to figure 3, most of the students i.e. 73% preferred Basic Search option followed by 61.8% students who preferred Advanced Search while using the SE to search information on the web. 33.7% students search information using Author as search strategy to find information. 28.1% students used Article Title Search and 27% students used Exact Phrase Search strategies to find information on the web. On the other, 24.7% students search information using Journal title and 22.5% used Boolean Operators. Other search strategies used by the students are Publisher 15.7%, Define Search Period 10.1% and only 7.9% students use ISSN to find information on the web.

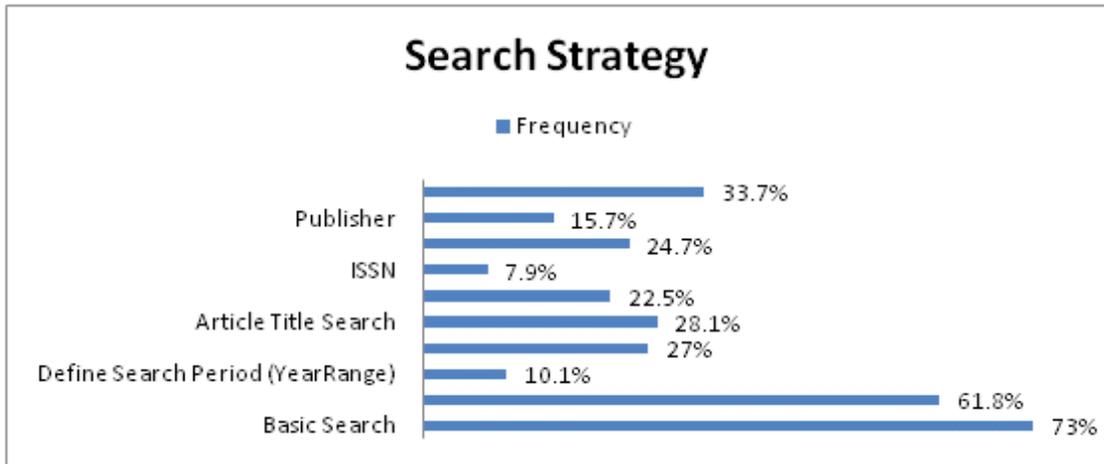


Fig. 3: Students' most preferred search Strategy

Discussions & Conclusion:

The present study, showed that most of the students of NIT Meghalaya are using Internet daily, Most of the students are using the Internet for Education, news, entertainment, sports and the least sought after information from the Internet is health tips. Students are availing the Internet facilities from Hostel/Home, computer centre of the institute, Internet Cafe and very few are availing the Internet facility from the Institute Library.

In National Institute of Technology Meghalaya, Google is the most used search engine and Infoseek is the least used search engine by the students. Yahoo with 49.4% is a search engine, which students sometimes use, where as Ask, Bing and AltaVista are rarely used search engines. These search engines are the ones that are leading the sector in the world but NIT Meghalaya students may not well enough informed about these search engines. The most important criterion for the students is the speed of the

SE in retrieving information from the web followed by the Precision/Relevant results that the SE retrieved. The number of results, user interface, popularity and result page style of the SE are others important criterion as well. When asked about the students' opinions on their favourite SE, most of the student feels that they are satisfied with the speed of their favourite search engine, which is 96.6%. Around 82% of the students also feel that their favourite search engine is updated daily where as 65.2% feel that their favourite search engine is user friendly. Students also complain about retrieved irrelevant results and discomfort from advertisements during search process. The most frequent search strategy used by the students to find information from the web using SE is the basic search then followed by advanced search. Others search strategy are author, article title search, exact phrase search, journal title, Boolean operators, publisher and the least used search strategy is ISSN.

Overall results of this study add empirical data to the relevant field and are expected to help computer science students, instructors and everyone else who wants to reach information via search engines.

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