

USAGE OF BOOKS BY COMPUTER SCIENCE ENGINEERING STUDENTS AT JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY LIBRARY: AN ANALYSIS

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INTRODUCTION

Library collection is the sum total of library resources, books, journals, manuscripts, government documents, pamphlets, catalogues, reports, microfilms micro cards and microfiche etc., that make up the holding of particular library. Collection development is a process of building up and improving the collection in the library and it is a very important function of a library. Users need, collection development policy, selection, acquisition, management-evaluation, weeding out, storage and preservation of collection are the important areas of collection development. Today academic library is faces a state of change in the composition of their collections and patron usage of those collections. New electronic resources and patrons desire to use those resources remotely increase every year. In conjunction with this trend, libraries may find traditional measures of usage, such as circulation statistics, declining. In developing countries like India, circulation and loan of documents from a library collection is a vital medium for the dissemination of information and knowledge. Circulation of books for home reading maximizes the use of library resources, and helps meet user needs for research, publication, and instructional activities. Circulation data is one way of assessing a library. Since circulation of printed material remains important in Indian, it is appropriate to analyze circulation as a way of guiding the acquisition of books. The growth of information in terms of quality and quantity, the many subjects of interest to users, increasing costs, and limited fiscal resources force librarians to use data for making rational decisions. The present investigation uses circulation records to study the books borrowed from the central library of Dravidian University by biotechnology students.

Jawaharlal Nehru Technological University (JNTU) was originally 'The College of Engineering, Vizagpatnam' at the time of its establishment in 1946. It is now a sprawling campus of 110 acres, green with mango trees in the fast developing port city of Kakinada, East Coast of peninsula India. This college became a constituent of the Jawaharlal Nehru Technological University with effect from 02-10-1972 through an act of legislature along with other sister institutions under the control of the then Director of Technical Education, Government of Andhra Pradesh. This university college has five undergraduate programmes and nine postgraduate programs to its credit. In addition to that, the university helps unemployed under employed diploma and degree holders in engineering to improve their qualifications through its continuing education programmes. The University College Library has 50,497 volumes, 259 national and international print journals, ASCE, ASME, IEEE Explore online journals, DELNET, NPTEL databases, Internet and Intranet facilities etc. are available in this library.

OBJECTIVES

The following are the objectives of the present study:

1. To find the number of books used by computer science and engineering students ;
2. To determine the authorship patterns, range of publication dates, and countries of publication of used books;
3. To prepare a ranked list of most frequently used books ; and
4. To prepare a ranked list of publishers

HYPOTHESES

The following hypotheses have been formulated for testing

1. Computer Science Engineering students used single-authored books;
2. Male students used more books than female students;
3. Computer Science engineering students prefer the most recent books;
4. Computer Science Engineering Students preferred Indian publications over others.

SCOPE AND LIMITATION

The present study seeks to conduct a critical analysis on the books used by computer science engineering students of Jawaharlal Nehru Technological University Library (JNTUL), Kakinada. It is restricted to only the books used by computer science engineering students passing out in the year, 2018. The present study limits itself to an analysis of data related to borrowed books, not any other means of consultation. In fact, Data pertaining to the use of textbooks and reference books consulted in other areas of the library is excluded from the scope of the present study.

METHODOLOGY

At present, the JNTU central library offers access to undergraduate and postgraduate students; faculty members and supporting staff. The researcher has selected post graduate students in the first instance. Broadly, the post graduate students come under M.Tech, MBA & MCA departments. However, the researcher has selected only students from Computer Science Engineering (CSE) for the investigation and analysis in the second instance. The total sample consists of 140 CSE students, out of which the researcher could obtain the book borrowing data of 133 students based on their enrollment in the JNTU library. Out of 133 students, 89 are male students and 44 are female students.

ANALYSIS OF DATA

Gender-wise classification of used books

The distribution of used books by computer science engineering according to their gender wise is displayed in Table 1.

Table 1: Gender-wise distribution of used books by computer science engineering

Sex	Number of Students	Number of books borrowed	Percentage	Average number of books borrowed per student
Male	89	1676	70.01	19
Female	44	718	29.99	16
Total	133	2394	100.00	18

Table 1 indicates that a majority of books (70.01%) in computer science engineering were used by male students for home reading purpose, whereas 29.99 percent of the books were used by female students. It is also evident that each student used in computer science engineering 18 books on an average during his/her study period. On an average, male students used 19 books during their period of study, while female students used 16 books on an average.

Number of books used

The distribution of computer science engineering students according to the number of books used for their usage is shown in Table 2.

Table 2: Distribution of computer science engineering students according to the number of books used

S.No	Number of books	Students	
		Number	Percentage
1	1 – 5	11	8.27
2	6 – 10	28	21.05
3	11 – 15	22	16.54
4	16 – 20	15	11.28
5	21 – 25	13	9.77
6	26 – 30	14	10.53
7	31 – 35	13	9.77
8	36 – 40	8	6.02
9	41 and above	9	6.77
Total		133	100.00

Table 2 indicates that 28(21.05%) members of computer science engineering students have used between 6-10 books for their usage; 22(16.54%) students used between 11-15 books; 15(11.28%) students used between 16-20 books; 14(10.53%) students used between 26-30 books; 13(9.77%) students used between 21-25 and 31-35 books respectively; 11(8.27%) students used between 1-5 books; 9(6.77%) students used 41 and above books; and the remaining 8(6.02%) students used between 36-40 books.

Authorship pattern of used books

The distribution of books used by CSE students according to authorship pattern is shown in Table 3.

Table 3: Distribution of books used by CSE students as per authorship pattern

S.No	Author	Borrowed Books	
		Number	Percentage
1	Single	1556	65.00
2	Double	563	23.52
3	Three	149	6.22
4	More than three	126	5.26
Total		2394	100.00

Table 3 indicates that a majority of the books (65%) used by computer science engineering students are written by single authors; 23.52 percent of used books are written by double authors; 6.22 percent of used books are written by three authors; and the remaining 5.26 percent used books are written by more than three authors. Hence, it can be concluded that a majority of the computer science and engineering students used single-authored books for their usage.

Chronological distribution of used books

The distribution of books used by computer science engineering students according to the year of publication is shown in Table 4.

Table 4: Distribution of books used by computer science engineering students according to the year of publication

S.No	Year	Books	
		Number	Percentage
1	1991 – 1995	49	2.05
2	1996 – 2000	149	6.22
3	2001 – 2005	185	7.73
4	2006 – 2010	383	16.00
5	2011 – 2015	1101	45.99
6	After 2015	527	22.01
Total		2394	100.00

Table 4 indicates that most of the books (45.99%) used by computer science engineering students were published between 2011 and 2015, whereas 22.01 percent of the used books were published after 2015. 16 percent of the used books were published between 2006 and 2010; 7.73 percent of the used books were published between 2001 and 2005; 6.22 percent of the used books published between 1996 and 2000. The remaining 2.05 percent of the used books were published between 1991 and 1995. Hence, it can be concluded that a majority of the used books by computer science engineering students for their usage were published in the latest years.

Country of publication of used books

The classification of used books by computer science engineering students according to the country of publication is shown in Table 5.

Table 5: Classification of used books by computer science engineering students according to the country of publication

S.No	Country	Books		Cumulative	
		Number	Percentage	Number	Percentage
1	India	1649	68.88	1649	68.88
2	U.S.A	313	13.08	1962	81.96
3	U.K	245	10.23	2207	92.19
4	Singapore	42	1.76	2249	93.95
5	Japan	36	1.50	2285	95.45
6	Russia	34	1.42	2319	96.87
7	Newzealand	18	0.75	2337	97.62
8	Australia	13	0.54	2350	98.16
9	Netherlands	12	0.50	2362	98.66
10	Germany	11	0.46	2373	99.12
11	Other countries	21	0.88	2394	100.00

Table 5 indicates that a majority of the books (68.88%) used by computer science engineering students for their usage was published in India. It is also evident from the table that 13.08 percent of books used by computer science engineering students originated from U.S.A.; 10.23 percent of the used books originated from U.K.; 1.76 percent of the used books were published in Singapore; 1.50 percent of the used books were from Japan; 1.42 percent of the books originated from Russia; 0.75 percent of the used books originated from New Zealand; 0.54 percent of the books used from Australia; 0.50 percent of the used books originated from Netherlands; 0.46 percent of the used books originated from Germany. The remaining 0.88 percent of the used books was published in other countries. Hence, it can be concluded that more than ninety percent of the books used by computer science engineering students for their usage were Indian editions.

Type of publishers of used books

The distribution of books used by computer science engineering students according to the type of publisher is shown in Table 6.

Distribution of books used by computer science engineering students according to the type of publisher

S.No	Publisher	Books	
		Number	Percentage
1	National	1649	68.88
2	International	745	31.12
Total		2394	100.00

Table 6 indicates that most of the books (68.88%) used by computer science engineering students were published by national publishers and the remaining 31.12 percent of books were published by international publishers. Hence, it can be concluded that the computer science engineering students tend to use a large number of books published by national publishers.

Publishers wise distribution of used books

The rank list of publishers as per the books used by computer science engineering students is shown in Table 7.

Publisher-wise distribution of used books

S.No	Name of the Publisher	Rank	Used		Cumulative	
			No	%	No	%
1	Pearson Education Asia	1	417	17.42	417	17.42
2	Cengage Publishers	2	321	13.41	738	30.83
3	Prentice Hall of India Private Limited	3	289	12.07	1027	42.90
4	McGraw Hill International Book Company	4	217	9.06	1244	51.96
5	Tata McGraw Hill Publishing Company Limited	5	115	4.80	1359	56.76
6	Oxford University Press	6	101	4.22	1460	60.98
7	Galgotia Publications Private Limited	7	96	4.01	1556	64.99
8	John Wiley and Sons Incorporation	8	91	3.80	1647	68.79
9	BPB Publications	9	67	2.80	1714	71.59
10	Narosa Publishing House	10	51	2.13	1765	73.72
11	Vikas Publishing House	11	41	1.71	1806	75.43
12	Shorff Publishers and Distributors Private Limited	12	39	1.63	1845	77.06
13	Wiley Eastern/New Age International Private Limited Publishers	13	31	1.29	1876	78.35
14	SciTech Publication (India) Private Limited	14	22	0.92	1898	79.27
15	Cambridge University Press	15	18	0.75	1916	80.02
16	Oreilly Publishers	16	15	0.63	1931	80.65
17	Penguin Books	17	14	0.58	1945	81.23
18	Techmedia	18	13	0.54	1958	81.77
19	Sun Microsystems	19	12	0.50	1970	82.27
20	S.Chand and Company	20	11	0.46	1981	82.73
21	Macmillan Publishing Company	21	11	0.46	1992	83.19
22	Wrox Press Limited	22	10	0.42	2002	83.61
23	Kidarnath and Badarnath	23	10	0.42	2012	84.03
24	Prentice Hall International	24	10	0.42	2022	84.45
28	4 publishers 9 times each	25	36	1.50	2058	85.95
34	6 publishers 8 times each	26	48	2.01	2106	87.96
40	6 publishers 7 times each	27	42	1.75	2148	89.71
49	9 publishers 6 times each	28	54	2.26	2202	91.97
58	9 publishers 5 times each	29	45	1.88	2247	93.85
69	11 publishers 4 times each	30	44	1.84	2291	95.69
80	11 publishers 3 times each	31	33	1.38	2324	97.07
93	13 publishers 2 times each	32	26	1.09	2350	98.16
137	44 publishers 1 time each	33	44	1.84	2394	100.00

It is evident from table 7 that most of the books used by computer science engineering students are published by 'Pearson Education Asia' (17.42%) followed by 'Cengage Publishers' (13.41%), 'Prentice Hall of India Private Limited' (12.07%), 'McGraw Hill Publishing Company Limited' (9.06%), and 'Tata McGraw Hill Publishing Company Limited' (4.80%).

The 'Pearson Education Asia' is the top ranked publisher in terms of the number of books published from amongst the borrowed books by computer science engineering students; while 'Cengage Publishers', 'Prentice Hall of India Private Limited', 'McGraw Hill International Book Company', and 'Tata McGraw Hill Publishing Company Limited' are placed in 2nd, 3rd, 4th, and 5th ranks, respectively. In all, the above mentioned publishers have contributed to more than half of the books (56.76%) used by computer science engineering students for their usage.

Rank list of most frequently used books

The rank list of most frequently used books by computer science engineering students is shown in Table 8.

Table 8: Rank list of most frequently used books

S.No	Title of the book	Rank	Used		Cumulative	
			No	%	No	%
1	Cryptography and Networks Security/ William Stallings	1	95	3.97	95	3.97
2	Computer networks/A.S. Tanenbaum and David J.Wetherall	2	87	3.63	182	7.60
3	Distributed systems: principles and paradigms/A.S. Tanenbaum	3	76	3.17	258	10.77
4	Fundamentals of Database Systems/ Ramez Elmasri and Shamkant B.Navathe	4	63	2.63	321	13.40
5	Software Engineering/Ian Sommerville	5	51	2.13	372	15.53
6	Artificial Intelligence: A Modern Approach/Stuart Russel and Peter Norving	6	48	2.01	420	17.54
7	Modern Operating Systems/ Andrew S. Tanenbaum	7	47	1.96	467	19.50
8	Software engineering: A practitioner's approach/R.S. Pressman	8	45	1.88	512	21.38
9	Network Security and Cryptography/ Bernard Meneges	9	42	1.76	554	23.14
10	Data Structures: A Pseudo Code Approach/ Richard F.Gilberg and Behrouz A. Forouzon	10	39	1.63	593	24.77
11	Operating systems concepts/ A. Silberschatz	11	31	1.30	624	26.06
12	Database Systems Concepts/ ASilberschatz, H.F.Korth and S.Sudarshan	12	26	1.09	650	27.16
13	Principles of compiler design/A.V. Aho and J.D. Ullman	13	23	0.96	673	28.12
14	Artificial Intelligence/ Saroj Kaushik	14	23	0.96	696	29.08
15	Software Engineering: A Primer/ Waman S. Jawadekar	15	21	0.88	717	29.96
16	Object oriented systems development/Ali Bahrami	15	21	0.88	738	30.84
17	Operating systems concepts/ A. Silberschatz	16	18	0.75	756	31.59
18	Cryptography and Network Security/ B.A. Forouzan and D.Mukhopadhyah	16	18	0.75	774	32.34
19	Internet world wide web: how to program/H.M. Deitel	16	18	0.75	792	33.09
20	Visual basic 6: the complete reference/Noel Jerke	16	18	0.75	810	33.84
21	Principles of distributed database systems/ T.M. Ozsu and P. Valduriez	16	18	0.75	828	34.59
22	Introduction to Data Mining with case Studies/ G.K.Gupata	17	17	0.71	845	35.30
23	Computer Networks: A Top Down Approach/B.A. Forouzan and Firouz	17	17	0.71	862	36.01

	Mosharraf					
24	Compilers principles techniques and tools/Alfred V. Aho	18	15	0.63	877	36.64
25	Database Systems: A Practical Approach to Design Implementation and Management/ Thomas Connolly and Carolyn Begg	18	15	0.63	892	37.27
26	Advanced computer architecture: Parallelism, Scalability, Programmability/ Kai Hwang	19	14	0.58	906	37.85
27	UNIX Network Programming/W.Richard Stevens	19	14	0.58	920	38.43
28	Programming the World Wide Web/ Robert W.Sebsta	19	14	0.58	934	39.01
29	Data Structures and Algorithm Analysis/ Mark Allen Weiss	19	14	0.58	948	39.59
30	Distributed Operating Systems: Concepts and Design/ Pradeep K.Sinha	20	13	0.54	961	40.13
31	Database Management Systems Oracle SQL and PL/SQL/ P.K.Das Gupta	20	13	0.54	974	40.67
32	Java programming languages/ Ken Arnold and James Gosling	20	13	0.54	987	41.21
33	C how to program: introducing C++ and JAVA/ H.M. Deitel and P.J. Deitel	20	13	0.54	1000	41.75
34	Introduction to Artificial Intelligence/ Patterson	21	12	0.50	1012	42.25
35	Database Management Systems/Raghu Ramakrishna and Johannes Gehrke	21	12	0.50	1024	42.75
36	C and Data Structures: A Snap Shot Oriented Treatise Using Live Engineering Examples/N.B.Venkateswarulu and E.V. Prasad	21	12	0.50	1036	43.25
37	Data Structures, Algorithms and Applications in JAVA/Sartaj Shni	21	12	0.50	1048	43.75
38	Data Mining Methods and Models/ Danies T.Larose	21	12	0.50	1060	44.25
39	HTML black book/Steven Hozner	21	12	0.50	1072	44.75
40	Data communication, computer networks and open systems/Fred Halsall	22	11	0.46	1083	45.21
41	Embedded systems design: a unified hardware/software introduction/F. Vahid	22	11	0.46	1094	45.67
42	Object oriented programming using C++/B. Chandra	22	11	0.46	1105	46.13
43	Concepts of programming languages/R.W. Sebesta	22	11	0.46	1116	46.59
44	UNIX Network Programming Vol.1 Sockets API/ W.Richard Stevens	22	11	0.46	1127	47.05
45	Understanding Machine Learning: From Theory to Algorithms/Shai Shalev Shwarz	23	10	0.42	1137	47.47
46	Microsoft visual basic 6: Design, Specification and Objects/B.S. Hollis	23	10	0.42	1147	47.89
47	Object oriented programming using C++/B. Chandra	23	10	0.42	1157	48.31
48	Artificial intelligence/ Elaine Rich and Kerin Knight	23	10	0.42	1167	48.83
49	C++ how to program/ Deitel and Deitel	23	10	0.42	1177	49.15
50	Let us C++/Yashwant Kanetkar	23	10	0.42	1187	49.57
51	Microprocessor architecture programming and applications with the	23	10	0.42	1197	49.99

	8085/8080 A/Rames S. Gaonkar					
62	11 books 9 times each	24	99	4.14	1296	54.13
84	22 books 8 times each	25	176	7.35	1472	61.48
107	23 books 7 times each	26	161	6.73	1633	68.21
125	18 books 6 times each	27	108	4.51	1741	72.72
146	21 books 5 times each	28	105	4.39	1846	77.11
188	42 books 4 times each	29	168	7.02	2014	84.13
239	51 books times 3 each	30	153	6.39	2167	90.51
292	53 books 2 times each	31	106	4.43	2273	94.95
413	121 books 1 time each	31	121	5.05	2394	100.00

It is evident from Table 8 that a total of 413 titles and 2394 volumes of books were used by computer science engineering students for their usage during their period of study.

It is also evident from the present study that the book entitled, '*Cryptography and Networks Security/William Stallings*' was used more number of times than any other book bagging the first rank amongst the books used by computer science engineering students for their usage. The books entitled, '*Computer networks/A.S. Tanenbaum and David J.Wetherall*', '*Distributed systems: principles and paradigms/A.S. Tanenbaum*', '*Fundamentals of Database Systems/ Ramez Elmasri and Shamkant B.Navathe*', and '*Software Engineering/Ian Sommerville*' secured 2nd, 3rd, 4th, and 5th ranks, respectively as per the number of times used by students. All these titles account for 15.53 percent of the total used. Thus, it may be concluded that only a few titles have been used more frequently by computer science and engineering students.

CONCLUSIONS

There are some conclusions that can be drawn from this data, which could be used to guide acquisition of new books. Computer science engineering students used an average of 18 books during their period of study. Male students used more than female students on average (19vs.16). Most of the used a single author and were published during the ten years preceding the study. 413 titles and 2394 volumes of books were used by computer science engineering students for their usage during their period of study. The book entitled, '*Cryptography and Networks Security/ William Stallings*' was used more number of times than any other book bagging the first rank amongst the books used by computer science engineering students for their usage. In addition, most of the books were published in India, with Pearson Education Asia being the leading publisher.

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