Indexing the Average Library Utilization Trend: A Case Study of SDM College, Ujire

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Abstract: Indexing the trend in the average library usage is important due to the administrative convenience and functional efficiency. It registers the composition of readers periodically in a library. This observation was made through the manual methods such as subjective observations, making an entry in a ledger etc. Because of the laborious process, inefficient data and difficulties in drawing timely inferences, the process used to end up in a fake work. In recent times Library Management System [LMS] is computerized and automated. As a result, more efficient, time-bound and analyzed data are available to the library administrators for efficient functioning. In this paper, the authors make an attempt to find inferences with the newly evolved methodology through a case study of the library usage trend in an undergraduate college library.

Keywords : Library Management System, EERPMS, Library automation, Computer Assisted LMS, Usage trend, class-wise indexing, annual indexing, monthly indexing, maximum, minimum and average usage, mandatory library usage,

1. Introduction

In the first decade of the twenty-first century, number of libraries has taken a paradigm shift from the traditional system to the modern, digital Library Management Systems [LMS]. Attendance Management System (AMS) is one of the several functions of the LMS. AMSs can be grouped into four categories, namely, Manual System, Biometric System, Card-based System and E-Commerce System. EERPMS [in-house developed software] was introduced as LMSs at SDM College Ujire in the academic year 2010 –11 for auditing the library usage of the students.

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EERPMS is a browser based application performing at its best in Mozilla Firefox having its compatibility with multiple operating systems such as Windows, Macintosh, or Linux. It started to compute the library attendance entry by scanning the bar-coded identity cards of the users at entry and exit points. A consolidated usage data on the monthly basis is generated based on the individual and class usage data. This paper explores the methodology adopted in average indexing, and notes down inferences in LMSs after analyzing the data of three consecutive years.

2. Variables of the Study

Trend analysis is bound by different variables. The first variable of study is time. Academic activities are performed in a time bound manner. Academic year and the calendar year do not correlate. If the calendar year begins in the month of January and ends in December, the academic year begins in June-July and ends in April - May. An academic year is further divided into two semesters. The first semester will conclude by November and the second semester shall commence by December having a few days' vacation in between. Hence, it is important to visualize academic set ups as months of academic activities and to consider the months of holidays as academically inactive. A semester, however, for the administrative convenience is further divided on the monthly basis. Even if the academic semester begins or concludes in the middle of a month, the usage of the library is calculated upon the entire dates of the month because the library is kept open for the students during the vacations as well.

Second variable of the study is the programmes the college offers and the students enrolled to them. SDM College Ujire offers five undergraduate programs namely Bachelor of Arts [BA], Bachelor of Science [B Sc], Bachelor of Commerce [B Com], Bachelor of Computer Applications [BCA] and Bachelor of Business Management [BBM]. There are nearly two thousand students enrolled for these programmes. Popularity of B Com, B Sc and BA are greater than BCA and BBM programmes. As a result, the college has three sections of B Com programs and two sections of BA and B Sc programmes. Whereas, the college is having single batches of BBM and BCA programs. Under-graduation is a three year programme and therefore the classes or the programs are further divided into the first, the second and the third year.

Though the authors recognize other variables such as gender, age, background details of the students such as geographical set up, economic factors, day scholars and hostel inmates, performance in the examinations, participation on the curricular and extracurricular activities etc., the paper explores programs and the months as the only two variables for the time being. The College offers different subjects under a course of study. For example B Sc programme offers the subjects such as Physics, Chemistry, Maths, Biology, Bio Technology, Statistics, Computer Science, etc. Students have to study any three subjects in three academic years to be graduated. All the three subjects are considered with equal weight-age. In this context, though it is possible to study the sections and combinations of study, the authors consider the entire bunch of students as a course and index the trend of library utilization.

3. Objectives

- To identify the average usage of the college library at different time frames: Month, semester, year
- To index the average college library usage in accordance with the classes and batches of study.
- To explore the composition of average Library Usage Trend [LUT] in terms of different classes at different points of time
- To observe the inferences of the average library utilization trends as a reflection of an institutional best practice.

4. Methodology

The study focuses on students from the academic year 2010 – 11 to 2012 -13 of SDM College Ujire as the primary users of the library. Initially, student identity cards are bar-coded based on their Roll Numbers. This data has been stored in the library server and uploaded in EERPMS [LMS]. Individual identity cards are scanned at each entry and exit points of the library users. As a result, an individual reader's total reading hours in the library is calculated. They are further classified according to their courses of study. The total usage of the students of the course is later divided by the number of students in the class to calculate the average usage index. For example, III BBM Aug 2010: 2.1 = the students of III BBM were physically present in the college library during the month of August 2010 for an average of 2 hours and 10 minutes.

The authors collected primary data from the server of the college. The data was available in the .txt format and were copied to an .xls/ .xlsx format for the purpose of further analysis. This entry into an Excel Spread sheet of MS Office further helped the authors to sort the data, bring out summations, draw averages, find out the maximum, minimum, average usages and draw charts, providing the illustrations of the data for better visualization.
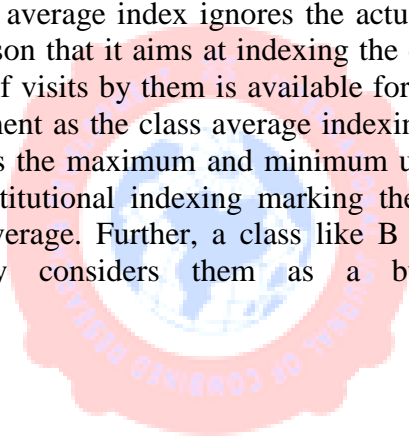
5. The Growth

Excluding the months of holidays, the authors tabled the active college working months as samples of study. Based on the data analyzed the authors calculated the total usage by a class [A class is the group of number of combinations: A class of BA has a maximum of 33 combinations of study] and divided the total usage by the number of students in the class indexing the average monthly usage of each class. The total of the average usage of each class is further divided by the number of courses to derive the college average usage per month. The college average usage of the months are further added and divided by the total active library usage months of a semester to calculate the semester average usage by each class and college. The total of two semesters divided by two marks the average annual usage of the classes and the college. The authors have also made an attempt to total the average usage in all the three years and divide them by three for

finding the total average of each class and the college in all the three years. This method, though laborious, provided the fairer picture of the institutional average library usage index.

Along with the above average usage auditing with different variables, the authors observed the influence of some of the best practices of the college management and library usage policy as an influential factor. The trend analysis also discusses the impact of such policies after the detailed study made in three academic years.
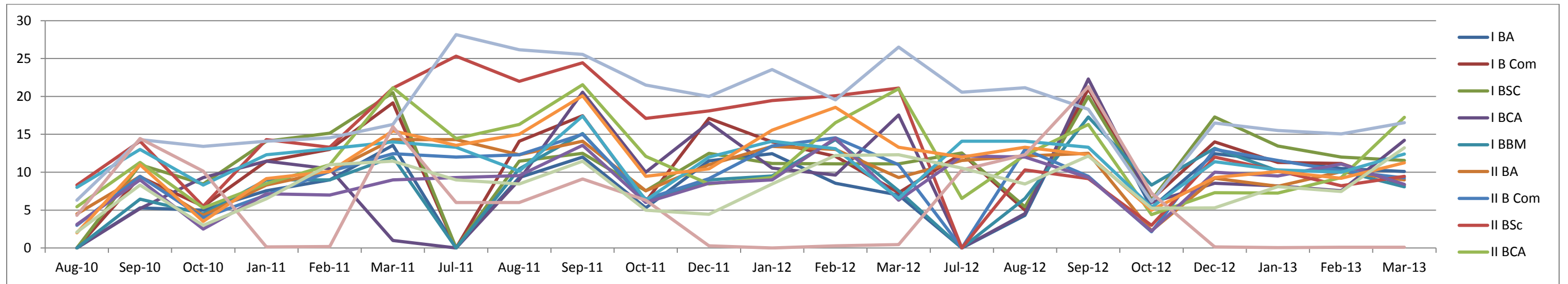
6. Average Monthly Usage Index

As a first step monthly average usage of the classes is calculated by dividing the total usage made by each student of the combinations of admission and later added them according to their classes. Instantaneously, the total usage of the library is divided by the number of students admitted to the class. The average index ignores the actual reader in the college library in this context for the simple reason that it aims at indexing the class average. Though the number of students and the number of visits by them is available for reference, they do not form the basis for assessment at the moment as the class average indexing is the objective. The average class usage in a month indicates the maximum and minimum usage of individual students; however, the study aims at the institutional indexing marking the class average instead of individual student or combination average. Further, a class like B Com at all the three years has three sections and the study considers them as a bunch of one class of students.

Average Monthly Usage Index

	Aug-10	Sep-10	Oct-10	Jan-11	Feb-11	Mar-11	Jul-11	Aug-11	Sep-11	Oct-11	Dec-11	Jan-12	Feb-12	Mar-12	Jul-12	Aug-12	Sep-12	Oct-12	Dec-12	Jan-13	Feb-13	Mar-13		Average
I BA	0	5.3	5	7.55	9	13.55	0	9.3	12	5.3	11.5	12.45	8.55	7	0	4.3	21.1	5.3	12.45	11.5	10.5	10.1		8.65
I B Com	0	9.4	5.5	11.45	13	19.15	0	14.1	17.45	6.15	17.1	14	12.1	7.3	12.45	5	21	6.4	14	11.3	11.15	8.3		11.25
I BSC	0	11	8.45	14.1	15.15	20.5	0	11.45	12.5	7.55	12.5	11.15	11.1	11.1	12.55	5.45	20	6.3	17.3	13.45	12	11.55		11.67
I BCA	0	5.2	9.3	11.45	10.45	1	0	9	20.55	10	16.55	10.55	9.63	17.55	0	4.55	22.3	6	8.55	8.2	7.55	14.2		9.65
I BBM	0	6.45	4.5	9	9	12	0	10.45	15.1	6.15	9	9.5	14.3	7.55	0	6.55	17.3	8.3	13.15	10.2	10.2	8.07		8.89
II BA	4.5	9.45	4.3	8.3	10.1	14.3	14.3	12.3	14.1	7.55	11	13.4	13	9.3	11.55	12.15	12.5	2.3	9.2	8.15	10.07	9		10.04
II B Com	3	9.45	4	7	10.1	12.45	12	12.3	15	6.45	9.15	13.45	14.55	11	0	13	9.45	2.15	13	11.55	10.2	9.25		9.48
II BSc	8.3	14.1	5.5	14.3	13.3	21.1	25.3	22	24.45	17.1	18.1	19.45	20.1	21.1	0	10.3	9.15	3	12	10.2	8.21	9.45		13.93
II BCA	5.45	11.3	5.3	8.5	11	21.15	14.45	16.3	21.55	12.1	8.45	9.3	16.55	21	6.55	12.25	16.3	4.4	7.3	7.25	9.3	17.25		11.94
II BBM	3.1	9	2.5	7.15	7	9	9.3	9.55	13.55	6	8.55	9	14.5	6.3	12.15	12	9.3	2.25	10	9.5	11.09	8.4		8.6
III BA	8	13	8.3	12.3	13.1	14	13.3	10.15	17.4	6.3	12	14.1	13.1	6.55	14.1	14.1	13.3	5.4	11.4	10.3	10	12.4		11.48
III B Com	2	11	3.5	9.15	10.1	15.45	13.55	15	20.1	9.45	10.45	15.55	18.55	13.3	12	13.3	12.3	5	9.3	10.1	9.2	11.25		11.35
III B Sc	6.3	14.3	13.4	14.1	14.55	16.3	28.15	26.15	25.55	21.5	20	23.55	19.55	26.5	20.55	21.15	18.3	6.15	16.5	15.5	15.05	16.55		18.17
III BCA	4.3	14.45	10.15	0.15	0.2	16	6	6	9.1	6.3	0.3	0	0.3	0.45	10.3	12.3	21.3	7.25	0.15	0.05	0.1	0.1		5.69
III BBM	2.1	8.3	3	6.5	11	11.45	9	8.45	11.45	5	4.45	8.45	12.2	12.3	10.55	8.45	12.15	5.25	5.3	8.1	7.45	13.22		8.37
Average	4.84	10.28	6.4	9.6	10.55	14.66	14.73	13.01	16.86	9.03	11.48	12.47	13.43	12.08	12.52	10.49	15.88	5.14	10.8	9.88	9.61	10.8		10.61

7. Findings

During the first year of study[4] the average monthly usage index demonstrated gradual increase from the initial months to the later months of the semesters. After the inception of the calculation in the month of August 2010, the second and the third year student of the college displayed considerable average usage of the library. II BA class has moved from the average monthly usage of 4.5 hours in the month of August 2010 to 14.3 hours in March 2011, II B Com from 3 hrs to 12.45 hrs, II B Sc from 8.3 hrs to 21.15 hrs and so on. As a result, the average monthly usage index has taken a jump from 4.84 hours in the month of August 2010 to 14.66 in the month of March 2011. Though the general average index was gradually increasing, the month of October 2010 marked very low turnout in the average library usage marking 6.4. However, it is greater than the starting point where the calculation started.

During the second year of study[5] all the second and the third year students were aware of the institutional practice. The BCA and BBM Programmes demonstrated improvement in the average monthly usage, however a gradual decline in the usage of the other classes is observed. But the overall average usage of the college library was observed in a steady note with the average semester usage of the library at 12.94 hrs in the first semester to 12.16 in the second semester.

The third academic year[6] demonstrated a balanced average usage index in the months. Though there were some fluctuations in the initial months of the academic year [July and September marking the higher and august and October marking the lower average usage] the average usage of the semester has been registered at 10.61 and 10.1 in the first and the second semesters respectively. The average annual usage was recorded at 10.38 hrs which was still above the 10 hrs average mandatory monthly usage index. However, there was a fall in the annual average usage from the second year [12.56 hrs] to 10.38 hrs.

The highest average monthly utilization was registered in the September of 2011 with 16.86 hrs and the lowest average monthly utilization was reported in the August of 2010 at 4.84 hrs. The first semester of the second year marked the maximum average semester usage at 12.94 hrs whereas first semester marked the lowest semester average at 7.44 hrs. Of the three academic years if the second year marked the highest average usage at 12.56 hrs, the first year marked the lowest with 9.51 hours. The average usage of the college library on the three years is recorded therefore at 10.82 hours.
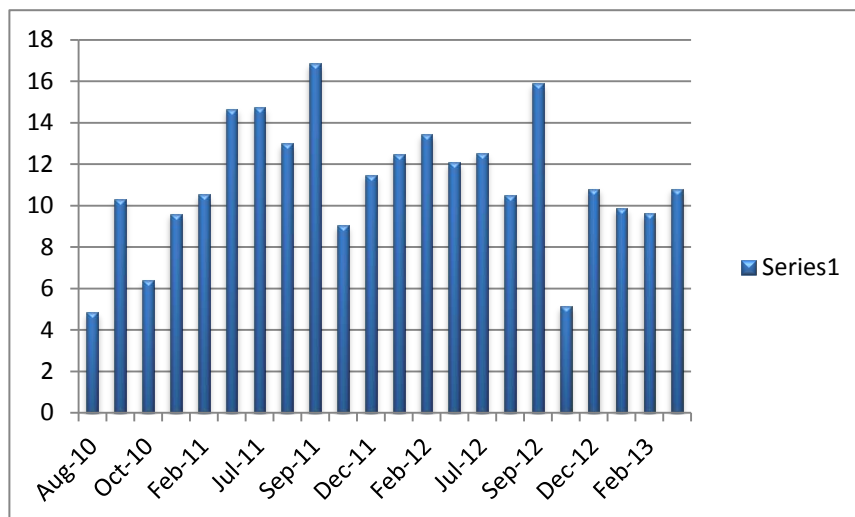
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[4]Academic year 2010-11
[5]Academic year 2011-12
[6]academic year 2012-13

8. Average Monthly Usage of the College Library[7]

Month	Average Usage
Aug-10	4.84
Sep-10	10.28
Oct-10	6.4
Jan-11	9.6
Feb-11	10.55
Mar-11	14.66
Jul-11	14.73
Aug-11	13.01
Sep-11	16.86
Oct-11	9.03
Dec-11	11.48
Jan-12	12.47
Feb-12	13.43
Mar-12	12.08
Jul-12	12.52
Aug-12	10.49
Sep-12	15.88
Oct-12	5.14
Dec-12	10.8
Jan-13	9.88
Feb-13	9.61
Mar-13	10.8

In all the three years, III B Sc students have made the maximum utilization at an average of 16.72 hrs per month whereas the students of III BCA registered the lowest at 5.2 hrs per month. One of the strongest reasons for such a low report is that the students of BCA go for a mandatory project work in the VI semester and they will be out of the college campus. B Sc students generally make the highest average usage of the library [14.34 hrs] where as BBM students were rarest [8.78] in the average library usage.
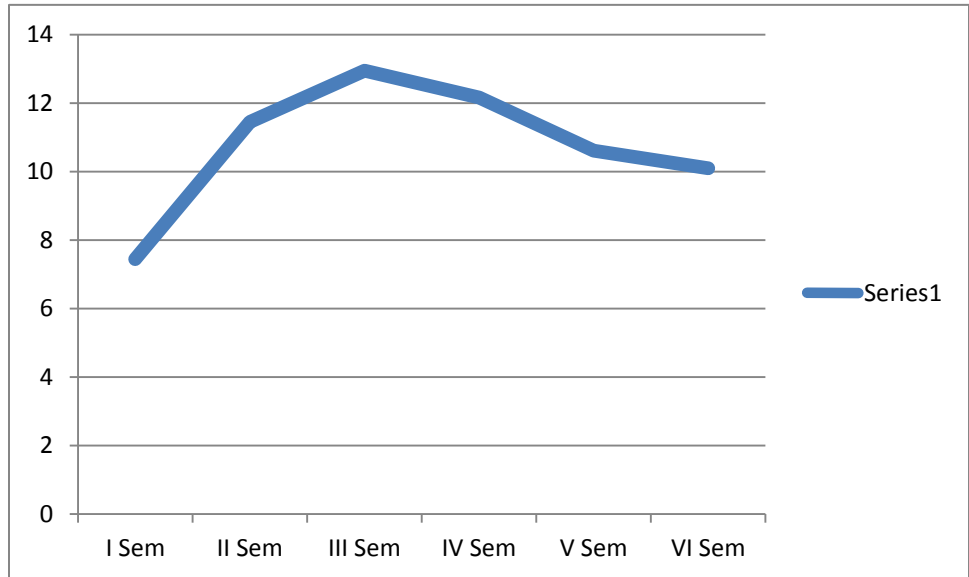
The month wise trend analysis indicated that class of III BCA were lowest turnout in the library [0.07] in the Januaries of the years where as I B Com student attended library to the maximum [22.58 hrs] in the Marches. Of all the working months of the semesters, students are found least [6.69 hrs on an average] in the months of October and they are found flooding the library in the months of September [14.16] and March [12.33]. The mandatory usage index may be a reason

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[7] Average monthly usage of the college library is calculated based on the total number of library hours spent by individual students in the college library. It is further divided by the total number of students in the class. The study doesn't consider the actual number of students and the number of visits to the college in making up the usage hour into consideration as it tries to hit upon the class average and not the individual average.

for the heavy turnout in the last month of the academic year but the authors conclude that the students make the best use of the library for the basic academic works in the months of September.

Average Semester Usage Trend of the College Library[8]

Semester	Average Usage
I	7.44
II	11.45
III	12.94
IV	12.16
V	10.61
VI	10.1

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[8] Average semester usage trend of the college library is calculated by taking the average of the average actual working months' usage in the college library. Total usage divided by the total active usage months of the semester.

The semester wise average usage index presents a gradual increase in the utilization index. From the initial lowest 7.44 hours of average semester usage index it reached the level of 10.1 hours in the VI semester. However, the third and the fourth semesters displayed highest usages at 12.94 and 12.16 hours respectively.

Average Annual Usage Index of the College Library[9]

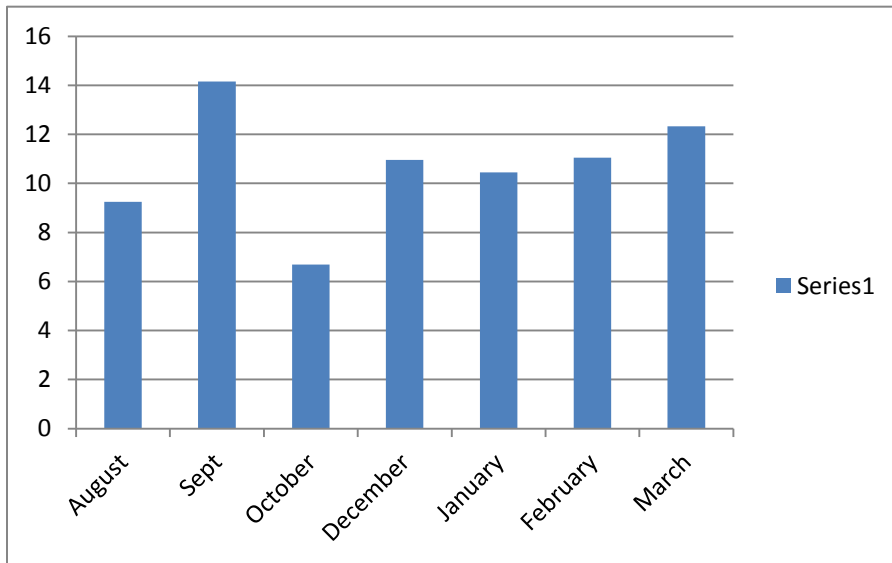| Year	Average Usage
2010-11	9.51
2011-12	12.56
2012-13	10.38

Annual Average index marks a hill design where from the initial below the minimum mandatory usage level [9.51 hrs it reached to the highest [12.56 hrs] in the second year and falls into the average of 10.38 in the final year of the study. Of all the classes in all the months except for III BCA all the other classes have registered either very near or above 10 hours of average monthly, semester and annual usage. [Average usage of III BCA in the first semesters of the years is 10.13 hrs.]

Annual library utilization trend is marked with the rise and the fall trend in the identified academic years. The first academic year marked the lowest and the second with the highest. In between, the usage trend has considerably increased keeping the mandatory usage limit of 10 hours per month per student [from 9.51 hrs in 2010 -11 to 10.38 hrs in 2012 -13] into consideration. This also speaks of the sustained usage index as the fall in the usage index in the second to the third year is lesser than the raise index from the first to the second year.

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[9] Average annual usage index of the college library is calculated by taking the average of all the three years average usage.
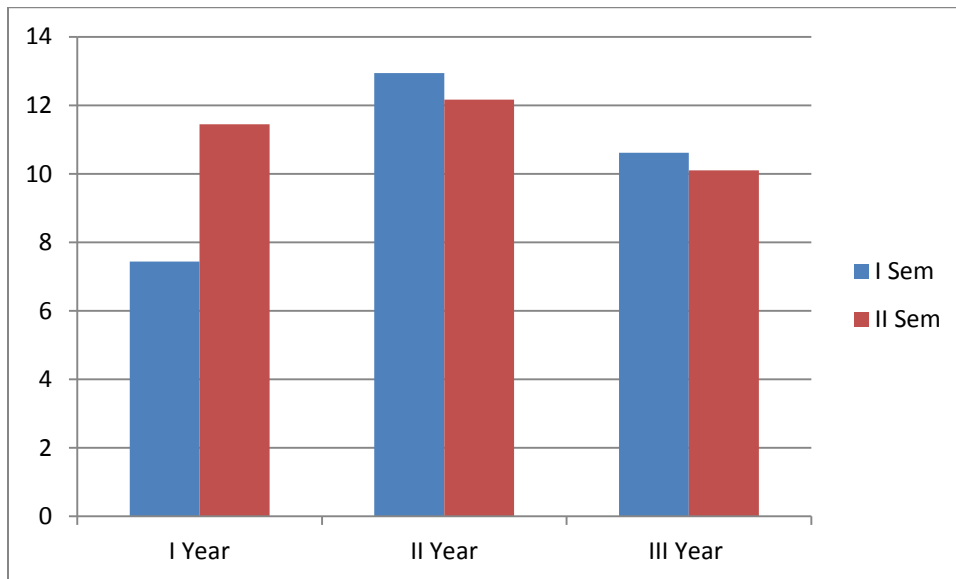
Month-wise Average Usage Index [10]

Month	Average Usage
August	9.25
Sept	14.16
October	6.69
December	10.96
January	10.45
February	11.05
March	12.33

This analysis was prepared taking a particular month of the years into consideration. The month of September demonstrated the highest average usage in all the three years with an average usage of 14.16 hrs. In the active working months of the academic years students turned out least to the library in the month of October [6.69 hrs] October is the month which marks the study holidays and the semester end examinations too and therefore only the regular students turn out to the library whereas the month of September demonstrates the maximum institutional average library usage timing. The month of March too marks the second highest average library usage index where the students who didn't meet the mandatory library usage turn out to complete the hours. Over a period of time the average library usage timings of the month of March has demonstrated a hillside chart indicating a gradual decline in the trend of the eleventh hour rush in the library. Hence the authors conclude that in three years' time reading in the library has become a regular practice of the students. One of the important findings of the Month wise average usage index is that the users of the library make a uniformed and better consistent average usage of the library in the second fourth and sixth semesters rather than the first, third and the fifth semesters. In other words, steady usage is indicates in the months of December, January, February and March compared with the months of August, September and October.

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[10] As the study is spread in three academic years, the repetition of the months is observed. The average usage in a month is collected by the average usage of a month in three academic years.

Semester-wise Average Usage Index[11]

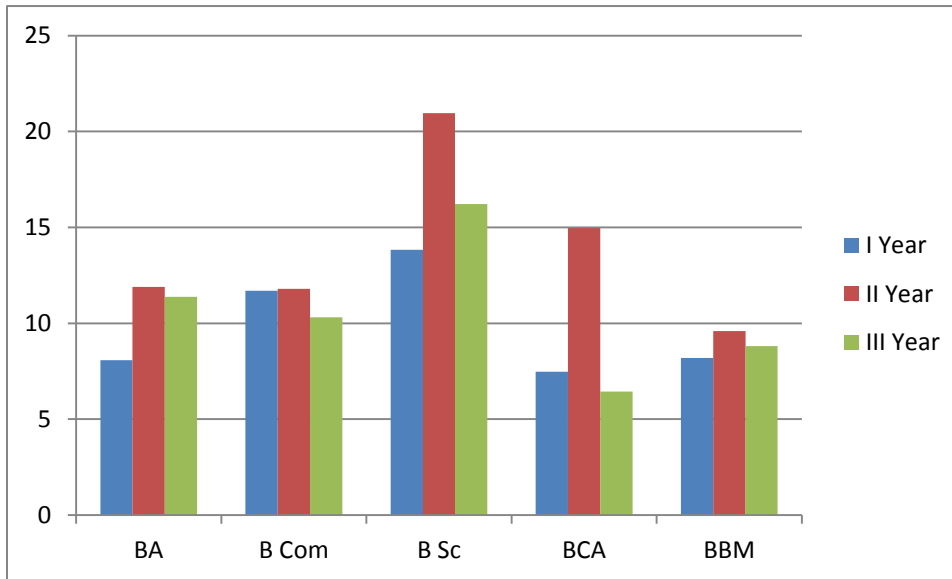|	I Semester	II Semester
I Year	7.44	11.45
II Year	12.94	12.16
III Year	10.61	10.1

When the two semesters of an academic year is compared for three academic years there is a trend of raise and fall in both the semesters. However this trend is grater in the first semester [from 7.44 through 12.94 to 10.61] compared to the second [from 11.45 through 12.16 to 10.1]. The second semesters of these years have demonstrated rather consistent average utilization trend than the first. Reasons for such a trend may be traced in some of the initiations by the college especially by the library itself. The effects of Library orientation, library oriented classroom activities necessitate the learners to make the maximum and consistent average usage.

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[11] Semester wise average usage index is calculated based on the average usage made by the readers in the college library in the first and second semesters of all the three academic years.

Batch-wise Average Usage Index [12]

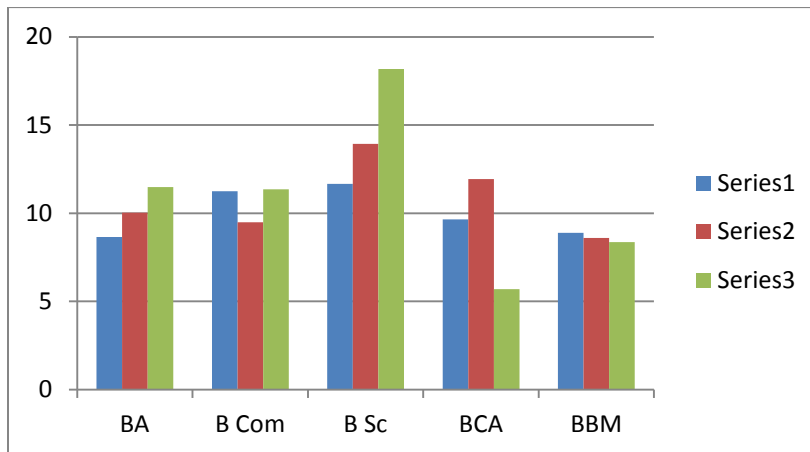|	BA	B Com	B Sc	BCA	BBM
I Year	8.08	11.7	13.84	7.48	8.19
II Year	11.89	11.79	20.95	14.96	9.59
III Year	11.38	10.31	16.22	6.44	8.81

After the time bound analysis it was important to note the class usage taking a batch of students into consideration. Hence, the authors took all the first year students at 2010 as samples of study. These students turned out to be the second year students in the second and the third year students in the third year of the study. Their average monthly, semester and annual usages were calculated. All the classes demonstrated a common raise and fall curve in their usage habit. After the initial low average usage in the first year all the classes raised to the maximum usage in the second year and fell to an average usage in the third year. The only promising factor in the fall seems to be that all the classes demonstrated minimum 10 or more hours of average usage in the year. The greatest fall is observed in BCA class where the students opt to go out of the college campus for their project works in the final semester whereas the class of BBM has maintained their very close to the minimum usage bar throughout their graduate programme. Students of BSc still mark their maximum average usage index though having a fall in the usage during the third year.

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[12] The academic year offers five undergraduate programmes. This is an attempt to calculate the average usage made by a particular batch in their entire under graduation. Hence the statistics is collected from all the three years of a particular batch and calculated their average usage.

Year and batch wise usage Index [13]

	I Year	II Year	III Year
BA	8.65	10.04	11.48
B Com	11.25	9.48	11.35
B Sc	11.67	13.93	18.17
BCA	9.65	11.94	5.69
BBM	8.89	8.6	8.37

The usage index in this section finds a constant hype in B A and B Sc Classes and the constant fall in BBM Class during the academic years. If the class of B Com demonstrated a fall and the rise, BCA demonstrated a rise and the fall in the three academic years. Considering the chart two important observations are made. The Class of BSc had made use of the college library in the third year and it is much more than the minimum mandatory usage index. Along with BSc number of other classes have crossed the mandatory usage level and marked the average usage index much more than the mandatory usage limit. It demonstrates that the readers in the library have not limited themselves for the regulatory aspects. Reading in the library has become a routine for them. The other observation is in the form of minimum usage by the BCA students in the third year; much below the mandatory usage limit. It was due to the fact that the learners were out of the campus during the days for a compulsory project work.

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[13] This data informs the average usage made by different courses in different years of their study. It is calculated based on the average usage made by a particular course such as BA or B Com students' usage in the college library.

9. Best Practices of the College

When consulted the college authorities, how such as massive library usage is promoted and managed they indicated on some of the best practices of the institution. First of all a compulsory library orientation programme is conducted to the entire first year student and later provided them with the identity cards with bar-coded system. Most of the faculty members provide the students activities to the students which necessitated their library reference. The institutional practices such as Compulsory student research projects further motivate the students in this regard. One of the internal exams is conducted online. During these days the regular classroom activities are not disturbed. Generally this internal exam takes place in the month of September and February. It is interesting to note that the students use the library for the maximum average usage during these months. As one of the best practices of the college, in the academic year 2010-11, after the implementation of EEPRMS, minimum library usage if an individual student is fixed to 10 hours per month. However, many classes demonstrated the utilization much more than the minimum mandatory timings. Most important factor to be noted here is that reading has become habitual and sustained in the college library after these initiations.

10. Conclusion

LMS is the need of the hour with the digitization. Its implications are multifarious in auditing and indexing the usage of library from the management perspective. A close observation of the utilities of the digital system shall present plethora of unheard voices of the existing systems, averages and trends most useful in estimating and managing the library resources.

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