FEASIBILITY STUDY FOR IMPLEMENTATION OF SIX SIGMA IN SINHGAD INSTITUTE(STES) LIBRARIES FOR ENHANCING
QUALITY OF LIBRARY PROCESSES AND SERVICES

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"FEASIBILITY STUDY FOR IMPLEMENTATION OF SIX SIGMA IN SINHGAD INSTITUTE(STES) LIBRARIES FOR ENHANCING QUALITY OF LIBRARY PROCESSES AND SERVICES"

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Abstract

Academic Libraries are required to focus on quality of service for optimum user satisfaction. Libraries acquire a lot of information, store, classify and disseminate to users as per demand. Major objectives of the present study are, to reduce process variation and delays to achieve users' satisfaction. This study will help in optimizing resources and continuous improvement in library processes. The data is collected from library employees, Faculty and Students of Sinhgad Institutes by convenient sampling method and descriptive research methodology is used. Major finding are, Behavior of library staff towards users, Reluctance of students and faculty in following Library rules and time table, Service gaps, Resource gaps and Library software issues. Lack of proper instructions to Users. Authors have suggested that, to improve library services Six Sigma Methodology should be adopted such as DMAIC, DMADV, PDCA and Fishbone Diagram, which will help in identifying root cause analysis and resolving issues.

1. Introduction:

The Academic Libraries have observed a paradigm shift from Books, print Journals to electronic resources. The focus is on relevant piece of information than the whole of the document as provided through the Internet and Web technologies. Library Processes and services are observing redefining the approach and shift in the mode of offering services to the Patrons. The major task in front of the Library professionals, is rendering efficient service and give accurate information in the stipulated time to the patrons. At times, users experience a lag in receiving proper information and services from the Library and information centers. The reasons

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may be different but the basic aim of the service is to cater the users in best possible manner. For the information lag or the service lag the Library units need to set a standard process to seek optimum satisfaction level of its clientele. It is always better to move to the root cause of such delays and misinformation and improve upon. Applications of Six Sigma techniques in Libraries would certainly help to rectify such problems.

The Authors , realized the problems and wanted to sort them out with the proper implementation of Six Sigma Techniques as applicable to the Library and Information Centers. For the better operational feasibility of the Sinhgad Technical Education Society (STES) Institutional Libraries, the present study was conducted. A fact-finding analysis is done and some concrete suggestions are given to improvise the STES Institutional Library system with the proper implementation of Six Sigma method.

The scope of study is confined to 5 Campuses of STES and total 27 college libraries were studied, The libraries cover 7 Engineering Institutes, 8 Management college institutes , 5 Pharmacy college institutes, 2 Architecture college Libraries, 4 Science, Commerce and arts college Libraries. 1 Hotel Management and 1 Medical College Library.

2. Objectives of the as Study:

1. To reduce time taken to fulfillment user information query in library through implementation of six sigma techniques amongst 5 campuses of Libraries of Sinhgad Institutes.
2. To achieve better planning of resources and library processes to optimize time and save energy of library personnel.
3. To implement and successfully adopt, the six sigma methodology in the library routine work by awareness and training the staff in an efficient and effective way about Six Sigma
4. To work for continuous improvement of individual library unit and as part of STES in resource sharing.

3. Literature Review :

(Mahipal Dutt,2013)[1] discussed Six Sigma methods and depicts how to apply the six sigma in library functionalities for identifying the main areas of functions, to get the most user's satisfaction.. The study of six sigma application in Jayakar library of Pune University was done by Ulhe, Ujvala Sudhir and Patil, S.K. (2011). Six sigma at Pune University was tried to be implemented in 2007 and was introduced in all sections of library. In flaw finding phase, they classified the defects in three groups as, context of quality, in context of administration, and (Sathe, 2015)[2] pointed out techniques and tools and benefits of TQM in libraries such as Continuous improvement, Increased staff participation, He also mentioned some of the barriers and problems in implementation of TQM. (Duren P., 2017)[3] highlighted few examples of implementing Total Quality Management in Academic libraries in Germany. The paper focused on various styles of leadership and review of complaints from every member. Transformational Leadership plays very important role in implementing TQM in libraries. (Singh,Kirti,2013)[4] revealed that lack of sufficient infrastructure, irregularities in the receipt of journals,

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Good use of books by stakeholders are the main reasons for not reaching to quality standards. Begum, S. S. N. (2003)[5] described the importance of customer feedback for improvement service library and Library staff training to retain quality in academic library.

The focus of (Sahu, A. K. ,2007)[6] study is measuring the service quality in JNU library. He suggested that the library should set performance goals, solve and prevent problems, Communicate with internal and external customers also delivering right information at right time. (Baird, K., Hu, K. J., & Reeve, R.,2011)[7] highlighted relationships between organizational culture and total quality management.. It further examined generalizability of Kaynak's model. (Kim & Chung ,2010)[8] described Six Sigma based methods to renovate library and information services in corporate research library of telecom company in Korea. And identified 12 key factors who have effect on information acquisition, information utilization and suggested improvement plans. This research work uses DMAIC and DMADV models to design and develop new process. (Kim, D. S.,2010)[9] mentioned the implementation in Sungkyunkwan University Library and determination of its success. The research stressed upon Manager's role and fundamentals of Six Sigma Activities.

(Jenicke, Kumar, Holmes, M. C.,2008)[10] proposed three tiered framework to find out Six sigma improvement methodology and academic performance and highlighted institution challenges while applying Six Sigma methodology. (Anthony, S., & Antony, J.,2016)[11] demonstrated a simple case study example on academic leadership for implementing Six Sigma. The main tool used to structure the systematic literature review is a Taguchi Orthogonal Array design, specifically an L16 grid. They used novel approach for using design of experiments. (Murphy, S. A., 2009)[12] explored the application of Six Sigma in Ohio state University Library using SIPOC method to understand the problems from stakeholders. Some of the finding from this paper showed that there are significant budgetary constraints for training staff. (Sivankalai, S., & Thulasi Kavitha Yadav, S.,2012)[13] analyzed quality awareness among library professionals and effective benchmarking standards. It also studied effective work environment to implement quality. (Mistry, V.,2001)[14] mentioned the Quality management services has generated some common set of behaviors among the staff like, interacting with each other for problem solving, team work, High trust relationships, improved interdepartmental communication reducing barriers.

Sirkin (1993) work cited by (Dixit, P.,2010)[15] suggested few ways to implement TQM in library and enhance quality. Such as Feed back from stakeholders, change hour operation, track complaints, improve physical layout of library , develop the active outreach program and flexibility in staff assignments. (Khera & Sharma,2012)[16] listed down benefits of TQM in libraries such as staff participation in decision making and library managers leadership skills. Also highlighted tools like Flowcharts, fishbone diagram, control charts helps in identifying solving problems and continuous improvement. (Chakrabarti, a.,2014)[17] applied scientific and systematic upgrading strategy to improve processes in academic libraries. He highlighted DMAIC and DAMDV methodology for implementing Six Sigma in the areas in libraries like Acquisition, Classification, Circulation, Stack Maintenance, Loan and Reference Services. (Al-

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Zubi, A. A., & Basha, I.,2010)[18] highlighted the importance of Six Sigma for user satisfaction and quality processes in library. This paper has applied scientific and systematic six sigma tools.

4.   Limitations of the study:
➢   Only Operational and process feasibility study is considered financial and technical feasibility is not considered for this feasibility study.

5.   Research Methodology:
The descriptive research design was used for the study. Questionnaires for Library staff, student users, Faculty users were designed to fetch Library issues viz. library collection, processes, problems in library functioning, management support and difficulties faced by the Users of the Libraries as Faculty/ staff and students. Sinhgad Institutes Library is spread over Six Campuses. Stratified Random sampling technique was used to collect the data from various respondents. Population and Sample size for study is shown in the table below.:

Sr. No	Name of the campus Library	Library Staff		Staff (Teaching)		Students	
		Population	Sample Size	Population	Sample Size	Population	Sample Size
1	Vadgaon-Ambegaon(Bk)	52	52	1000	100	10000	1000
2	Nahre	25	25	500	50	1250	120
3	Warje	5	5	250	20	1000	100
4	Kondhwa	15	15	600	60	5000	500
5	Lonavala	20	20	400	40	3000	300
	Total sample	117	117	2250	270	20250	2020
	Actual Response		104		214		2018

Table : 1 Sampling for the study

6.   Data Analysis and Interpretation:
The researchers have used Percentage Analysis, Graphical Analysis-pie charts, bar diagrams and Tabular Analysis. The analysis is divided in to three parts
1.   Faculty Data Analysis
2.   Students Data Analysis
3.   Library Staff Data Analysis

6.1 Faculty Data Analysis :
Faculty visits regularly to the library for various information sources. It was

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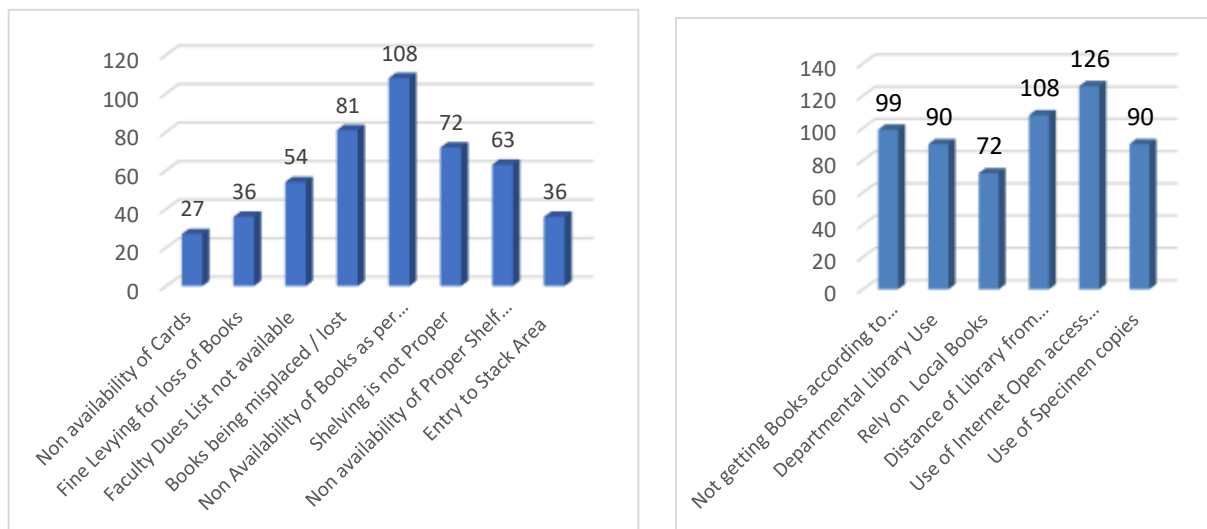essential to understand the issues faced by faculty during their faculty visit

6.1.1 Areas of Library in which faculty experience any problem
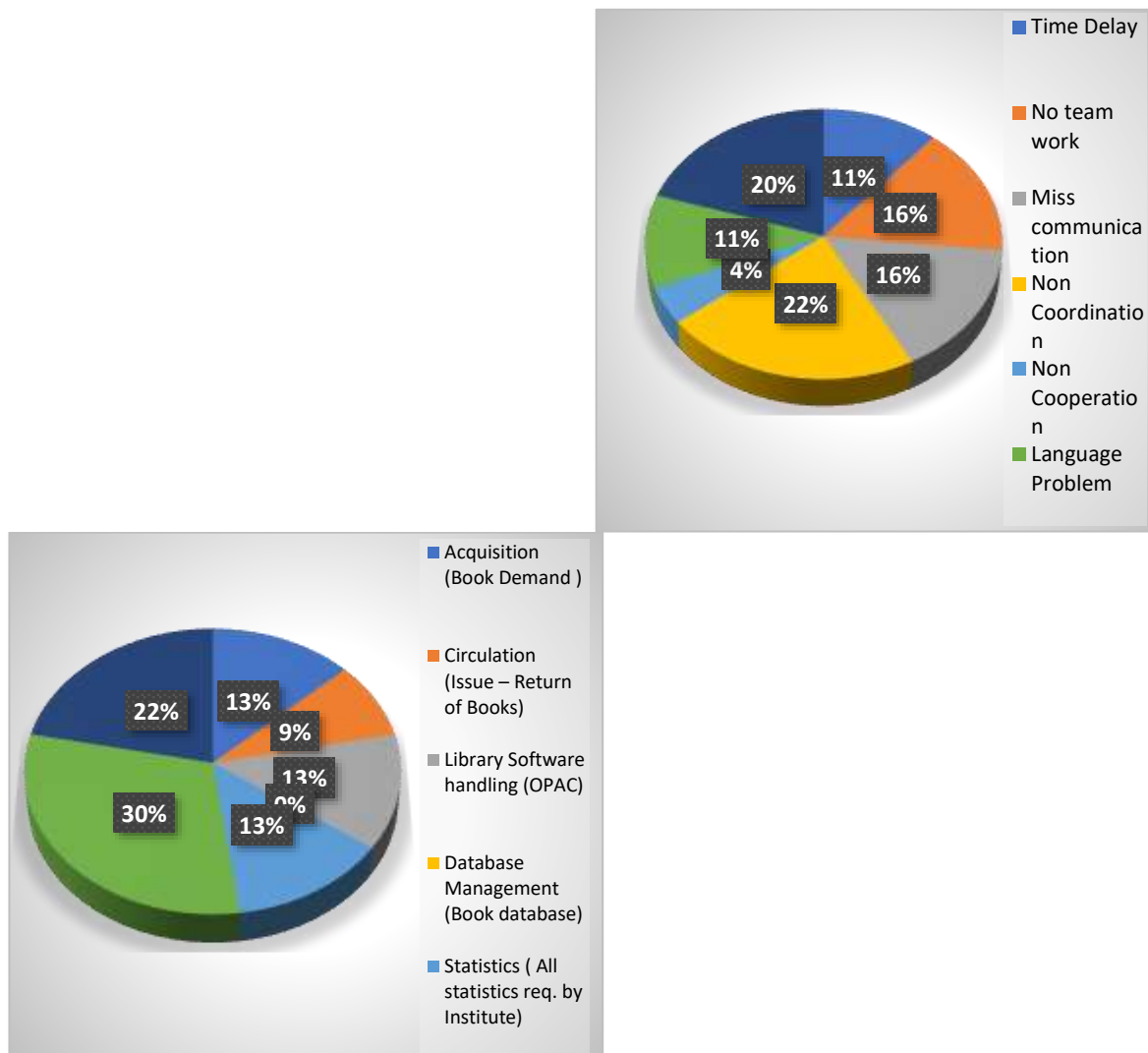
Fig. 1: Areas of Library in which faculty experience   Fig: 2: **Difficulties**
faced by faculty while working any problem in various library areas

The above graph shows that Faculty faces major issues in Digital Library and Periodical section. 13% faculty experiences the problems in acquisition section and handling Library software. Few faculty do not find all statistics required by institutes. Major issues faced by faculty is coordinating with library staff. Many of them face language issue and feel that there is no coordination in the activities carried out in library. This leads to time delay in completing the task carried out in library.

6.1.2 Library Counter related issue :

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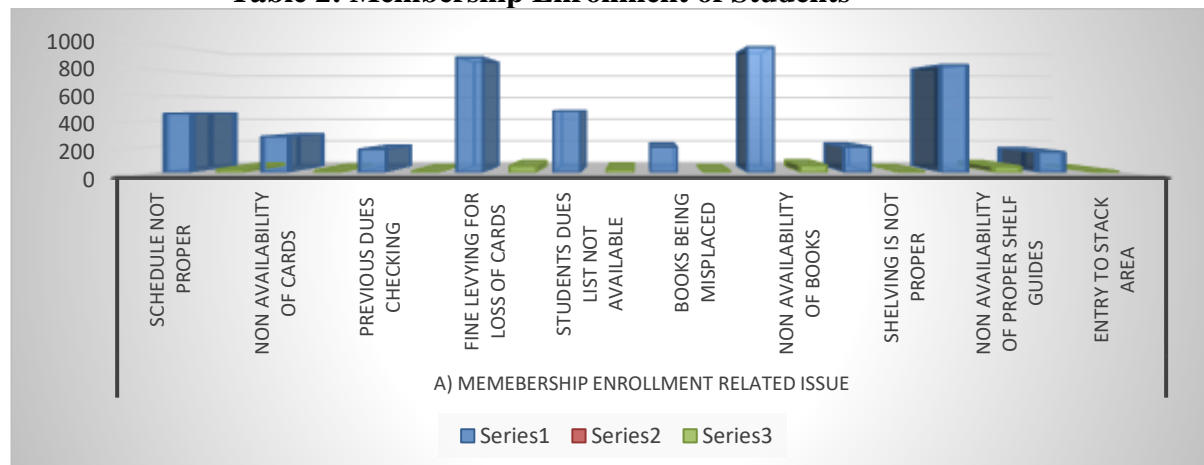**Fig 3 : Library Counter related issue Fig. 4 : Reasons for not coming to library**

From the above figure it is observed that majority faculty do not find the books available as per requirements. This is either due to books being misplaced or not having shelf guide. Many faculty do not find issue cards and faces issue in fine levying for loss of books. Many departments have Departmental library and all necessary reference material is available in department library. Some of the faculty use Local author books and specimen copies given by publisher. The library is far away from many institutes hence many faculty avoid coming to library.

6.2 Student Users Data Analysis:
6.2.1 Student Membership related Issue :

Table 4.4.1 Membership Enrollment Related Issue

Schedule not proper	Non availability of Cards	Previous Dues Checking	Fine Levying for loss of cards	Students Dues List not available	Books being misplaced	Non Availability of Books	Shelving is not Proper	Non availability of Shelf Guides	Entry to Stack Area
26%	16%	10%	50%	27%	11%	54%	11%	47%	8.9%

Table 2: Membership Enrollment of Students

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Fig 5 : Student Membership related Issue

It is observed that majority of students have concern about fine levied for loss of cards, Non availability of books and non availability of shelf guide.

6.2.2 Reasons for not coming to library:

b) Reasons for not coming to Librry
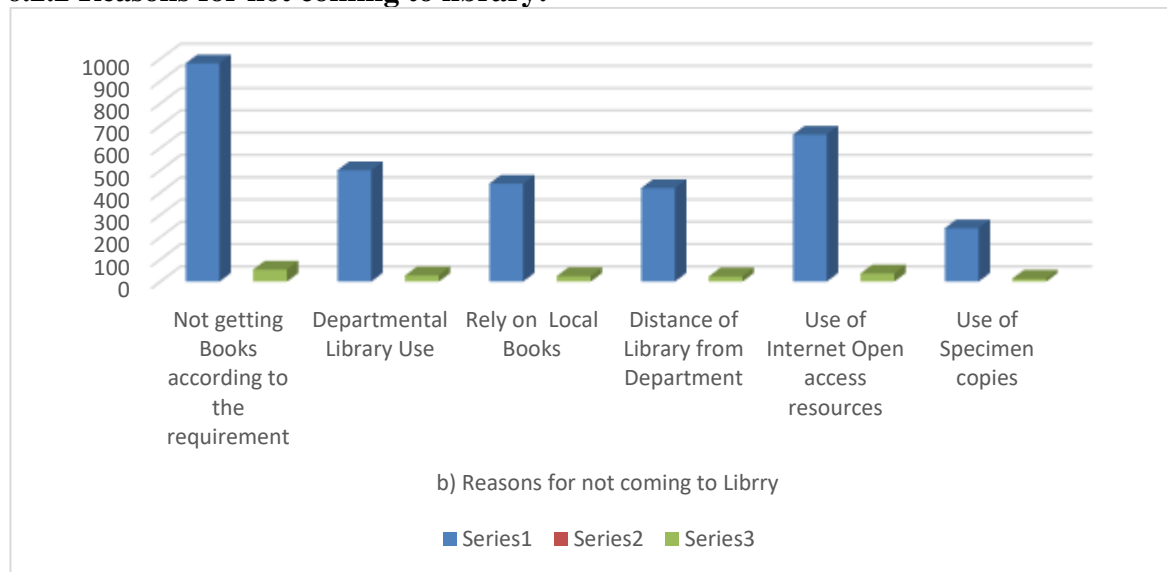
Fig 6 : Students not coming to Library

Majority of students complaints that they do not get book according to the requirement. Library is located far away from their department hence they do not visit frequently to library. They prefer to use departmental library as many specimen copies and reference books are available there.

6.2.3 Frequency of Library Visits by students
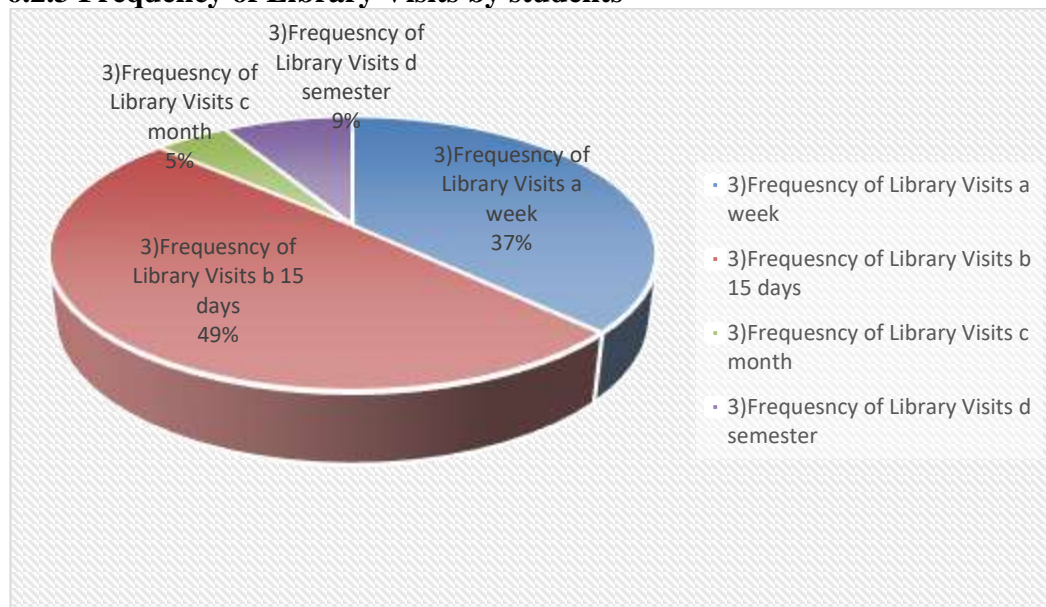
Fig 7 : Frequency of Visit to Library By Students :

Majority of students visit library once in 15 days. Less than 10% students visit once in semester and once in month.

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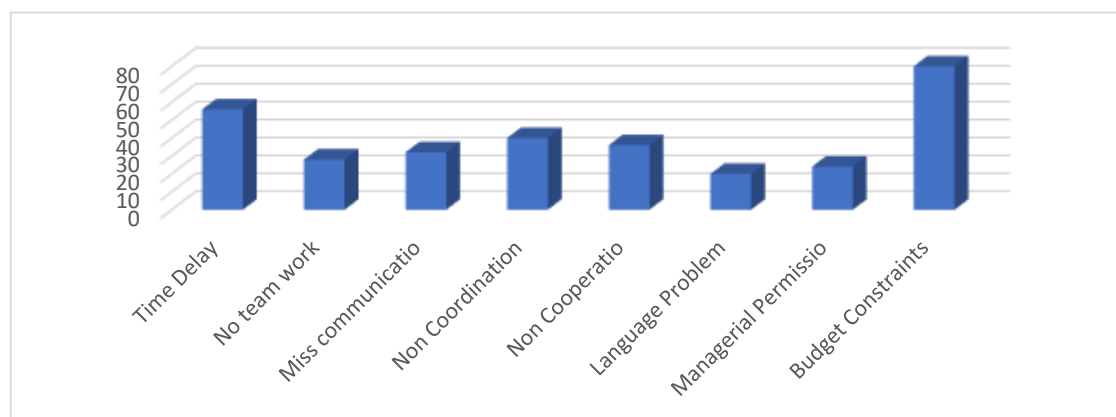### 6.3 Library Staff Data analysis:

Acquisition - Book Order	Processing - Book	Circulation - Issue – Return	Software handling -Lib S/W	Database Management - Book database	Statistics -All statistics req. by Institute	Digital Library - Hardware & e-resources	Reading Hall Duties - CL	Periodical Section - National Jr Issuing	E-Resources operating
73.1 %	84.6%	88.5%	88.5%	88.5%	80.8%	65.4%	57.7%	80.8%	50.0%

Table 3: Areas of Library in which Library staff has experience problem

Library Enrollment - Card Issuing					Book Issuing related Issues				
Schedule not proper	Repetitive jobs due to Non reporting of students	Non availability of Cards	Previous Dues Checking	Fine Levying for loss of cards	Over Due Books	Technology support for reminders not available	Difficulties in Late fees charging	Dues for old students not available	Books being misplaced
19.2 %	50.0 %	11.5 %	61.5 %	19.2 %	53.8 %	69.2 %	30.8 %	23.1%	11.5%

Table 4 : User Related Issues with students

Library staff work in rotation. It has been found out from above graph and table that more the 80% Library staff have work experience in Book Processing, Circulation, Library software handling and periodical section. Nearly 50% staff have worked in e-resources and digital library section. One of the Major problem during card issuing and enrolment is due to students not reporting as per schedule. It increases repetitive jobs to staff. Many students do not return books issued within given time limit. Library staff do not have technology support to check over dues of books and send reminder to students regarding over dues.

Fig: 8: Difficulty faced by staff while working in library area

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From the above table and graph we can observe that around 76% staff face difficulty in working in library due to budget constraints. 53% staff members face time delay in completing the work.

Status Checking					Status Updating	(Updated Entry not done)				
No Proper Library Software	No Proper Training	User Friendly Modules	Computer Operations not known	Staff Reluctance for Technology Learning	Electricity Problem	UPS not connected to computer	Functioning of software	Staff not Trained	Reluctance to do the entry	Time Delay
60	35	25	15	40	30	40	50	40	35	25

Table 5: Library Automation and Software Related Issue

Maintenance of library software is not proper. 80% Library staff stated that AMC of library software not done. There is delay in getting sanctions for maintenance also the visiting charges requires approval which leads to delay in visit. Another issue found out is library staff is reluctant to learn technology as they have not been given proper training. Library staff also faces Networking and hardware related issues, system upgradation problems, maintenance of digital library

7.3 Student Related Issues
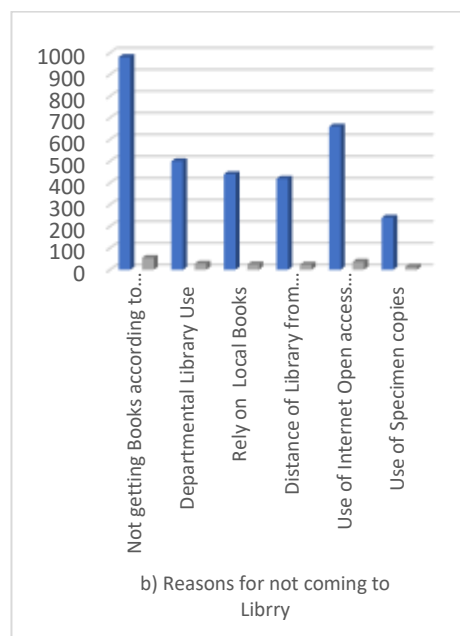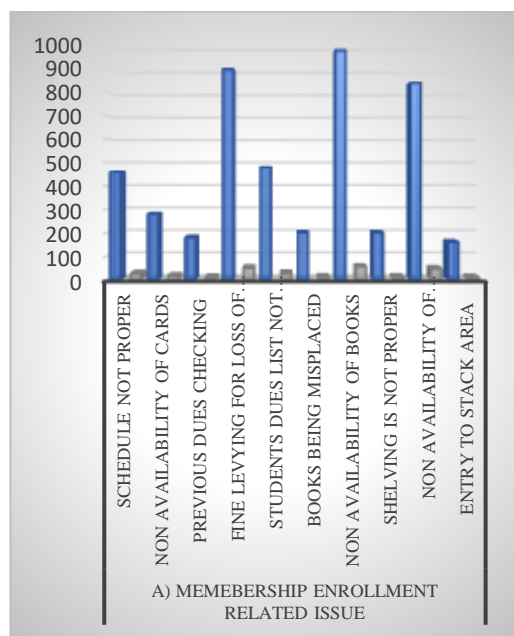
Fig. 9: Student Membership related Issue   Fig. 10 : Reasons for students not coming to library

It is observed that majority of students have concern fine levied for loss of cards, Non availability of books and non availability of shelf guide. Majority of students

complaints that they do not get book according to the requirement. Library is located far away from their department hence they do not visit frequently to library. They prefer to use departmental library as many specimen copies and reference books are available there.

7.   Findings of the feasibility study :
7.1 Findings from Library user's perspective
➢   Good Library software for proper guidance to user and OPAC is required. A terminal of Online Public Access Catalogue to be kept at entrance of the Library.

➢   Non availability of Books demanded at the time of issuing is another most noted factor out of Both the type of users.

➢   The Libraries provide Open Access , in this case the Users should be guided well to the stack area. Proper shelf guides need to be there and staff should guide the Faculty or Students with service approach.

➢   Faculty users faced the issue of less coordination within the Library processes which result to time lag.

➢   Another issue is related to the Membership Enrollment, especially the student members pointed out that Library Membership enrollment should be more coordinated and schedules should be communicated properly to reduce the waiting time.

➢   The need was felt to give induction about the e Resources to the users and the Digital Library to be kept updated for usage.

➢   Reducing service time gap is essential as faculty has very less time to spend between lectures.

➢   Infrastructure Space , Library Timings, Resource Sharing are the positive points of the Libraries.

7.2 Findings from The Library Staff perspective:
➢   The data indicates that all librarians are qualified according to the AICTE/UGC norms. And experienced as majority have experience between 10 to 20 years.

➢   According to Library Staff , the users specially Students should follow Library rules regarding Book Issue time Table and late fees.

➢   For maximum Library Professionals the main problem is Library Software related issues and AMC of the Software, as the libraries have much dependency to it, to cater to the user information needs.

➢   Digital Library facility should be proper and hardware maintenance schedule should be regular. It is recommended that knowledge about subscribed e Resources should be given to them by arranging training sessions.

7.3   Major Suggestions : This Research is a feasibility study and a set of SOP is suggested, they can be implemented in next level study of . Six Sigma implementation. Taking into account, all the findings the researchers have recommended a set of suggestions as below : The Libraries have problem areas as identified in this survey. There are service gaps, Resource gaps and Technology gaps identified. These are the issues which can be solved by the Total Quality Management and application of Six Sigma process standardizations.

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➤ The Institutes can have good proven Library software and an annual contract can be done for efficient service.

➤ The Library Staff can have SOPs for all Library Process and Services with the guidance and approval of the college authority.

➤ A well managed Digital Library will fill up the Information Gap.

Conclusion: The Researchers are confirmed that in the present situation of STES Libraries; Six Sigma method of DMAIC can be applied perfectly for enhancing quality of library processes and services to achieve time and service efficiency,

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