

## A LEAN CASE STUDY ON MANAGING INTERLIBRARY LOAN AND DOCUMENT DELIVERY SERVICE IN AN ACADEMIC LIBRARY

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### ABSTRACT

**Introduction:** Interlibrary loan and document delivery (ILL/DD) is an essential service provided by academic libraries to support research activities, publication and academic programmes. ILL/DD service capitalises on resource sharing or library networking by providing library materials that are not available at the host library. The Lean Six Sigma method was applied to identify the root problems. A construction of a web-based system branded as “Request Book and Article System (RBAS)” soon followed as an intervention. A retrospective study was conducted from March 2020 to August 2021 (16 months) to evaluate the key indicators of the service. Customer feedback on service quality was also surveyed. The majority of request was for articles, 649 (87.5%), followed by book request 84 (11.3%) and ebook, 9 (1.2%). Turnaround time fell within 24 hours for the majority of requests, 494 (68.4%). The highest number was from article request category, 460 (71.8%). A high proportion of users (78%) deemed the service as “high quality”. The use of a lean approach and the development of a homegrown system have improved the ILL/DD service at our library. Here we share lean practices in ILL/DD management, focusing on transforming a manual method to a digital homegrown system development and its advantages.

Keywords: Request article, Interlibrary loan and document delivery, lean management, academic library, innovative library system.

### INTRODUCTION

Advanced Medical and Dental Institute (AMDI), Universiti Sains Malaysia (USM) is an institute focusing on three key components which are clinical services, research activities and postgraduate academic programmes. AMDI library plays an important role to make the institute an established advanced centre in medicine, dentistry and health.

Interlibrary loan (ILL) and document delivery service (DD) service is an essential portal of information heavily prescribed by AMDI library users to facilitate their research, teaching and learning activities and clinical references. Through this service, items which are not readily available at the host library are acquired most commonly in the electronic form to maximise its accessibility (Li, 2014; McCaslin, 2010). It also increases the library collection, which can add value to any academic institutions. An automated ILL/DD system is advantageous along with the widely expanding online resources, as 50% of published articles are available on open access platforms (Schopf, 2015). Innovating ILL/DD service which is an important library service is consistent with the best practice guidelines by IFLA which emphasise on setting up services which are relevant to local users. Libraries are also recommended to set a benchmark or performance indicators to evaluate the effectiveness of the service for continuous quality improvement (Stein, 2008).

Even though lean methodology is generally accepted and applied in other service-based industries, there is a paucity of research on its application in libraries and information

organisations. This article introduces a lean case study which demonstrates how the traditional ILL/DD service was transformed to a digital platform. Lean Six Sigma method was used to improve the quality of the ILL/DD service performance at AMDI library. Adopting a homegrown system technology has improved service performance, efficiency and customer satisfaction. To the best of our knowledge, “Request Book and Article System (RBAS)” at USM is the first homegrown ILL/DD system employed at an academic library in the country which is open to its organization’s members as well external users, with unlimited number of request at no charging fees.

The manual system that was previously practised at our library involved a chain of manual work processes i.e. submitting a request in Google form, documentation of request in hard copies and filing of articles/ebooks in PDF files and hard copy forms in a storage cabinet. Part of the work process was also staff-dependent, particularly in communicating action feedbacks to the users. When the staff retrieved an article from online sources, it would be saved as a portable document format (PDF) file to the staff’s desktop and a copy would be emailed to the user. On the occasion where the resource was not available at our library, it would be requested to other institutions throughout the country. Requests would go to the identified public or private academic institutions which belonged to the Conference of Academic Libraries and National Library of Malaysia. In this scenario, there would be additional process due to different request system used in both institutions such as filling in another Google form or sending an email to the ILL/DD department.

In addition, communications regarding access to journal articles or books were previously handled over the phone and processed manually. There were delays in response and ILL/DD staff took time to address the issues. This manual workflow process made tracking and monitoring of the materials on loan difficult. Generating statistics on the materials that had been requested, retrieved and delivered were also time-consuming. In the absence of an automated system, time stamped status for each step and average completion of request was tedious and hard to quantitate.

Manual processes increased workload, redundancy and subject to inaccuracy, limiting the service effectiveness. Without proper work process, this posed many disadvantages due to loss of data, damaged records, consuming storage areas and inadequate analytical tools. A digital system which can eliminate inefficient work processes would improve the service delivery significantly.

At the beginning of this study, we aimed for these objectives:

1. To employ a lean approach to problem identification and solution in a library service
2. To develop an ILL/DD web-based system to improve the service with added features
3. To study the ILL/DD service indicators following the introduction of RBAS.
4. To obtain a customer feedback on the quality of the service provided by RBAS

## RELATED WORK

The era of digital technology witnesses increasing use of the internet and online resources as evidenced by search logs of library usage patterns. This included searching strategies, citation managers and document delivery. Electronic document management system is in line with the government aspirations for smart initiatives (Ain Umaira *et al.*, 2020).

Our library mainly refers to Malaysian Academic Library Union Catalog (MALCAT) to search and discover books and articles that are not available in our collections (Conference of Academic Libraries & National Library of Malaysia, 2020). Libraries commonly have a consortium of regional voluntary associations that provide an online union catalog of all the items held by member libraries (IGI Global, 2015). Library consortia played a critical enabling

role in facilitating ILL/DD among and between libraries (Thomas and Fourie, 2006). This service allowed sharing and discovery of Malaysia Academic Library Information Resources such as books, journals, ebooks, ejournals and institutional repository.

Along with other library services, ILL/DD should evolve by embracing new technologies to explore how ILL/DD can be a fully automated online service (Bangani et al., 2018). The traditional practice is slowly phasing out as library users expected ILL/DD performance to match the ease and speed of electronic (Boukacem, 2003; Leon and Kress, 2012), and libraries have to capitalise the rapidly changing digital technology to optimise library services (McMullen, 2007).

Information systems streamline the processes to be faster and deliver library materials effectively through ILL/DD. It might also respond to queries from users on another school or university in a timely manner (Bangani et al., 2018). Most public and private academic libraries use manual work process or partially automated ILL/DD systems. These systems are either developed in-house; such as at the BiblioMIME developed by the Italian Research National Council (Mangiaracina et al., 2001) and Nanyang Technology Institute which used Java enabled Web browsers (Lim et al., 1999), or using external ILL/DD system, such as Library-Administration-Software Aleph at the University of Danube, Austria (Moser, 2015), giving a few examples.

The development of most international ILL/DD management systems was frequently outsourced to a third party who provided training, maintenance and upgrading of the system. The choice to outsource is dependent on several factors; experienced in-house system developers are not available or would be expensive to hire, tough project schedules or lack of knowledge about domain and technology of certain complex software systems in the organisation (Haider et al., 2016). This method inevitably resulted in significant costs, making it an unfeasible alternative for smaller libraries. Other article request management systems such as ILLiad™, Clio™ or RapidX™ are not readily available in this country, nor do any of the libraries participate in Online Computer Library Center, Inc. (OCLC) Direct Request™ system (Kohler and Theiss, 2012).

The lean methodology had been used previously to improve a library service and information organisations aimed towards efficient service delivery and improved customer satisfaction (Cervone, 2015; Red-Elaurza and Usah, 2017). Having adopted lean methodology from manufacturing plants (Singh et al., 2018), library services could benefit from the practices to improve work processes to achieve desirable outcomes.

The improvements would add value to the service by addressing serious issues that may have caused inefficiency before. The DMAIC project phases (Define, Measure, Analyze, Improve, Control) were used during the execution of an improvement project (Chu, 2012). Involvement and empowerment of employees was taken into consideration as part of the lean approach. To measure the ILL/DD service performance, several key indicators including turnaround time (TAT) of request completion, percentage of filled requests and customer satisfaction (Mangiaracina et al., 2001) were used.

## MATERIAL AND METHOD

### LEAN SIX SIGMA APPROACH

Using the above method allowed us to understand the problems and find a solution to maximise the service within the constraints and capability of our organisation. Briefly, the five-phase method involves define, measure, analysis, improve and control (DMAIC) phases:

1. Define - The work process for ILL/DD service was reviewed and the areas for improvement were identified.
2. Measure – as a measurement of an efficient ILL/DS service, the average turnaround time (TAT) of 24 hours was taken as the key indicator which is consistent with international standards (*USC libraries, 2022*).
3. Analysis – to get more evidence of the service performance, a study on 50 article requests between 17<sup>th</sup> July 2019 until 3<sup>rd</sup> February 2020 was performed. Figure 1 showed an average TAT of 30 hours, with 74% of the request had been completed within 24 hours. To identify the potential weakness point, each step was considered independently as the possible root cause. We conducted interviews with the ILL/DD staff to focus on questions like “Why does it take longer than 24 hours to complete a request?”. The overall issues that were raised by staff pointed to: a) inefficient work process which are repetitive or redundant such as documenting a request or after getting the ILL/DD items, b) staff-dependent processes such as sending out emails and manual filing of PDFs in the staff computer terminal, and c) processing items that are not owned by USM. The findings of this interview were presented in Figure 2.
4. Improve – this step aims to develop a solution to the critical root causes as identified above. RBAS was developed to tackle some of the work process in a single step, reduce time and resource and to obtain measurable outputs in terms of statistics
5. Control – measurable outputs such as statistics of total filled request for each item, TAT and percentage of satisfactory feedback were analysed for continuous quality improvement.

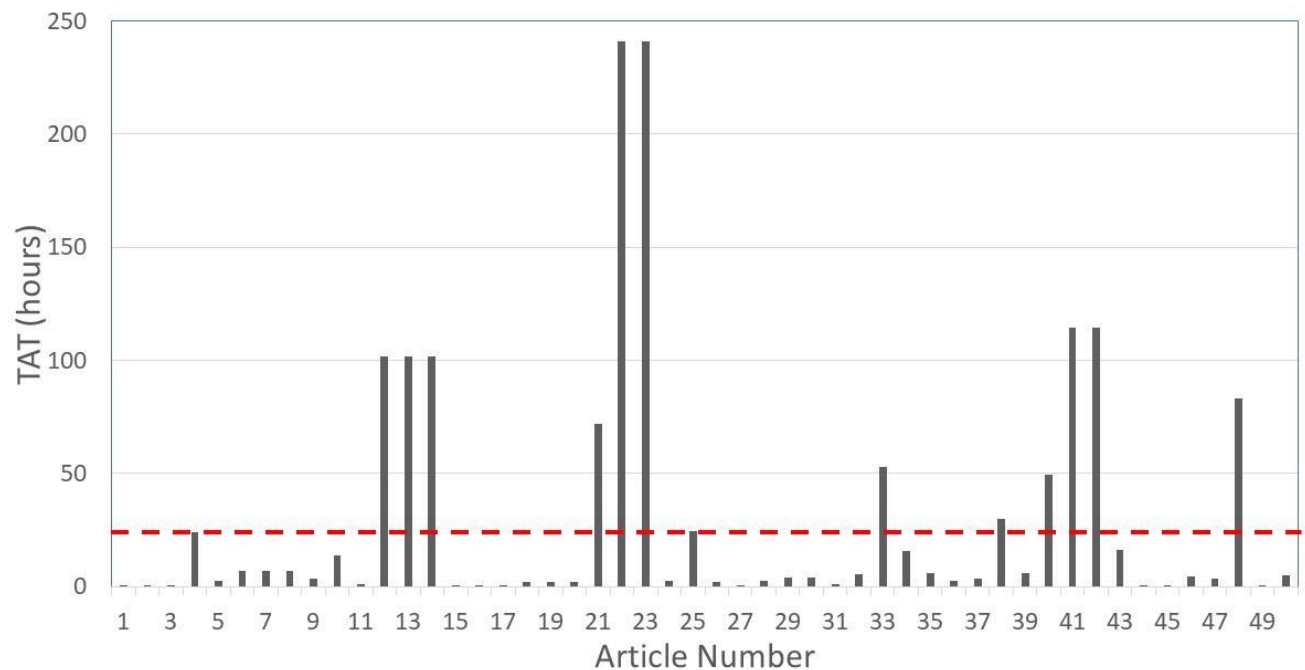


FIGURE 1. Turnaround time (TAT) for 50 articles. Red line indicates the 24-hour TAT.

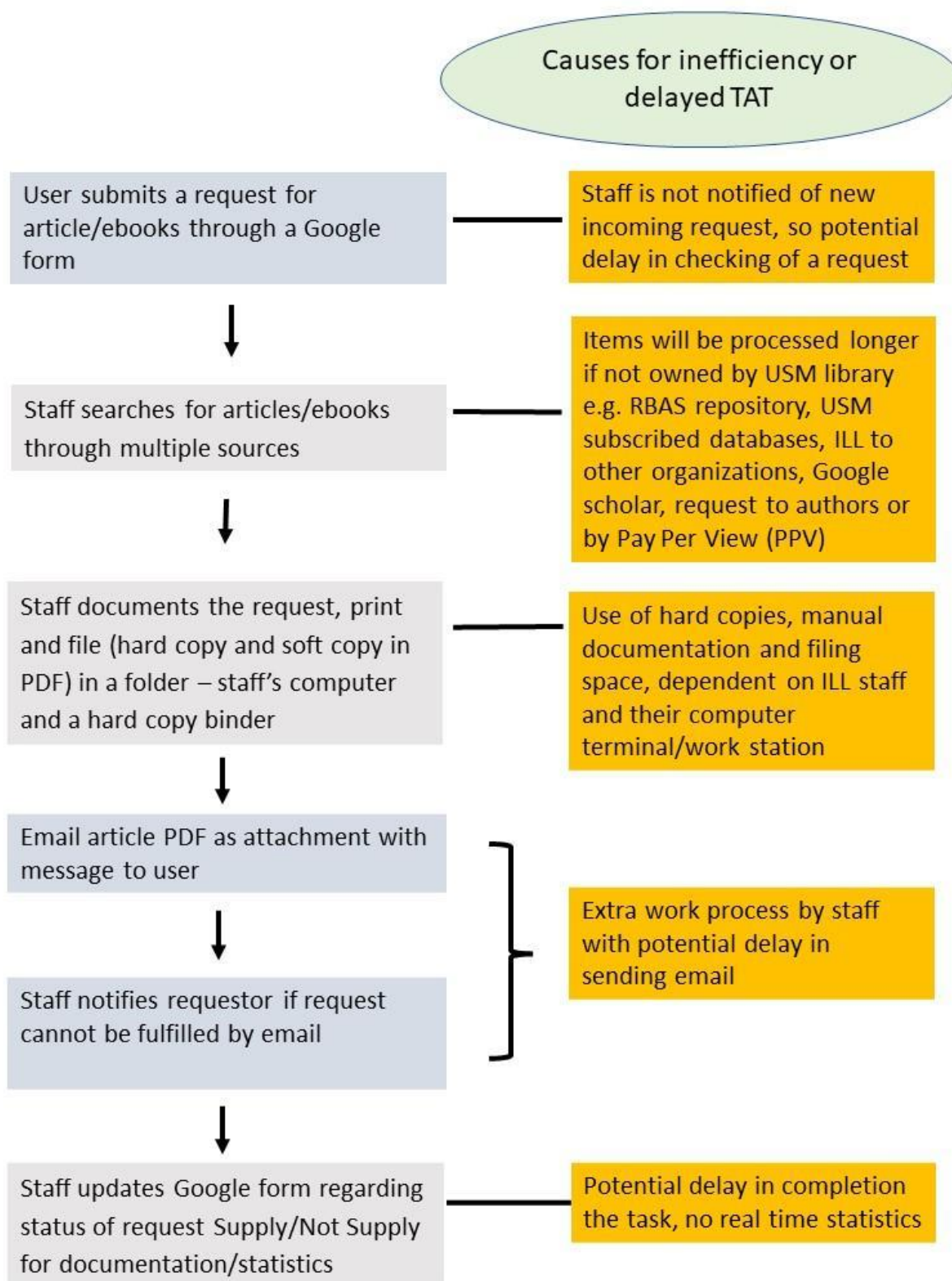


FIGURE 2. Identification of root problems in the current work processes (left) of the ILL/DD management (right).

#### DEVELOPMENT OF RBAS

Guided by information gathering from existing ILL/DD systems around the world, we designed a new automated system to fulfil our needs. On average, a homegrown system costs around \$8,000 (RM34,000) on hardware and \$1,000 (RM4,200) on software (Shahzad et al., 2017).



Although this value is much less than the commercially available products, it is more than what most small libraries can afford. RBAS development was a collaboration between AMDI Library and IT@AMDI, Universiti Sains Malaysia. The aims of the homegrown system development are broadly categorised as:

- (1) A web-based system that is independent of client-side software.
- (2) Streamlining two major work processes: book request and article request.
- (3) One-off system that enables users and library staff to manage the entire request flow - from request, internal processing, and document delivery to the user.
- (4) A user- and staff-oriented system that is easy to configure, administer and maintain, at a minimal cost.

#### SYSTEM ARCHITECTURE

RBAS adopts a client-server architecture as shown in Figure 3. The ILL/DD web application is hosted in the main server and can be accessed via browser using internet connection from a personal computer (PC), laptop or smartphone at the user sites. Both database and application will be hosted on a local institution's network. The server system consists of a MariaDB open access relational database and application server. The components of the server consists of Window Server 2012 R2, Hypertext Preprocessor (PHP) and Internet Information Services (IIS). The IIS web server receives the user's request, retrieves the appropriate file, and passes it to the PHP processor. The latter examines the file, sees a set of instructions, and connect to a database (MariaDB, in our case) and run a code written in a structured query language (SQL).

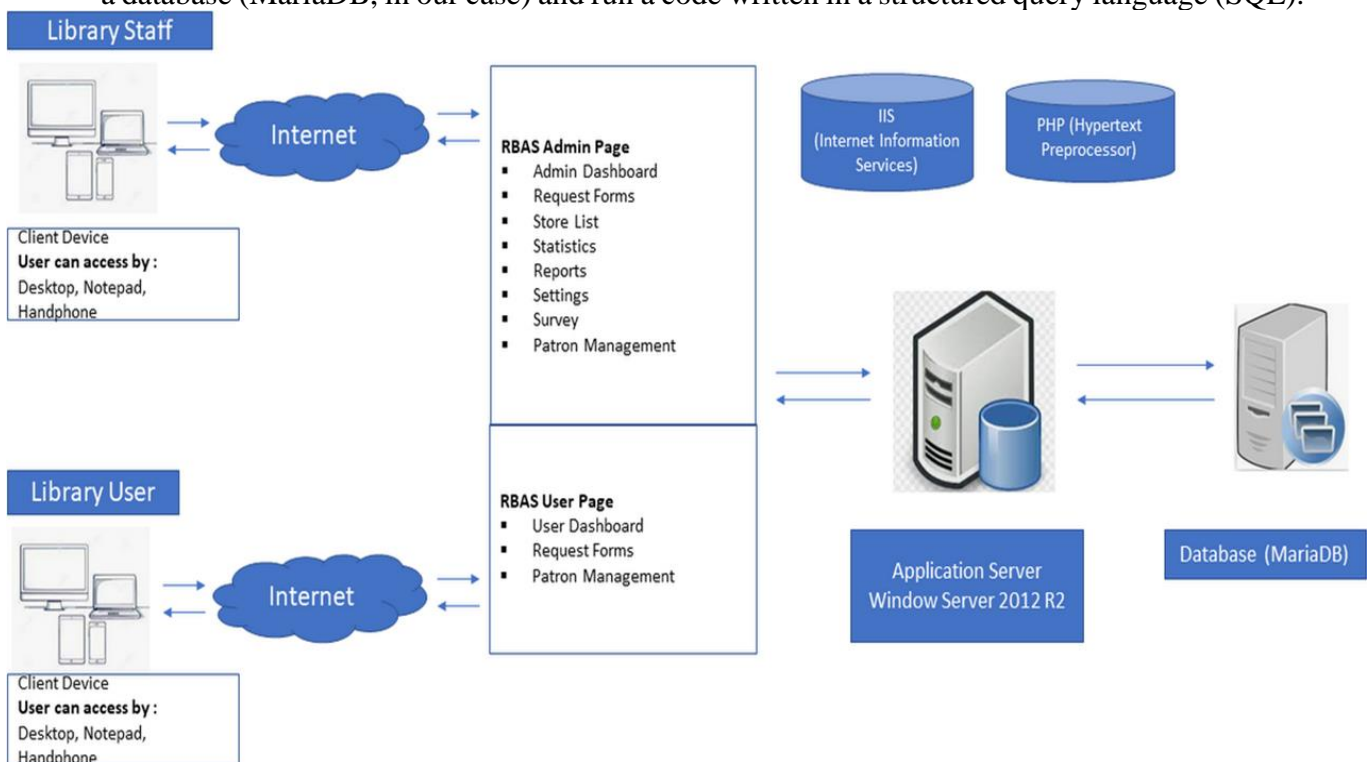


FIGURE 3. Overall RBAS System Architecture. The web application and database (MariaDB) are hosted on a local network server; which comprises of a Window Server, PHP processor and IIS web server.

MariaDB receives and executes the SQL and sends the results back to the PHP processor for formatting. The PHP processor receives the query results, formats them as HyperText Markup Language (HTML) and passes them back to the web server. The web server then returns the HTML formatted results to the user's web browser, thus completing the

process. The database is updated with each transaction or request. There is additional service implementation such as mail server for mail notification. There is an interaction in the system every time a request is submitted, processed, cancelled, or completed by the requestor or library staff.

RBAS database is designed to keep information about all incoming requests. The information contained in the database is summarised as follows:

1. Library users are uniquely identified by their user ids. The information maintained for each authorized library user include their first name, last name, designation and identification number.
2. The list of attributes of all requests include the request submission date, title, processing date, status, and completion date.
3. Items are either book, ebook or article. The essential information of book and ebook items includes the title, author, edition, ISBN number and publisher. For articles, information on the title, year, volume number and issue, are required.

For each request, we maintain a transaction record in the database. All requests are tracked by monitoring transactions throughout the cycle. Similar database protocols as described above have been published previously by Lindy (Lindy et al., 2015) and Lim (Lim et al., 1999).

#### USER INTERFACE DESIGN

User interface design is a continuous interactive process that allows users to understand, modify, and eventually approve a working model of the system that meets their needs. RBAS is equipped with a user-friendly interface and have been designed to minimize user input. Users are able to access the system via our library website at <http://www.amdi.usm.my/amdilib>. using their authorised emails from any USM campuses or off campus login. Users from non-USM institutions need to click “direct request” and will be processed in a similar way. Users then fill in a request form for books or for articles).

RBAS can track book, ebook or article request transactions from the beginning of the request until the end process from the system dashboard (Figure 4). Users can perform multiple requests for books, ebook and articles for a more flexible service in a single dashboard that allows users to manage all their library interactions in one place including the status and history of previous request.

On the same principles, from the library staff’s point of view, once users complete and submit their request form either for books, articles or ebook, their request is transmitted through the system and is automatically placed in the queue to await the library staff’s response. Library staff will receive an email notification when new request for book, ebook or article is available. RBAS has added the ability to view the request and request queue on either book, ebook or article list. Staff may change request status based on the work processes (Figure 5).

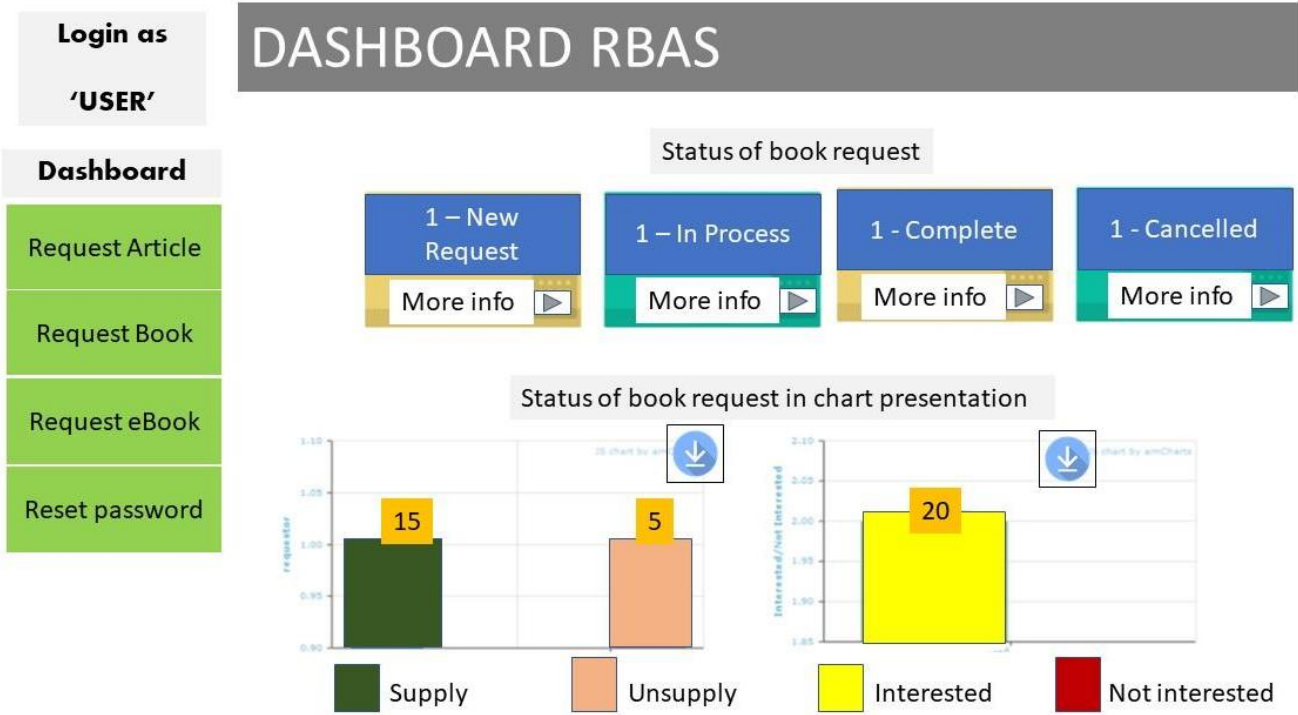


FIGURE 4. A representative schematic of an admin interface for *RBAS dashboard* which features New Request, In Process, Complete and Cancelled items. The main modules are on the left-hand side. By clicking on the Download icon on the interactive chart presentation, further options such as “Download, Save As, Annotate and Print” actions will display the charts’ raw data.



FIGURE 5. A schematic diagram of *RBAS dashboard* for admin to monitor status of book request. Clicking on the “Action” button will bring to the “In Process” display.



RBAS provides status of “In Process” for book request (Figure 6) or article request (Figure 7) for monitoring. The system allows ILL/DD staff to communicate with the users using its communicative feature which can be pre-configured with notes or questions; and receives replies through the users’ email account. For book request for example, a direct link to external sources e.g., Malaysian union catalogue provided to identify the availability of books from other institutions. Once the source has been identified, the staff may submit a loan request to the institution’s library. RBAS allows unlimited storage of articles as a repository to be shared with other users by means of a convenient ‘search’ function.

*Book Request Information*

**STATUS: In Process**

Requestor information

Name: NURUL HUDA

Email: Nurul@usm.my

Category: Staff

Phone no: 019-4056078

OPAC: <https://elib.usm.my>

OPAC: <https://malcat.uum.edu.my/kip/>

Book request: Open Data for Future Technology

Author: David Child

ISBN: M322456

Book from: PHS Library USM

Call no: LB2369 8786 1998

Delivery address: Ivory Apartment, Jln Hamzah, 11800 Penang.

Request date: 14-08-20

Email to requestor\*:

**Send email**

Source from: UTM- Universiti Teknologi Malaysia ▼

*Source link: http://library.utm.my*

Supply: Please select ▼

**Supply**

Unsupply

Source from:

Supply status:

Interested status: Interested

eBook file\*:

**Choose file**

*No file chosen*

**Max file size 2MB**

**Back**

**Cancel request**

Not interested?

**Complete Request**

FIGURE 6. A schematic diagram of admin’s *Book Request Information* interface showing ‘In-Process’ status, “user communication features”, list of sources such as OPAC and MALCAT or direct link to other institutions’ ILL/DD request forms. \*In such circumstances when hard copy book is not available, an email and a note will be sent to requestor regarding ebook option and status would change to “Interested” if requestor agrees for an ebook supply. Final process ends with “Complete Request” click button.



## Article Request Information

**STATUS: In Process**

### Requestor Information

Name: NURUL HUDA  
Email: Nurul@usm.my

Category: Staff  
Phone no: 019-4056078

Email to requestor:

Send email

Article request: 'Assoc. Prof Dr Awanis : Ouyang, Z., Yang, Y., Zhang, C., Zhu, S., Qin, L., Wang, W., ... & Qin, F. (2021). Recent advances in photocatalytic degradation of plastics and plastic-derived chemicals. Journal of Materials Chemistry A, 9(23), 13402-13441.

DOI/URL:

<https://doi.org/10.1039/D0TA12465F>

Request date: 14-08-20

Supply status: Supply

Interested status:  
Interested

eBook/Article Title:

Supply :

Please select

Supply

Unsupply

Request Category :

Please select

USM Collection

ILL

PPV

Open Access

Request from Author

Notes to email requestor:

Back

Cancel request

Complete Request

## List of Article

Published Year

All years

Search:

No	Article Title	Author	Journal Name	Publish	ISBN	Vol	Issue	Redistribute	File	Action
1	Does image quality matter?	Saunders RS Jr, Baker JA,	Medical Physics	2007		66	4	Distribute	<a href="#">saunders2007.pdf</a>	

FIGURE 7. A schematic image of admin's interface for *Article Request Information* showing 'In-Process' status and user communication features. Request category shows the source of the article supply. When an article is retrieved, the document is reposted in the "List of Article" on RBAS 'cloud'. Clicking on the "Action" button will take admin to the next step - attaching the article for supply to the requestor. The final process ends with "Complete Request" click button.

## SERVICE AND QUALITY INDICATORS

A retrospective study was conducted to compare the total number of request and supply of books, articles and ebooks through RBAS from March 2020 until June 2021 (16 months). Data of completion of request was taken for all requests which were handled, including filled (supplied) or unsupplied. Speed of completion or TAT was analysed for less than 24 hours, between 25 to 72 hours, 73 hours to 7 days and more than 7 days. An email notification was sent through RBAS after completion of their request which provided a link to a survey question; “What do you think about the overall quality of RBAS service?” and four options were given; very high, high, moderate and poor.

## RESULTS

RBAS was successfully developed and introduced at our library during COVID-19 pandemic in the country (March 2020) as more manual work processes were transformed to digital platforms; to cater for people who worked from home and employing online services. Since its inception, all document requests (100%) were managed through RBAS, providing this service to USM as well as non-USM registered users, free of charge.

### Review of ILL/DD work process post development of RBAS

The automated system managed to transform the workflow to paperless. We reviewed the work processes of ILL/DD service post introduction of RBAS where the initial alert notification of an incoming response started the request process faster than submitting a google form. The automated communication features have lessened the delay in response. There was less redundant work involved in documentation of request, filing and use of storage space (either electronic or hard copies). The mitigation steps introduced by RBAS and how these steps have improved the service are summarised in Figure 8.

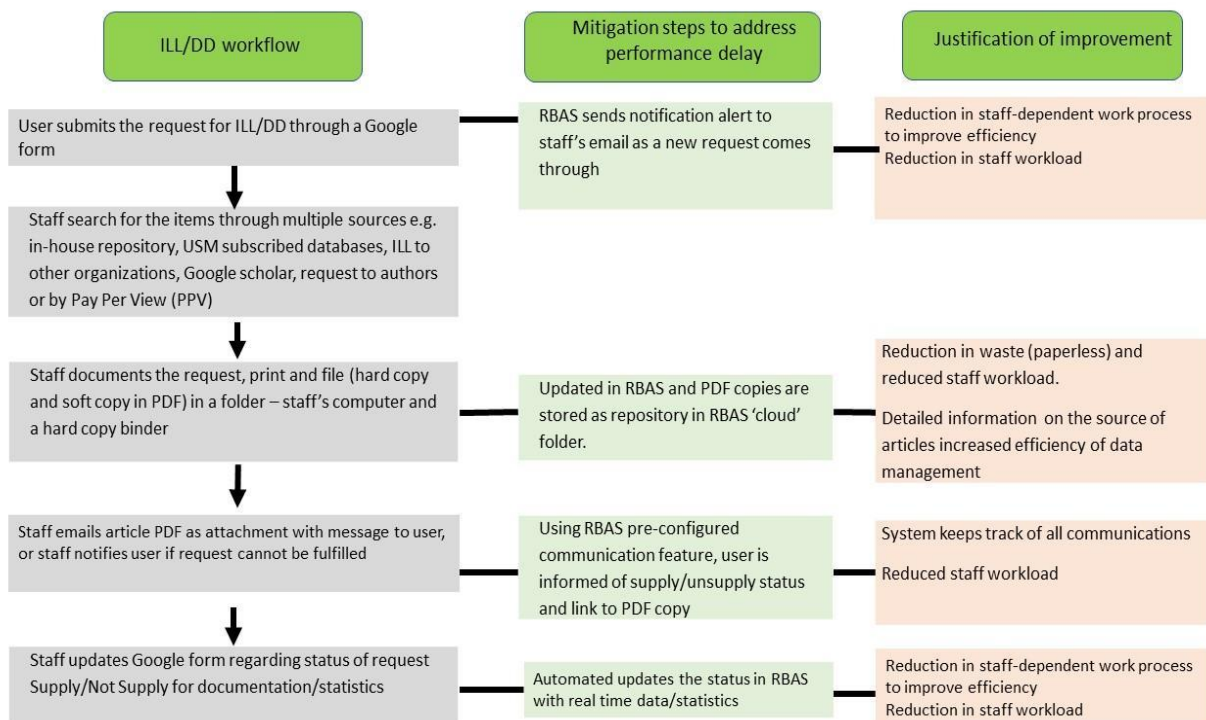


FIGURE 8. Justification of how RBAS mitigates inefficiency and performance delay by improving the workflow.

## SERVICE AND QUALITY INDICATORS

### RBAS TOTAL REQUEST AND SUPPLY

Since the initiation of RBAS in March 2020 until June 2021 (16 months), the majority of request was for articles, 649 (87.5%), followed by book request 84 (11.3%) and ebook, 9 (1.2%) (Figure 9). Out of these requests, a total of 603 (92.2%) of articles were supplied, 45 (6.9%) of books and 6 (1%) ebook requests were supplied. For percentage of supply compared to unsupply items, article supplied was 93%, book supplied 54% and ebook (67%).

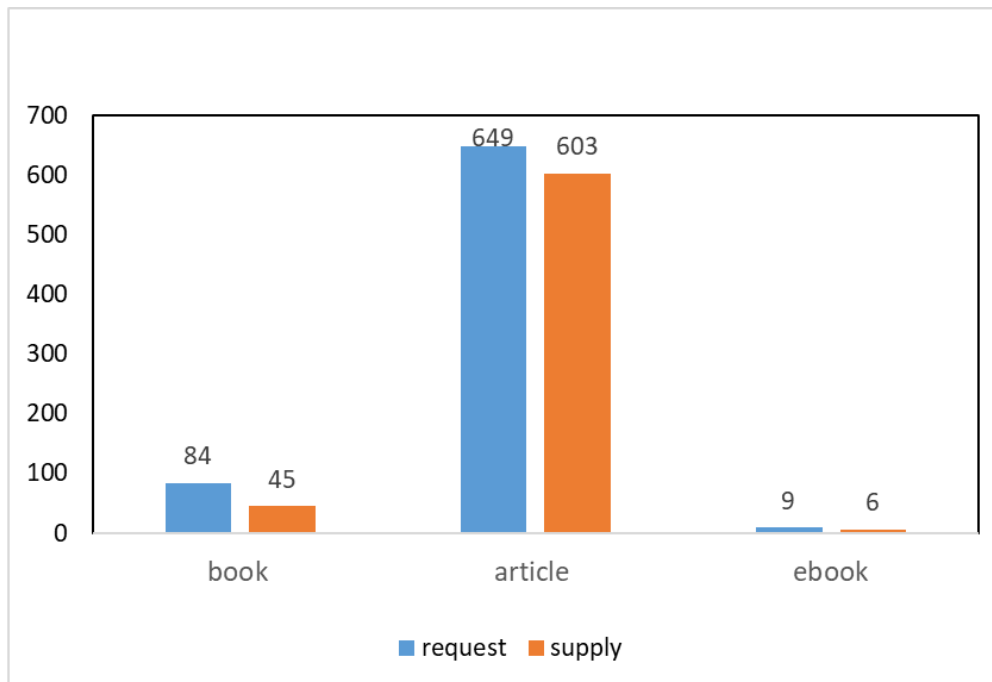


FIGURE 9. Total request and supply through RBAS for categories; book, article and ebook; March 2020 – June 2021.

### TURNAROUND TIME (TAT)

During the study period, most of the request completion fell within 24 hours (one day), 494 request (68.4%), the majority was from article request category, 460 (71.8%). This was followed by completion within two to three days 150 (20.8%). Completion which took more than 7 days was 44 (6%) as demonstrated in Figure 10.

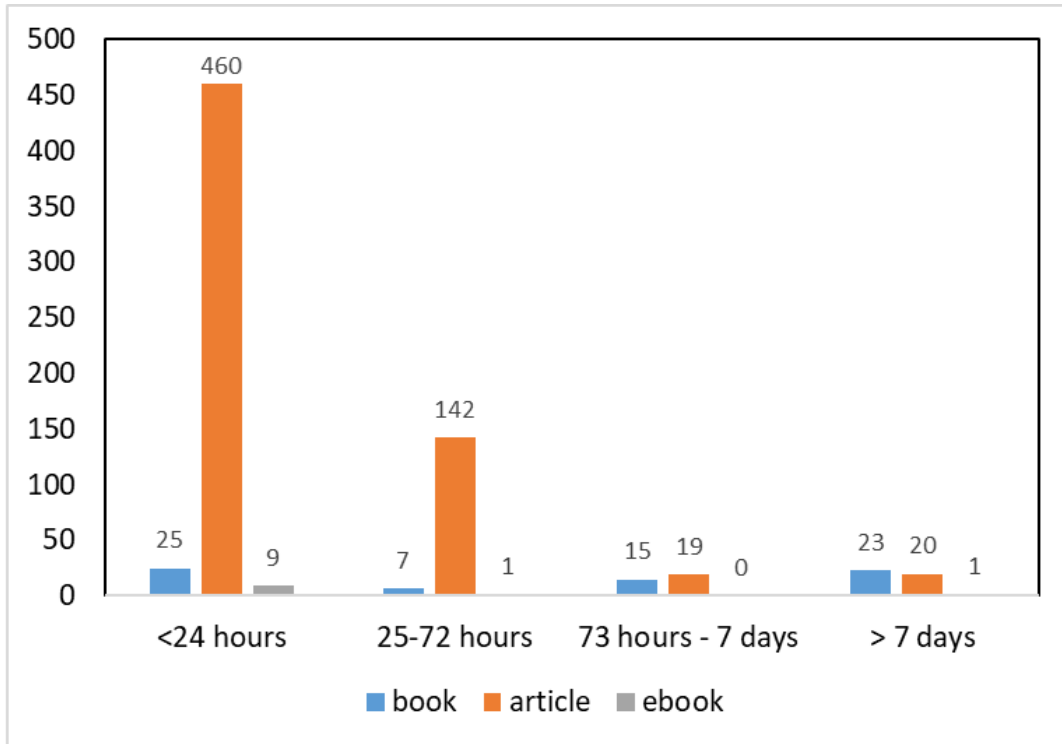


FIGURE 10. Turnaround time (TAT) or speed of completion of request for categories; book, article and ebook. TAT were categorized as; less 24 hours, up to three days, up to seven days and more than 7 days.

*RBAS USERS' FEEDBACK ON SERVICE QUALITY*

From 78 respondents, the majority remarked as very high quality (79%), followed by high (17%) and moderate (4%). None of the respondents answered as “poor” (Figure 11).

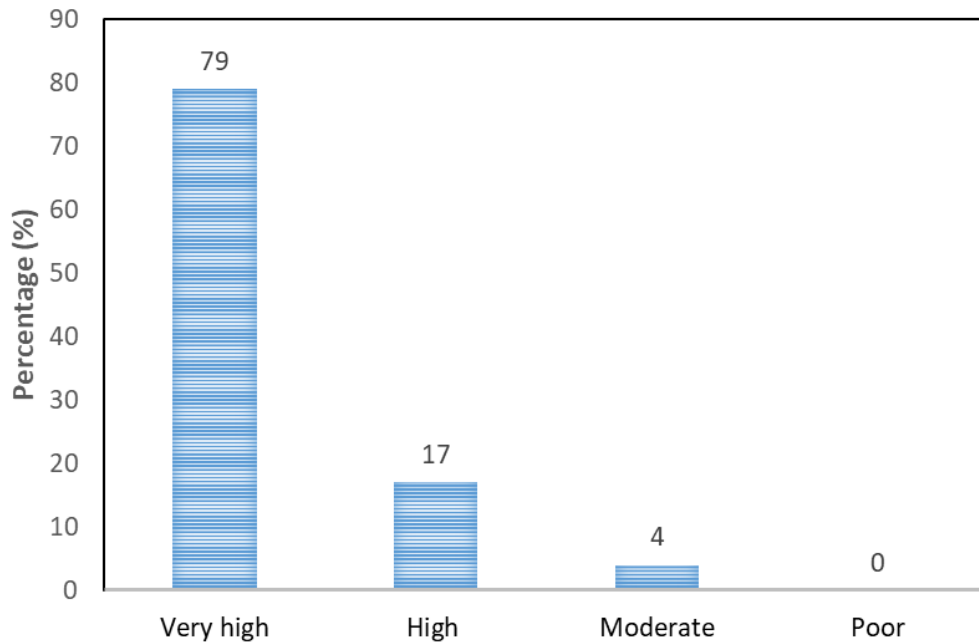


FIGURE 11. Survey results of users' feedback on RBAS service quality from March 2020 to June 2021 (N=78).

## DISCUSSION

The lean approach can be applied for continuous improvement of a library service. In this study, we applied Lean Sigma Six methodology to identify potentially problematic work processes in the existing ILL/DD service. RBAS development and implementation accomplished reduction of cost, staff workload and waste, thus increase the efficiency of the library service. This effort has facilitated information and knowledge management system in the library. RBAS allows both library users and staff to be equally engaged in the management of the service. It improved the mechanisms for users to track, manage and communicate their requests. Less steps were involved, with less time to execute a process, thus improved the TAT.

RBAS output include reports and statistics i.e. frequency of requests, category of users and status of request, in Excel file, and could be saved as a .PDF, complemented with interactive dashboard and ready for reports presentation. These features are valuable for organisational planning and improving the library collection, as well as in the management of library finance. Librarians can make an informed decision when planning for purchasing of books, serials, media or articles according to chart-topping borrowed or loaned items.

A homegrown system or also referred to as an “in-house” developed solution (Baig, 2020) is cost effective with the use of existing IT hardware and web-based software which requires no extra investment. Analysing the existing and available systems and resources, and innovating using a smarter methodologies and processes are also part of the developmental phase of RBAS. These are some of the principles and advantages of lean management.

As RBAS is homegrown, it does not require an external system administrator to maintain, thus lowers the start-up cost by using existing resources as opposed to outsourcing (Haider et al., 2016). A homegrown application system has the flexibility in tailoring the features to fit the users’ demand and library functions. RBAS is quick to set up and takes less time to deploy. As a web-based system, it does not require a special client-side software and can easily hook up with internet connection (Zibtek Resource, 2020).

In addition, the wide use of smartphones in the new digital world makes web-based platforms easily accessible (Digital Skynet, 2020). Library users can place their request, view their status and history through the system at anytime and anywhere. A web-based system is also convenient for the library staff to get access from any computer and workstation instead of having to be individually or locally installed. Workload can be shared, and monitoring process can be employed by multiple users at the same time, in real time.

It is critical that a hardware have to be current, robust, fast, and sturdy (Sturr and Parry, 2010). Ideally, equipment should be replaced every three years and absolutely within five years (Ferrell, 2003). The secure planning and deployment of Active Directory Federation Services (ADFS) and Web Application Proxy employed in RBAS enhanced the system security. Active Directory Federation Service (ADFS) is a software component developed by Microsoft to provide single sign-on login as authorised users on Windows Server Operating Systems. Web-based application ensures that all data is stored on software developers’ servers. Additionally, data is centralised and accessible over the web from any computer at any time and protected from data loss with the advantage of data backup (Digital Skynet, 2020).

RBAS introduction at our library showed a high request rate, with the majority of request was for journal articles. This is expected as most of our library users are mainly academic faculty members, scientists and researchers, and staff that manage clinical patients. In this circumstances speed of getting the items requested and high percentage of filled/supplied items are critical requirements of the users (Chamberlain, 2003). Percentage of ‘supply’ over ‘unsupply’ was also remarkable for all categories especially for article and ebook as these electronic media are easier to be sourced and readily available.

Users’ feedback on the quality of the service is an important milestone to assure its continuous and successful implementation. RBAS was ranked very high based on the feedback



of library users. Most of the users agreed the service is of “very high quality”. We can infer that this is due to the primary focus of RBAS is customer satisfaction. This is a system that is conveniently accessible whereby patrons can monitor status and look at history of request and feel connected via the communication features.

The TAT or speed of completion largely falls within less than 24 hours. The emerging standard for the TAT is within 48 hours of placing a request (Sturr and Parry, 2010). This is based on how quickly the user could have the access to the material from the time of request (Sturr and Parry, 2010). In this case study, TAT for filled or supplied items that fell within 24 hours was at 68.4%. TAT exceeding 24 hours could be attributed to delayed request completion of items which are not owned by the host library. To target 80% or above, the libraries which provide ILL/DD service must promote inter library collaboration and advocate for a central catalogue database. Through a central repository system, resources can be shared to reduce costs, there could be increased time effectiveness by eliminating duplicative work process and improved overall efficiency. Efforts toward centralisation of a federal library catalogue have been established in major libraries abroad such as EUCAT in Netherlands (Gatenby, 2003) and National Archives of Germany (Imhof, 2008). With improved collaboration and networking, academic libraries in Malaysia could have more accessibility of online documents and therefore opens up more avenues for inter library initiatives.

## CONCLUSION

A lean approach was applied to identify the inefficient ILL/DD work processes and causes of performance delay to improve the current service. A problem solution was constructed by developing RBAS to automate and streamline the service. Key indicators were used to measure and monitor the new implementation. Through RBAS, we were able to process a high number of requests with high satisfaction rate among the users. For small libraries with limited operational budget, RBAS is a cost-effective option that requires just a one-time investment. We encourage other academic libraries to explore technology-based advances, especially homegrown application development. Future direction in this area is to gear towards efficient global resource sharing by integrating multiple ILL/DD systems and multi-Online Public Access Catalogue (OPAC) search tools. A consortium of academic libraries collaborating in this area is the way forward.

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