

# University of Santo Tomas Faculty of Medicine Document Management System (MDMS)

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**Abstract**— With the existence of vast amount of documents in the organization, a handy functional system is needed to insure a seamless management of these data. Document Management System will be very useful in order to manage their documents productively. The researchers used an agile approach in the software development to accommodate this particular client's need. The primary focus of the study is to develop a system that will minimize paper usage and quickly generate reports that can be used for critical decision making. This research also aims to manage smoothly the documents going in and out of the Dean's Office of the University of Santo Tomas Faculty of Medicine and Surgery. To prove that the system has provided the Faculty of Medicine and Surgery an efficient cross-unit communication within the faculty, the researchers had taken ample time sampling all the steps in the existing process and compare it to the cycle time in the proposed process. Based on comparison of the existing and the proposed systems, it shows that there is a 33% increase in efficiency. Taking this into account, this will be a great enhancement in the current process.

**Keywords**—Document Management System, Agile, Communication.

## I. INTRODUCTION

A document may be in the form of written /printed or in a graphical form that contains information. It has been used by different businesses, governments, institutions, hospitals, and other organizations that need information in order for them to progress. Since the introduction of computer and other electronic technology, documents are now available in different formats such as text, image, videos, and recordings.

An example of an organization that relies on document information are universities. In a year they could accumulate tons of files and this may lead to loss of document, difficulties in tracking and managing documents, and time consuming in searching specific file.

The client, the Faculty of Medicine and Surgery of the Pontifical and Royal University of Santo Tomas existed for 144 years already. They are said to be the Philippines' oldest medical school. Currently they are having problem managing the documents going in and out of their office since they process their documents manually via pen and paper. Having this kind of process has many flaws. Papers do have a tendency of being lost. Pile of papers eats a lot of space in the office, which will then affect the efficiency of the people working around it.

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One of the solutions that could aid their problems is the Document Management System (DMS). Document Management Systems (DMS), is the use of a computer system and software to store, manage and track electronic documents and electronic images of paper based information captured through the use of a document scanner.

## II. REVIEW OF RELATED LITERATURES

### A. Review of Related Literatures and Studies

Institutions greatly depend on documents since lots of files comes in and out of their organization. According to P.A. Emelia Akashah, R. Syamsul Rizal, Kamaruzaman Jusoff, and E. Christon[1], there are many issues in having the traditional document management. One of these is that papers may have the tendency of getting lost. Another issue is that these documents eat a lot space in the working area. This would then result to the organization getting another area for these documents. But as we remember, documents keep on coming inside the organization. It would be a nonstop adding of area for the storage of documents.

The solution in those problems would be implementing an electronic document management system (EDMS). According to Yatin (2015)[2], an electronic document management system is typically referring to a computerized system that facilitates the creation, capture, organization, storage, retrieval, manipulation and controlled circulation of documents in the electronic format. This system will help the organization retrieve their files easily.

Having an Electronic Document Management System has many advantages. In the current generation, most organizations implement a paperless system. An example of an organization that converts from traditional document management system to electronic document management system is the University of Miami. According to Hodder, V. (2011)[3], an estimated \$50,000 of water damage to the records of the University of Miami has been caused by the hurricane. He stated that this lead the organization to find a way to improve their system and to create a backup of all their records. The solution they came up with is to implement an electronic document management system. Now then no longer have to avail a 400 square feet of space just for them to store all the document they have collected. Like what was stated by P.A. Emalia Akashah[1] that in the traditional document management system, the organization experiences difficulties in tracking and searching for specific files, but when the University of Miami have implemented the electronic document management system, searching and

tracking became easy because they no longer have to search row after row of vertical and horizontal cabinets for a specific file.

According to one article that we have gathered ([www.computerweekly.com](http://www.computerweekly.com))[4], Price Waterhouse conducted a study that differentiates the efficiency of having a traditional and an electronic system. It took them 67 hours to find 15 documents. The same search, using document management technology, found 20 documents in 4.5 seconds".

According to the article of AIIM [5], Document management is a developed technology prior to the content management. This kind of managements imposes controls and management capabilities to documents.

### B. Review of Related Systems and Technologies

One existing system that is related to the proposed system is the Microsoft Sharepoint. According to Sy [6], Microsoft SharePoint is a business collaboration platform for the enterprise and the web. It allows individuals in an organization to easily create and manage their own collaborative web site. Junk (2013)[7], also stated that with SharePoint, business will be given a shared space for them to store their documents so that anyone that has access to the system can easily get all the files they need to do their task.

According to the site of mayan-edms.com [8], documents can be sorted and be easily searched by just typing in a string of text. This function of the system is a huge impact on time saving. As stated above about the study undertaken by Price Waterhouse, that it takes personnel of an organization to search for several days just for them to gather 15 specific documents from 10,000 files. With this tracking system, document can be made available at any given time.

One document management system that is used by business is the PinPoint document management system. According to Brooks (2015) [9], a Business News Daily Senior Writer, what makes PinPoint appealing to its clients is that PinPoint offers a cloud-based solution for its customers that prefers not to host the system on their own server. Because of this the business will no longer have the difficulties in maintaining, installing, and upgrading their server and system.

Another factor why PinPoint is used by many businesses is that it is easy to use. The system has a very clean interface that allows its users to navigate the system easily. Lastly, PinPoint has the capability to conduct optical character recognition (OCR).

According to Brooks (2015) [10], there is an existing document management system named BlueDoc wherein the users the system has the capability of adding new categories of documents and assigning additional information for some purposed. Another existing similar system is the Doccept. This system has an audit trail and a function were notifications will appear once tasks are completed

### III. METHODOLOGY

The agile approach is a software development approach based on values, principles, and core practices. The four values that a system analyst should have are communication, simplicity, feedback, and courage. The agile approach provides a clear understanding of the client's vision since this approach has a

high degree of collaboration with the client. This methodology requires the developers to provide updates to the client in order to revise any errors early and to add some features if there are any. This approach has a better quality assurance since the client can clearly see the progress of the system along with the developers.

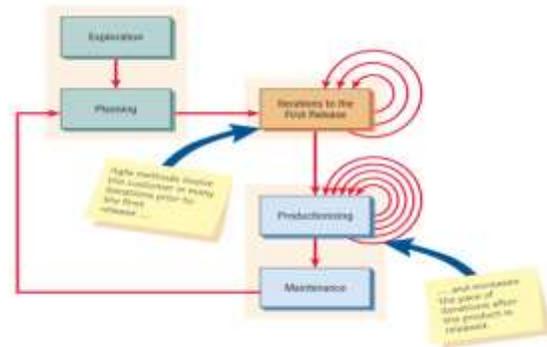


Fig. 1 Stages of agile modelling development process

In the exploration phase, the proponents will conduct an interview on a potential client to gather information about the business' processes and background to know in which particular process does the client is having a problem. After having the problem identified, the proponent's will gather data that can be used in the second phase, the planning phase.

The second phase is where the proponents must come up with a solution. In this phase, the proponents made use of the data gathered from the exploration stage to know the client's needs and in developing system's requirements that will give solutions to the client's problems.

Knowing the system's requirements and solutions to the client's problem, the third phase is the iteration of the first release where the proponents must have already have an initial prototype of the system. The initial prototype will undergo evaluation by the client, where the client should test and have a feedback whether the prototype system is going to help client or not. The comments and reactions provided by the users will be used to analyze and redesign until the desired system is attained. After attaining the desired system, the proponents will be moving in the productionizing phase.

In the productionizing phase, the fully functional system will be implemented in the client.

In the maintenance phase, the proponents will ensure that the system implemented is updated by adding new features and making sure that the system is still running smoothly.

### IV. DISCUSSION

Currently our client, University of Santo Tomas Faculty of Medicine and Surgery, is experiencing difficulties in managing their documents especially the Main Office of the faculty. The Faculty of Medicine and Surgery has twenty-four (24) departments and the Main Office often distribute and gather documents to and from each department. Collecting and distributing documents from all these departments is difficulty manage and track the compliance of each Department Chair and/or Faculty Members.

The proponents have suggested to create a web application exclusively for the Faculty of Medicine and Surgery that will help them organize and manage the document coming in and out of the main office. The said proposed system will not only manage the document but will also;

- minimize the paper consumption of the Faculty of Medicine since the Faculty Members will on upload and send their documents online,
- efficient communication to and from the different department of the Faculty of Medicine,
- monitoring the compliance and the timely submission of document to either the Department Chair or the Main Office,
- providing a central repository where all documents will be stored,
- and to provide a report to be used for decision making of the office.

With all this solution that the proponents came up to, will provide answers with the current problem of the Faculty of Medicine.

**A. Existing Business Process**

One of the main business process that the client would like to tackle is the sending memo to the different units of the Faculty of Medicine. The process of distributing memo to the different department (figure 2) are:

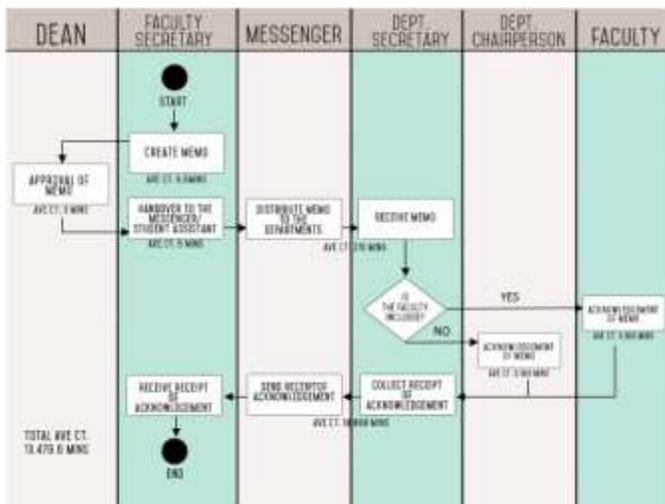


Fig. 2 Process map of existing process of memo distribution

- 1) The Faculty Secretary or Dean will create a memo. If the Faculty Secretary is the one who will create the memo, the Dean must affix his signature after reviewing the memo. Then he will give it to the office staff for distribution.
- 2) The office staff will give the memo to the student assistant to distribute the memo to the secretary of the department who will receive the memo.
- 3) The Department Secretary will receive the memo. He/she will then forward it to the Department Chairperson for acknowledgement.

- 4) The Department Chairperson will give back the memo to the Department Secretary together with the memo and the receipt of acknowledgment.
- 5) The student assistant or messenger who delivered the entire memo to each department will submit the tracer or receipt of acknowledgement to the Faculty Secretary.

Another business process is the submission of documents to the Main Office of Faculty of Medicine and Surgery as shown in Figure 3.

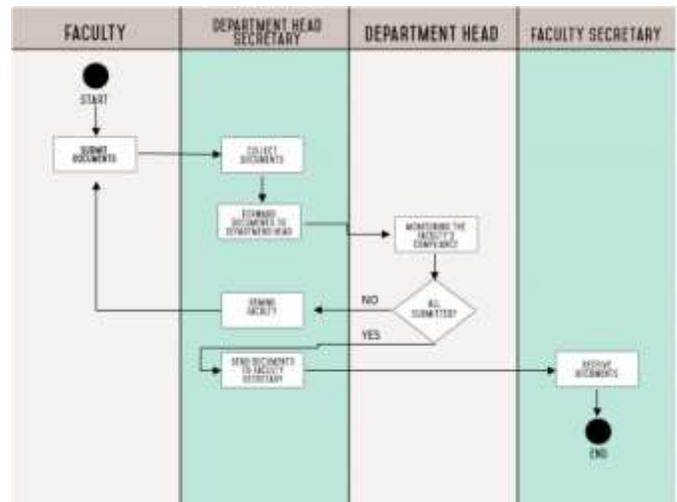


Fig. 3 Process map of existing process of document submission

- 1) If the Dean’s Office asked for documents from the faculty members stating the deadline to comply with the task is given.
- 2) The faculty members will submit their documents to their corresponding Department Heads and the
- 3) Department Secretary will collect all documents submitted by each faculty members.
- 4) If the documents are not completed on deadline, the department secretary will follow up the faculty members who have not yet submitted their task.
- 5) After collecting all the documents, the secretary will then send the documents to the Dean’s Office and will
- 6) Sign a tracer form that will be a proof that the department have submitted their required task.

**B. Proposed Business Process**

In the proposed business process of distribution of memo (shown in figure 4), the process will start at the:

- 1) Creation of memo.
- 2) If the faculty secretary is the one who create the memo, the faculty secretary will ask the approval of the dean.
- 3) After the approval of the Dean, the Faculty Secretary will send the memo through the use of the system to the addressee of the memo.
- 4) The recipient of the memo will then have to tick a checkbox that will validate the receipt of memo.

- 5) A summary or list of the recipient of the memo will then be gather by the system and generate a report for the Faculty Secretary's perusal.

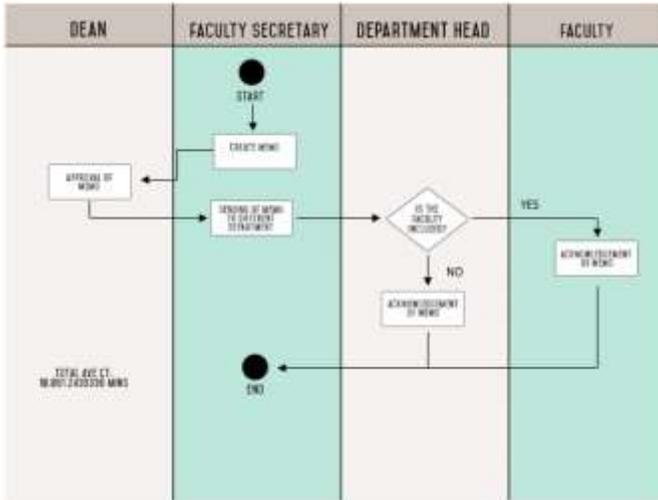


Fig. 4 Process map of proposed process of memo distribution

The proposed business process of outgoing documents (shown in figure 5), the process will start at the:

- 1) The faculty members will have to upload the required document using the system.
- 2) After uploading and inputting the right category and details of the documents, they will send it to their respected Department Chairperson.
- 3) The Chairperson will then be receiving all the documents that will be store in a central repository that will be shared to the Faculty Secretary.
- 4) If ever the faculty have not yet submitted the document at the date of the deadline. An automated notification will pop up to the specific faculty member to remind him/her that he/she have not yet accomplished his/her task.
- 5) A generated report will be created for every time the Dean, Faculty Secretary, and Department Head send task to the faculty members.

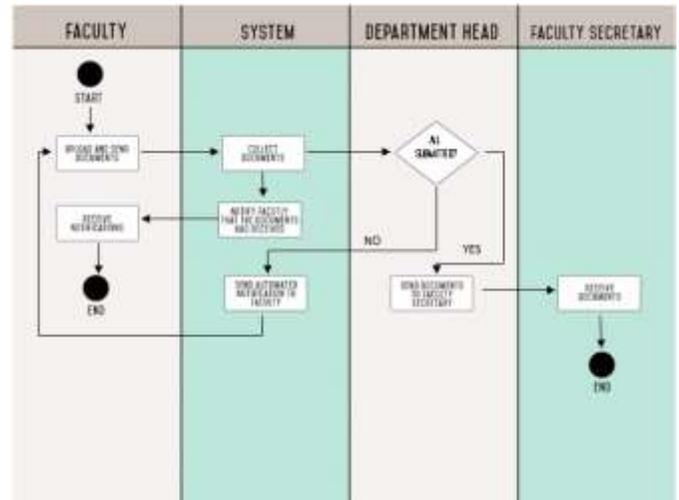


Fig. 5 Process map of proposed process of submission of documents

### C. Comparison of the Existing and Proposed Business Process

Comparing the existing and proposed business process, the proposed business process is faster than the existing business process in a way that it eliminated an actor and certain processes.

The proposed business process has eliminated some actors and one of this actor is the messenger. This messenger is the one who distributes the memos from the main office to the different departments. In the proposed business process, the messenger is no longer needed since the system will be the one to distribute these memos online. Another actor that will be eliminated is the department head secretary. The secretary will no longer receive and collect the documents since all documents will be stored and can be viewed by the recipient/user within the system.

Certain processes are eliminated in the existing business process. One of these is the manual distribution of memo. This process will be unnecessary because all business process will be done online. Similar with this are the printing of memos/documents, manual sending or delivering of memos/documents, and collecting the receipt of acknowledgement/compliance.

### D. User Interface of the Proposed System

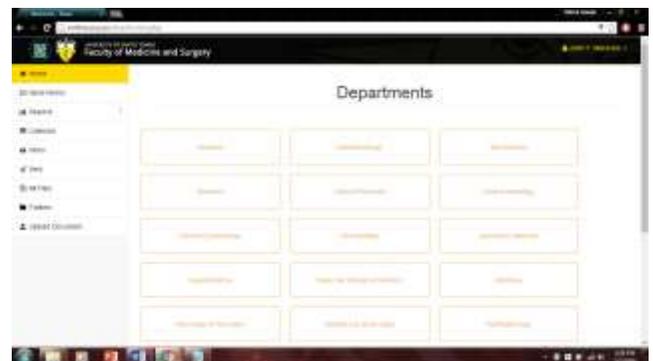


Fig. 6 Home page of Dean/Faculty Secretary account

The homepage contains all the departments that have an account in the system. The use of this is to sort all the documents that have been receive by the user. This home page is almost

similar to the Department Chairs except it has the name of his/her Faculty Members.

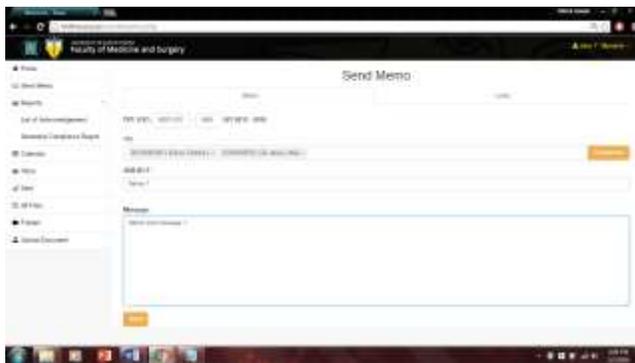


Fig. 7 Send memo page

This page is where the Dean, Faculty Secretary, and Department Chair can send their memo to the different users. One function of this page is to auto-generate the ISO-codes of each memo being sent to monitor the distribution.



Fig. 8 Semestral compliance report page

This page shows the generated report for the semestral compliance of each department or faculty member. Color legends (ex. Red – Have not complied, Green – Complied, etc.) are provided in this page.

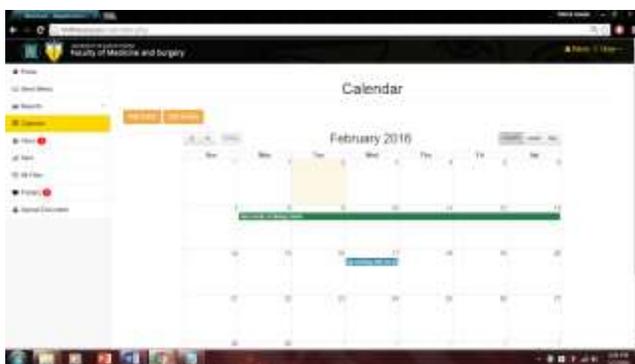


Fig. 9 Calendar page

The calendar page is an extra feature of the system. User may add events that may be departmental for everyone within the Faculty of Medicine could see or personal. This feature is added so the Faculty of Medicine can manage their schedules.

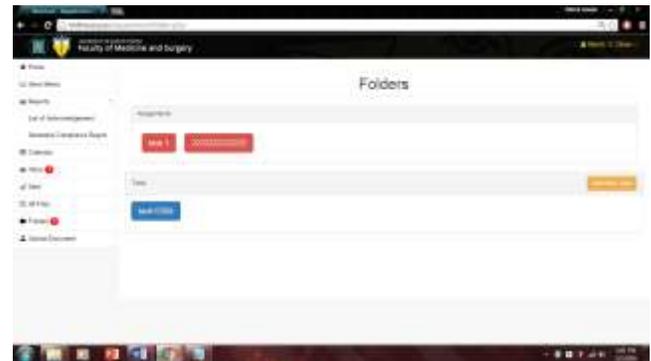


Fig. 10 Task and assignment page

This page will be used by the Dean, Faculty Secretary, and Department Chair to create task for their departments or faculty members. The assignment panel is where the user will upload their document to be submitted to the task manager.

## V. RESULTS

The developed system or the proposed business process satisfied all the user or client's requirements. Additional features were also functional.

Based from the tests conducted by the proponents and the users of the system, results show that all the modules are working with some minor bugs. However, these bugs are due to some error in the programming part, the proponents have fixed these errors.

There were five (5) users of the system namely the Dean, Faculty Secretary, Department Head, Faculty Members, and the Admin. Each user was given an account to test the system.

The proponents have conducted a user-acceptance test wherein the different types of users are present. The proponents have given each user an evaluation sheet for them to check if the functions for each user are working properly.

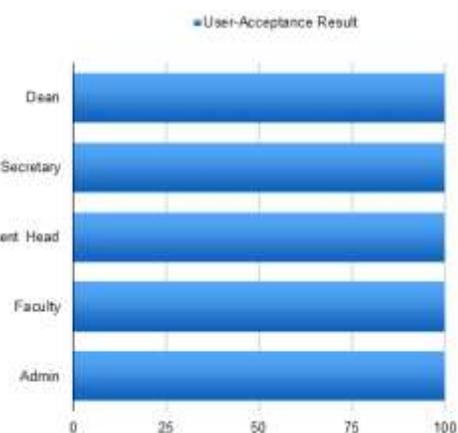


Fig. 11 User-acceptance result

### A. Business Process Improvements

The Faculty of Medicine and Surgery of the University of Santo Tomas will intend to change their process in handling documents with the use of the system. Handling of hardcopy

documents will lessen because of the system. The system will make most of the internal documents into paperless. Since the Dean, Faculty Secretary, Department Head, and the Faculty members have their own accounts, giving of task will be done through the system. Communication between the people inside the Faculty will be easier especially for the main office of the Faculty of Medicine and Surgery.

The Dean and Faculty Secretary will no longer have to ask for a messenger to pass every memo to all the 24 department of the Faculty of Medicine and Surgery. Tracer of acknowledgement will also be disregarded since the system automatically creates its own list for every memo or letter sent. It is also the same for the compliance of task given. The faculty members who were given a tasks will no longer have to pass a physical copy of the files, what they just have to do is to upload the document in task tab using their account. With this process the Faculty of Medicine and Surgery will reduce the use of paper. Statistical reports are automatically created every time the user sent a task or memo. The basis of the created statistical report is in the number of memo sent or task sent and the number of acknowledgement or number of task complied. For example, a user which is a department head, received five (5) tasks from the Faculty Secretary and he/she only uploaded three (3) documents as his/her compliance. Then the system will generate a report that the compliance of the department head is only sixty percent (60%). This statistical report will be check by the Dean, Faculty Secretary, and Department Head in the end of every semester for decision making purposes. The decision making is primarily on budgeting of each department as said by the client of the proponents.

In determining the timely submission of documents by the different units of the Faculty of Medicine and Surgery the system has a reporting tool wherein the status of compliance in each faculty members are shown. The proponents made the status of compliance color coded for easier evaluation of the departments or faculty members.



Fig. 12 Compliance reporting tools 1



Fig. 13 Compliance reporting tools 2

To prove that the system has provided the Faculty of Medicine and Surgery an efficient communication to and from the different units of the faculty, the proponents took a time sampling of the steps in the existing process and compared it to the cycle time in the proposed process. The table below shows

the computation of average cycle time in the existing process and proposed.

TABLE I: AVERAGE CYCLE TIME OF THE EXISTING PROCESS FOR THE DISTRIBUTION OF MEMO

	Creation of memo (in minutes)	Approval of Dean (in minutes)	Handing over of memo to the messenger (in minutes)	Distribute memo to the different department (in minutes)	Acknowledging of the memo (in minutes)	Collection of receipt of acknowledged (in minutes)	Sending and Receiving of acknowledgment (in minutes)	Total Cycle Time (in minutes)
Sample 1	5	3	5	240	2,800	10,000		13,213
Sample 2	7	3	5	180	2,800	10,000		13,195
Sample 3	5	4	5	180	3,200	10,000		14,895
Sample 4	5	2	4	240	2,800	10,000		13,215
Sample 5	5	3	5	240	2,800	10,000		13,215
Average Cycle Time	5.8	3	5	216	3,168	10,000		13,479.8mins

TABLE III: AVERAGE CYCLE TIME OF THE PROPOSED PROCESS FOR THE DISTRIBUTION OF MEMO

	Creation of Memo (in minutes)	Sending of memo to different recipients (in minutes)	Acknowledgement of memo (in minutes)	Total Cycle Time (in minutes)
Sample 1	1.083333	0.166667	10,080	10,081.25
Sample 2	1.05	0.166667	10,080	10,081.216667
Sample 3	1.1	0.166667	10,080	10,081.266667
Sample 4	1.066667	0.166667	10,080	10,081.233334
Sample 5	1.083333	0.166667	10,080	10,081.25
Average Cycle Time	1.076667	0.166667	10,080	10,081.2433336

$$Efficiency\ of\ the\ Proposed\ Process = \frac{Existing - Proposed}{Proposed} \times 100\%$$

$$EPP = \frac{13,479.6\ mins - 10,081.24\ mins}{10,081.24\ mins} \times 100\%$$

$$Efficiency\ of\ the\ Proposed\ Process = 33.71\%$$

With the comparison done by the proponents, it shows that the time to create, deliver, and acknowledging of memo can be done just within the day. However, in the table for the proposed we made a one week due date for the acknowledgement of memo. That is also the reason why there is a constant value in both of the tables. The creation of memo in the proposed is much faster because it will no longer be printed for each recipient. With the existing, it takes the Faculty of Medicine and Surgery almost a day in creating and delivering of memo and another one to two weeks in gathering the receipt of acknowledgment from all the recipients.

Another business process improvement the Faculty of Medicine will incur is the decrease in storage of documents. In the existing the Faculty of Medicine and Surgery uses cabinets and rooms allotted for document. This process is prone to misplacement of document and damaging of the physical copy. In the proposed process the documents uploaded in the system will be stored in a central repository which is the database of the system. The system is also capable of archiving to prevent loss of documents in case of system failure.

## VI. CONCLUSION

<http://www.seguetech.com/blog/2013/04/12/8-benefits-of-agile-software-development>

Like what a Document Management System should be, MDMS can store and manage documents. MDMS is able to make the process inside the Faculty of Medicine and Surgery more efficient.

Currently MDMS is up and running. Continuous maintenance should take place administered by the IT department. The proponents would like to recommend the future developers of the system to use Optical Character Reader (OCR). It is a technology wherein hardcopies or PDF files can be transformed into a text file. The OCR deciphers the characters in the scanned document which will then be used to create a digital copy. Another feature that the proponents would like to recommend is the electronic signature. It is best if the next developers could add this feature to make the business process of the Faculty of Medicine and Surgery become closer to a paperless system. If incase the electronic signature is to be included be advise the developers to create a more secure system. Security is one of the concerns of the proponent's client when it comes to electronic signature. Adding new type of reporting tools or statistical reports is also recommended to have a more accurate decision making in the user side of the system. Lastly, the proponents would also like to recommend the future developer of the system to include external document received by the Faculty of Medicine and Surgery in the Document Management System.

## REFERENCES

- [1] P.A. Emelia Akashah, R. Syamsul Rizal, Kamaruzaman Jusoff, and E. Christon (2011). Electronic Document Management System. [Online]. Available: [http://www.idosi.org/wasj/wasj12\(CA&KM\)/9.pdf](http://www.idosi.org/wasj/wasj12(CA&KM)/9.pdf) .
- [2] Yatin, S., Ramli, A., Shuhaimi, H., Hashim, H., Dollah, W., Zaini, M., & Kadir, M. (2015) Electronic Document Management System: Malaysian Experience . [Online]. Available: <http://www.ajbasweb.com/old/ajbas/2015/Special%2016%201PN%20KK/82-89.pdf>
- [3] Hodder, V. (2011). Increase Overall Efficiency with a Document Management System. EdTech Magazine. . [Online]. Available: <http://www.edtechmagazine.com/higher/article/2011/09/step-by-step>
- [4] Case Study: Document management systems. (n.d.). . [Online]. Available: <http://www.computerweekly.com/feature/Case-Study-Document-management-systems>
- [5] AIIM - What is Document Management? (n.d.). . [Online]. Available: <http://www.aiim.org/What-is-Document-Management>
- [6] Sy, D. (2009). What is sharepoint. . [Online]. Available: [https://www.bnlgovinterlab09/Presentations/What\\_is\\_SharePoint.pdf](https://www.bnlgovinterlab09/Presentations/What_is_SharePoint.pdf)
- [7] Junk, D. (2013, July 15). What is Microsoft SharePoint Used For? . [Online]. Available: <http://blog.apterainc.com/bid/316563/What-is-Microsoft-SharePoint-Used-For>
- [8] Mayan EDMS. (n.d.). . [Online]. Available: <http://mayan-edms.com/>
- [9] Brooks, C. (2015, June 3). PinPoint Review: Best Document Management for Business. . [Online]. Available: <http://www.businessnewsdaily.com/8027-best-document-management-software-overall.html>
- [10] Brooks, C. (2016, January 4). Best Document Management Software and Systems. [Online]. Available: <http://www.businessnewsdaily.com/8038-best-document-management-software.html>
- [11] Segue Technologies. (2015, August 25). 8 benefits of agile software development. . [Online]. Available: