BUSINESS PROCESS IMPROVEMENT OF REQUIREMENTS ANALYSIS USING UNIFIED MODELING LANGUAGE ON ENDEMIC DISEASES INFORMATION SYSTEMS

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ABSTRACT

In software engineering, requirements analysis encompasses those tasks that go into determining the needs to meet for a new or altered product, taking account of the possibly conflicting requirements of the various stakeholders, such as beneficiaries or users. In requirement analysis techniques there are three techniques to collecting and integrating the information. One of them is Business Process Improvement. Business Process Improvement (BPI) is a systematic approach to help any organization make significant changes in the way it does business. Using an Unified Modeling Language diagram to define the existing system is an essential first step to improvement that is often overlooked or addressed superficially. UML is a general-purpose modeling language that includes a graphical notation used to create an abstract model of a system. This project is an example of Business Process Improvement on Endemic Diseases Information System, which is implementing in Health Department. A manual reporting system will change into the new ones to improve efficiency and effectiveness. This new system must be actionable, measurable, testable, related to identified business needs or opportunities, and defined to a level of detail sufficient for system design.

Keywords: Software Engineering, Requirement analysis, Business Process Improvement, Unified Modeling Language, Health Department, Reporting System.

1 INTRODUCTION

Based on descriptive study that learn about recording and reporting system [7]. Recording and reporting system in Health Services is one of many activities in Health service which is burdening Health Service official cause of many reasons. The main obstacle is there are many kinds of recording and reporting without standard form. Mrs. Lestari suggests that we should change the system to improve efficiency and effectiveness in recording and reporting in Health Service.

From that research shows that Health Service official need almost 30% of day work to do 127 kinds of recording and 88 kinds of reporting. The process is beginning from political district. Local gvt. Clinic collects recapitulation data from districts, and then reports the data to Health Department.

To show how complicated the processes are, the process to get an endemic map needs three months. It cause by the system is knotty. Actually to make a better healthcare management system, government need to improve in many aspects. Such as: availability data and relevant healthcare information, accurate, and up to date. Healthcare information that needed by government are about spreading of diseases, quality of healthcare service, and availability of healthcare facilities. To support those aspects, kind of data that we need isn’t only line of numbers or graphics but also the spatial data in the reporting system.

In this paper, the activity to report endemic diseases from Local gvt. Clinic level until Health Department in Semarang will be modeled using Unified Modeling Language (UML). Afterwards we will implemented Geographical Information System to mapping Endemic Diseases into as-is system. So we can compare effectiveness and efficiency both of them. With the to-be system, it should improve the system in Health Center.

2 ANALYSIS

Business Process Improvement means making moderate changes to the way in which the organization operates to take advantage of new opportunities offered by technology or to copy what competitors are doing [9]. BPI can improve efficiency (i.e., doing things right) and improve effectiveness (i.e., doing the right things). BPI projects also spend time understanding the as-is system, but much less time than BPA projects, their
primary focus is on improving business processes, so time is spent on the as-is only to help with the improvement analyses and the to-be system requirement. Duration analysis, activity based costing, and information benchmarking is three popular BPI analyses [10].

The fact gathering associated with process improvement is a very volatile activity because it tends to create fears about job change and job loss. The skills and the integrity of the professional can go a long way toward reducing these anxieties and gaining cooperation. Skills enable the professional to collect critical, relevant data easily and assure that once collected it will not be lost. But, integrity is more important. It includes making sure that the focus of improvement treats people as a resource to be utilized and not an expense to be cut.

UML is a language which becomes standardization industry to visualize design and document of software. UML offers a standard system design [10]. Using UML, we can make application in many kinds of software model, where those can be worked as hardware, operation system of network and written in different language. The basic concept of UML uses class and operation. Moreover UML can be used to write software in language as an object.

The design gives a description about the real life, showed in diagram [4]. The advantage of this model is determining the object or factors which influence the incidence. So we could predict the responsibilities in an implemented model as a normal condition.

This paper will analyze the activity report in Health Department Semarang as study case.

a. Main Systems

The district of Semarang is 373.70 km² where divided into 16 sub districts and 177 political districts. They have 37 local gvt. clinics. Each clinics has an working area. One local gvt. clinic in charge of 2 to 11 political districts. It depends on the population. Some clinics have sub clinics. If clinic located in densely populated, it will be built sub clinic far away from main health service. But it still in the same working area. As an example: clinic Bangetayu, located in Bangetayu St. Genuk, and supervised 6 political districts where have densely populated. Therefore, it has two sub clinics in example: sub clinic Muktiharjo and sub clinic Gebangsari.

Each clinic has record and report systems by itself. In clinic, data record system of endemic diseases is crucial. The result is needed by Health Department to be analyzed, then will be a consideration to determine endemic location. Moreover, they will do the eradication of diseases or preventive action.

b. As-Is System

Data is recorded in data patient who examined in health service and kind of diseases. Generally, a patient chooses the nearest health service to examine his / herself. But, it is possible that patient may examine in further health service from his/her house to make a consideration of facilities or technical excuse. It makes the activities of data processing are more complicated.

Data patient is classified into working area. Grouping of data patient based on the patient lived. Data patient is gathered by clinic, then reported to Health Department every month. Shipping is done by fax or courier which takes half an hour to 2 hours. Figure 2 show the activity diagram in clinic:
The sender data from each Health Department is gathered by bagian umum and reported to subdn p2p. Each data will be grouped according to the disease. There are 16 diseases managed by subbag p2p, especially spread an epidemic disease. The examples are diarrhea, measles, diphtheria, Severe Acute Respiratory Syndrome, HIV-AIDS, and Avian Influenza. Those diseases will be recapitulated about 3 months, then will be analyzed and made map distribution. So it will be known the disease. The 3 months record result will be reported to the head of Health Departement which will be continued. Those result used to predict the endemic disease. So they will do the eradication of disease or other preventive action.

On that diagram, we can see in the recording and reporting activity system in Health Department. There are many points that can produce invalid data. First point is when healthcare center’s administrator recapitulates the data. The mistake that can happen is in the calculate data. Probability that kind of mistakes is quite high, they need to recapitulate data from 37 clinics.

The second point is data collecting process from 37 health services also taking a lot of time, because when there is one late health service will delay the data collecting process.

The third point is when administrator in Sub Department Disease Survey Center (DSC) recapitulates the data every three months. This point has the biggest fault percentage in the system, because the number of data collected is very large. The recapitulation is done manually, so the data is less valid and not efficient.

Complexity in that recording and reporting system can be seen in the usecase diagram below.
Looking for the goals is to know about diseases spreading pattern, the system will be optimal if we implemented Geographic Information System. Steps to implemented new information system to replace the as-is systems are:
- How an organization operates
- Changes operation with new techniques
- Can improve efficiency
- Can improve effectiveness

In below, activity diagram will be modeled reporting system from local gvt. Clinic to Health Department.

**c. To-Be System**

Based on many problems that have been showed before, if the recording and reporting system replace with a kind of information system, it will be increase the efficiency and the accuracy of that process. So we will model that activity that implemented information system.

Reporting system using GIS didn’t change the basic system. The basic pattern still follows on
figure 1. But we change manual reporting system with the new information system [3]. So recording and reporting activity will be done by GIS with higher efficiency and effectiveness than manual ones.

The process is as follows, data patient is recorded by local gvt. clinic administrator. After recorded, administrator should entering data into a system. With this system, we have eliminated the reporting task into health center. We didn’t need to recapitulate data in the end of month. To get a diseases pattern, DSC just need to open the sites and then print it to give the report for K.A. Health Department. The pattern will be a reference to do next task, for example: to prevent the spreading a disease.

In below, usecase diagram will describe about actors and usecases who involve the to-be system.
Figure 6 Sequence diagram As-Is System

In below, this sequence diagram describe about To-Be system. If we compare between two system using sequence diagram, To-Be system reduce the use of time. We can view diseases spreading pattern in one day.

After administrator in each clinic input data into GIS, the system will show the diseases spreading pattern.

In addition to reduce time, using GIS we also can reduce human resources. When we replace human resources with GIS, we can minimalist error in data processing. So we can get validity in data.

In table 1, we will show the advantages when we implementing the GIS into As-Is system. So we can conclude that using GIS in order to get a diseases spreading pattern will get a better system. In other hand we can say we have done Business Process Improvement.

Table 1 Compare for As-Is and To-Be System

<table>
<thead>
<tr>
<th>differences</th>
<th>As-Is System</th>
<th>To-Be System</th>
</tr>
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<tbody>
<tr>
<td>actor</td>
<td>need more actors to do this system</td>
<td>actors replace with the new system</td>
</tr>
<tr>
<td>time</td>
<td>one cycle can be done approximately 3 months</td>
<td>endemic diseases spreading pressures when data has been entered</td>
</tr>
<tr>
<td>effectiveness</td>
<td>the system isn't optimal</td>
<td>with the new system, recording and reporting task become easier</td>
</tr>
<tr>
<td>efficiency</td>
<td>waste many time to do recording and reporting task</td>
<td>reducing the use of time and actors</td>
</tr>
</tbody>
</table>

After we have done business process improvement, we can conclude that efficiency become increase when dependency each actor decreases. So with eliminate actors and replace with the system we can improve the efficiency.

4 CONCLUSION

Good people who understand parts of the process can get some value using high level charts for improvement. Some modify the method to incorporate genuine detail process symbols (or steps) to denote delay. This is a testimony to capable people who manage to be successful despite having inadequate or inferior tools. High level charts may provide enough structure to help an analysis team stay focused on the process and challenge the process blocks in sequence. HOWEVER, the team will have to dig into details to make good decisions about the process. Those same good people would do a better job, more easily with detail process charts. Detail charts may be intimidating at first glance. However, the chart is a reflection of the process. If the chart is complicated, the process is complicated. If it is a
challenge to understand complicated detail process charts.

**REFERENCE**


