THE DESIGN OF INTEROPERABILITY MEDICAL RECORD INFORMATION SYSTEM AS PART OF HOSPITAL ADDITIONAL SERVICE

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ABSTRACT

This study aims to design an interoperability medical record information system between hospitals in Bali and the police, the insurance party, and the health department about the exchanging information of visum et repertum, medical resume, hospital services indicator report, emergency visits report, and mouth and dental hygiene activity report. The hospital faces several problems including the process of exchanging information between hospital and outside party that need data related to medical record such as insurance party or police where almost in every hospital in Bali, has not been computerized yet. This research took case study at BRSUD Tabanan. The paper discusses the interoperability system designed using system development life cycle (SDLC) with waterfall approach. The purpose and benefits of designing this information system are the design of interoperability medical record information system as part of hospital additional service. With the development of interoperability of medical records into this information system, it can help the police, the insurance party, and the health department easier to get medical information from the hospital in Bali. The result of this study are the design of interoperability medical record information system with the police about exchanging information of visum et repertum, with the insurance party about exchanging information of medical resume, and with the health department about exchanging information of hospital services indicator report, emergency visits report, and mouth and dental hygiene activity report as part of hospital additional service.

Keywords: *Interoperability Medical Record, Health Insurance, Police, Health Department, SDLC*

INTRODUCTION

Interoperability can be interpreted as a system characteristic that has the ability to communicate and cooperate with other systems without any restrictions on information access [1]. The interoperability term usually used in information technology to define data exchange services and information between system having difference technically on both the operating system used, a programming language and technology database [2]. Interoperability system was needed to the process of increasing hospital care because it can ease the process of exchange of information between hospitals with the police, the health department and the insurance party. Interoperability service used to fasten process of shipping and acceptance of data patients. In this research, interoperability system used by police, health department and insurance party.

The process of exchanging information between the hospital with police, insurance party, and the health department, this moment in almost every hospital in Bali was only are recorded in the expedition without include identity detailed patients and identity of the applicant namely insurance or police, this caused data patients and the applicant medical information isn't completely noted. The exchange of information from the hospital to the insurance party or police at the moment is not computerized the insurance party or the police come to the hospital by bringing a demand, after that was given a receipt and then noted in the book the registration request, after that medical record searched and conducted according to patient identity, next medical records is borrowed in the medical records room and medical certificate is made, after it finished, and then

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the doctor signs and the medical record officer calls the insurance party or the police to take out the medical certificates at the hospital. Interoperability design information system in the hospital intended to ease exchange of information to insurance party, police, and the health department need information concerning certificates and medical reports from the hospital.

The interoperability medical record information system is using Structure Query Language (MySQL) database structure with Hyper Text Markup Language (HTML), Hypertext Preprocessor (PHP), Cascading Style Sheets (CSS), Bootstrap and JavaScript programming language. Medical record officers input the medical certificates data and the reports that needed by the health department in the system, and then the data is processed on the system and the data is protected by username and password before the outside party can access the medical record information. Only the police, the insurance party, and the health department who already have a username and password who can submit the request letter to the hospital. From this interoperability medical record, is expected to be a part in supplementary services, hospital in Bali especially on the discharge medical information.

METHODS

Conceptual Framework

Problem found in almost every hospital in Bali is in releasing medical information, those are the medical certificate data is not computerized yet, the service process need a long time because the officers are still have to come to the hospital to take out the finished medical certificate and the medicl certificate data proses pelayanan yang memerlukan waktu lama karena petugas masih harus datang ke rumah sakit untuk mengambil surat keterangan medis yang sudah selesai, dan is in the expedition is not detailed and systematic. In this research, the author is using system development life cycle (SDLC) with waterfall design to produce the web-design of interoperability medical record information system. Waterfall Approach [3] is used extensively in system development, the steps consisting of:

1. Requirement Gathering and analysis, collecting needs to complete and then analyzed and defined needs to be protected by programs to be built. This phase is to be able to get a complete result.
2. System Design, design that worked after the needs completely gather.
3. Implementation, program design is translated to codes using the right programming language. The program built directly tested both in a unit.
4. Integration and Testing, the union of program units then tested as a whole (system testing).
5. Deployment of system, is operates on its turf repairs and maintenance, like compliance or adapt to change because the whole situation.
6. Maintenance, is the maintenance system process that has been built.

In this system, input that needed is medical resume data are processed and summarized to be medical resume report, visum et repertum data are processed and summarized to be visum et repertum report, indicator of hospital services data are processed and summarized to be indicator of hospital services report, emergency visits data are processed and summarized to be emergency visits report, and mouth and dental hygiene activity data are processed and summarized to be mouth and dental hygiene activity report. After that, the result is a interoperability medical record information system that hoped to make the exchange of information can be faster, upgrading public service quality, resource efficiency and costs, and providing information is stored. The conceptual framework in this study can be seen in Figure 1.

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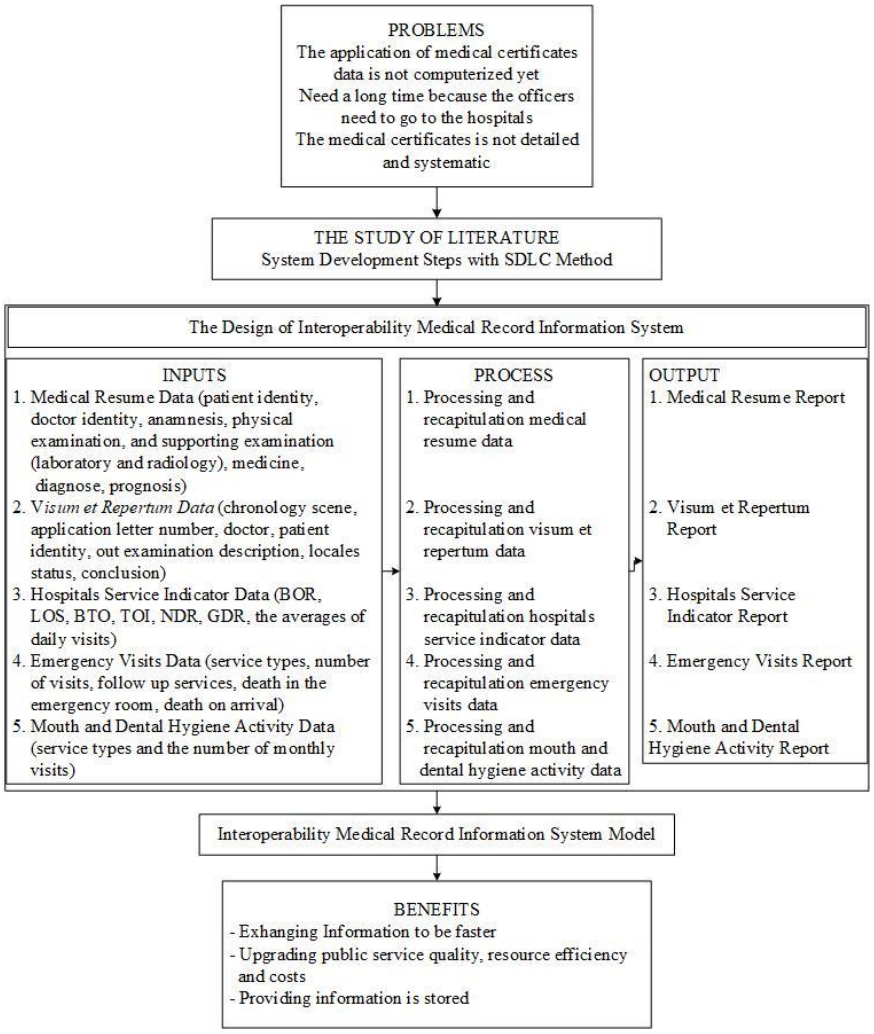

Figure 1. Conceptual Framework

Usability Instrument

Intruments to test usability aspects is using USE Questionnaire (*Usefulness, Satisfaction, Ease of use*). This test is a checklist table that is filled directly by users after using the design of interoperability medical record information system in the hospitals. The questionnaire is consisting of a number of questions that is divided into 4 those are *usefulness*, *ease of use*, *ease of learning*, and *satisfaction*. Likert Scale is used in this study. The choices of answer on the questionnaire are as follows:

1. Strongly Agree (SS) = is worth 5 points
2. Agree (S) = is worth 4 points
3. Hesitated (RG) = is worth 3 points
4. Disagree (TS) = is worth 2 points
5. Strongly Disgaree (SS) = is worth 1 point

After get the result in the form of calculation the percentage the score is compared with the criteria for interpretation of the score are:

1. 0% - 20% = Inadequate / Low
2. 21% - 40% = Less / Low
3. 41% - 60% = Enough
4. 61% - 80% = Good / High
5. 81% - 100% = Very Good / High

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Usability aspects said to be better if the result shows a high percentage[4]. USE Questionnaire has 30 questions. Instrument table of USE Questionnaire can be seen on Table 1.

Table 1. Use Questionnaire

No	Instrument	STS	TS	RG	S	SS
Usefulness						
1.	It helps me be more effective					
2.	It helps me be more productive					
3.	It is useful					
4.	It gives me more control over the activities in my life					
5.	It makes the things I want to accomplish easier to get done					
6.	It saves my time when I use it					
7.	It meets my needs					
8.	It does everything I would expect it to do					
Easy of Use						
9.	It is easy to use					
10.	It is simple to use					
11.	It is user friendly					
12.	It requires the fewest steps possible to accomplish what I want to do with it					
13.	It is flexible					
14.	Using it is effortless					
15.	I can use it without written instructions					
16.	I don't notice any inconsistencies as I use it					
17.	Both occasional and regular users would like it					
18.	I can recover from mistakes quickly and easily					
19.	I can use it successfully every time					
Easy of Learning						
20.	I learned to use it quickly					
21.	I easily remember how to use it					
22.	It is easy to learn to use it					
23.	I quickly became skillful with it					
Satisfaction						
24.	I am satisfied with it					
25.	I would recommend it to a friend					
26.	It is fun to use					
27.	It works the way I want it to work					
28.	It is wonderful					
29.	I feel I need to have it					
30.	It is pleasant to use					

FINDINGS AND DISCUSSIONS

According to the methods that is used, that is using System Development Life Cycle (SDLC), the result is the design of interoperability medical record information system by put the system to be ready to operate by the users. Login page view in this system in a figure 2 and display the main menu in Figure 3.

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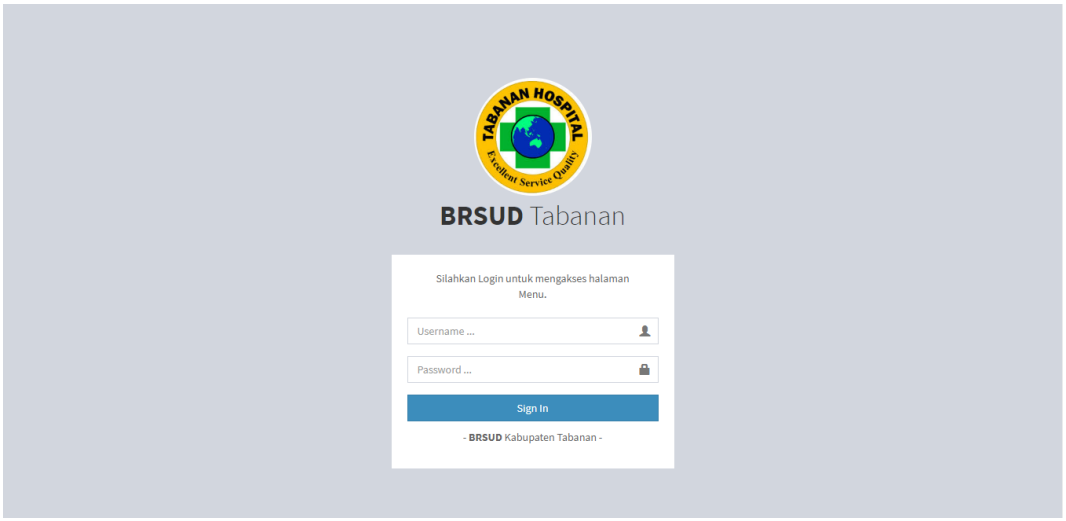

Figure 2. Login Page View

Figure 3. Home Page View

Then the author does the black box testing [5] to know the functions, inputs, and outputs from the software is compatible to the specifications required. In this study, the login page, user home page, admin home page, application letter page, application letter verifying page, visum et repertum page, medical resume page, hospital services indicator page, emergency visits page, and mouth and dental hygiene activity page are tested as a whole in accordance with the results desired by the author.

CONCLUSION

The result of this study are the design of interoperability medical record information system with the police about exchanging information of visum et repertum, with the insurance party about exchanging information of medical resume, and with the health department about exchanging information of hospital services indicator report, emergency visits report, and mouth and dental hygiene activity report as part of hospital additional service.

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