

SIPRO MEDICAL RECORD AS EXCHANGE PROJECT PILOT DATA MEDICAL RECORD (INTEROPERABILITY) HOSPITAL IN BALI

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ABSTRACT

This research was conducted as a pilot project in providing an integrated and standardized medical record interoperability system that can be applied by hospitals in Bali under the name Interoperability Information System (SIPRO). During this time the process of requesting data from outside parties such as the police, insurance, and health services to the Hospital in Bali related documents relating to the patient's medical record (interoperability) has not been integrated between the hospital system with those outside the hospital. The service of exchanging information with data collection and recording is currently still carried out with expedition books. The medical record information exchange reporting system is still manually recapitulated by officers. The system development analysis method used is the development of Systems Development Life Cycle (SDLC) with the Perl Hypertext Preprocessor (PHP) programming language, Hyper Text Markup Language (HTML), Cascading Style Sheet (CSS) and using a database based on Structure Query Language (MySQL). The results of this study are a prototype application (SIPRO) that can assist the police in the process of requesting and taking visum et repertum, insurers in the process of requesting and taking medical certificates, and the health department in the process of requesting and taking medical resumes, and successfully assisting the head of the medical record in the process of accurately reporting services to support decision making with user test (usability) Based on the USE Questionnaire method at the Mangusada Regional Hospital, Badung Regency, Bali Province as a research partner with good results (79.77%).

Keywords: *Interoperability of Medical Records, Visum et Repertum, Medical Certificate, Medical Resumes, RSD Mangusada*

INTRODUCTION

Interoperability is the ability of two or more systems or components to exchange information and use information that has been questioned with common standards that have been agreed together ^[1]. Fulfillment of interoperability will support the creation of a longitudinal Electronic Health Record (EHR), which provides long-term and fulfills all health services that have been received by each patient ^[2]. In hospitals, interoperability of medical records occurs when medical records are needed by several parties, namely the Police, Insurance, and Health Services. Based on the data recapitulation of medical record information transfer in October to December 2018 at the Mangusada Regional Hospital in Badung Regency covering 25 flights of medical record information between hospitals and the Police, and 76 records of medical records information between hospitals with insurance. Based on the results of an interview with the Head of Reporting Affairs at the Mangusada Regional Hospital in Badung Regency, agreement on the medical record information between the hospital and the Health Service does not require data that can be recapitulated.

During this time, the recording of recapitulation data has not been computerized and still uses expedition books, so officers must recapitulate when making monthly reports. The medical record information exchange service has not been integrated between the Hospital and the Police, Insurance, and Health Services which has resulted in the ineffectual exchange of medical record information services because the Police, Insurance and Health Services must come to the Hospital to submit an

application letter and come back if the required documents have been processed. With the Medical Record Interoperability Information System (SIPRO), it can become a pilot project design project that can help the medical record information exchange service be carried out effectively so that the Police, Insurance and Health Services can send an application letter and take *Visum et Repertum*, Medical Certificate, and Medical Resume without coming to the hospital first.

SIPRO was built using the Perl Hypertext Preprocessor (PHP) programming language, Hyper Text Markup Language (HTML), Cascading Style Sheets (CSS), JavaScript, and using a database based on Structure Query Language (MySQL). In this system, the police, insurance, and health offices will process the data for the application letter, the doctor will process the data entry *visum et repertum*, medical certificate, and medical resume, and the head of the medical record will process the monthly report input. Data processed is *visum et repertum* data, medical certificate, medical resume, and monthly report on medical record information exchange so that it can produce output in the form of *visum et repertum* that can be received by the police, medical certificate that can be accepted by insurance, medical resumes that can be accepted by the health department, and monthly reports on the exchange of medical record information that can be received by the head of the medical record. It is expected that the authors can create a design that can simplify the process of exchanging medical record information services using the interoperability information system (SIPRO) medical record.

METHODS

System development analysis method used is the development of Systems Development Life Cycle (SDLC) system with the method used is the waterfall method. The stages in the waterfall method are analysis, design, implementation, testing, maintenance ^[3], which are elaborated as follows:

- 1) Analysis
System services, constraints, and goals are determined by the results of consultations with users who are then defined in detail and function as system specifications.
- 2) Design
System design stages allocate system requirements both hardware and software by forming the overall system architecture. Software design involves identifying and describing the basic system abstraction of the software and its relationships.
- 3) Implementation
At this stage, software design is realized as a series of programs or program units. Testing involves verifying that each unit meets its specifications.
- 4) Testing
The individual units of the program or program are combined and tested as a complete system to ascertain whether it matches the software requirements or not. After testing, the software can be sent to the customer
- 5) Maintenance
Usually (although not always), this stage is the longest stage. The system is installed and used significantly. Maintenance involves correcting errors that were not found in the previous stages, increasing the implementation of the system unit, and improving system services as new requirements ^[4]

CONCEPTUAL FRAMEWORK

The problem found in the process of exchanging medical record information is that the process of exchanging medical record information requires a lot of time from the application process to document collection and recording and recapitulation of data that has not been computerized and still uses expedition books. In this study, the authors use the stages of system development with the Systems Development Life Cycle (SDLC) method with the method used is the waterfall method to produce an interoperability information system (SIPRO) medical record.

In this system, the input data is patient data visum et repertum which is further processed so that it can produce output in the form of visum et repertum, patient data medical certificate which is further processed so as to produce output in the form of medical certificate, patient resume medical data which is further processed so that it can produce output in the form of medical resumes, report data which is further processed so as to produce output in the form of monthly reports on the exchange of medical record information. After that the medical record interoperability information system (SIPRO) will be produced which is expected to facilitate the process of exchanging medical record information between the hospital with the police, insurance and health services, increasing the effectiveness of the performance of employees working in the medical record information exchange section, and making it easier the process of reporting medical information exchange. The conceptual framework in this study can be seen in Figure 1.

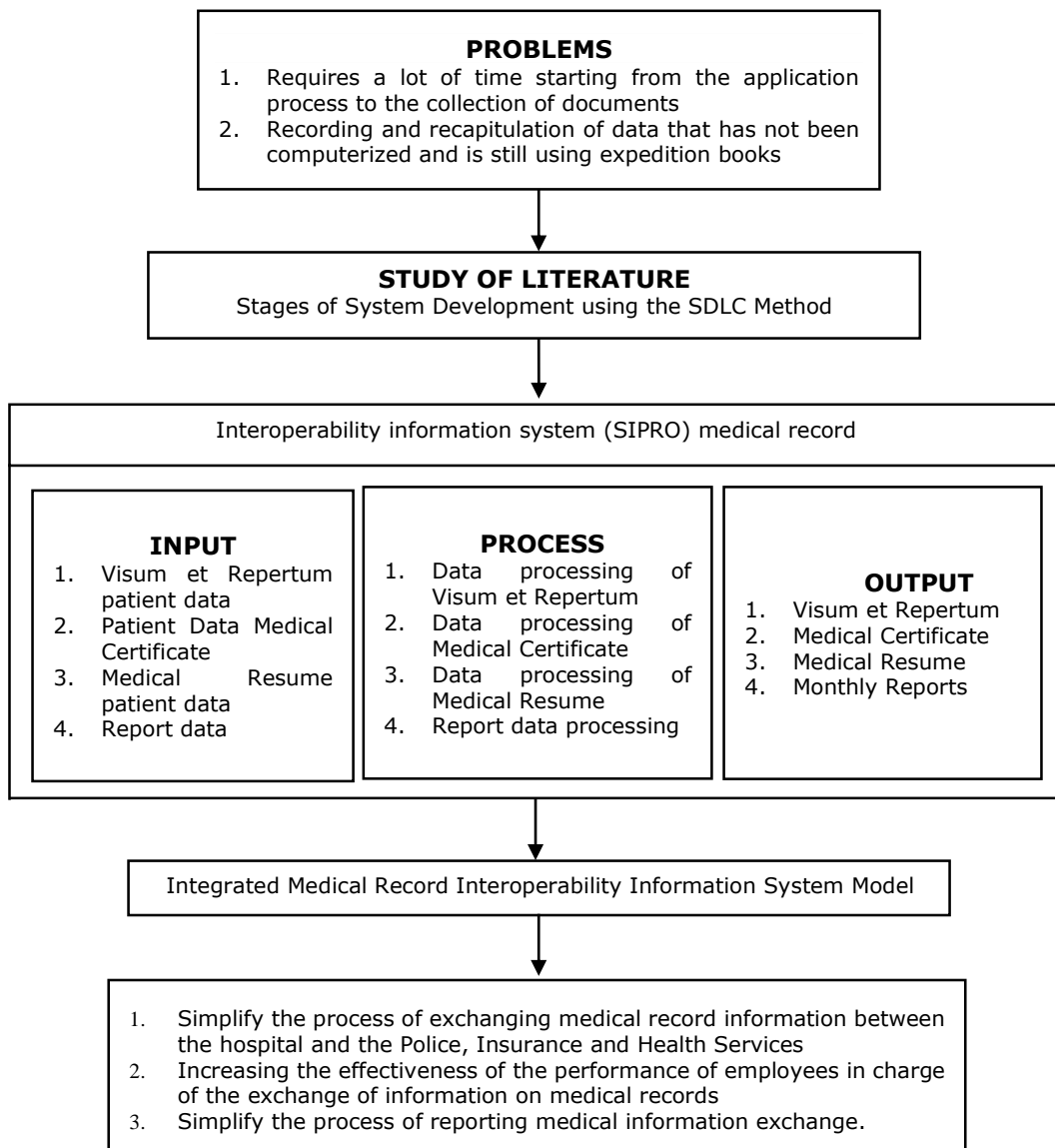


Figure 1 Coceptual Framework

USABILITY INSTRUMENT

The instrument for testing usability aspects uses the Usefulness, Satisfaction, Ease (USE) Questionnaire questionnaire. This test is a checklist table that is filled out by the user after using the medical record interoperability information system (SIPRO) using a positive statement likert interval scale. The likert scale of the positive statement can be seen in table 1.

Table 1 Positive Statement Likert Scale Intervals

Alternative Answers	Value
Strongly Disagree	1
Disagree	2
Hesitation	3
Agree	4
Strongly Agree	5

With the calculation method:

$$\text{Percentage of Eligibility (\%)} = \frac{\text{Observation score}}{\text{Expected score}} \times 100\%$$

After obtaining the percentage results from the previous calculation, then the data are compared with the criteria for interpretation of scores [5]. Criteria for interpretation of scores can be seen in table 2.

Table 2 Guidelines for Interpretation of Score After Convert

Number (In %)	Classification
0-20	Very Bad
21-40	Not Good
41-60	Enough
61-80	Good
81-100	Very Good

The USE Questionnaire consists of 30 questions that are divided into 4 namely usefulness, ease of use, ease of learning, and satisfaction. The USE Questionnaire can be seen in table 3.

Table 3 USE Questionnaire

No	Instrument	SD	D	N	A	SA
Usefulness						
1.	This application helps me be more effective					
2.	This application helps me be more productive					
3.	This application is useful					
4.	This application gives me a big impact on the tasks that I do in my life					
5.	This application makes it easy for me to achieve the things I want					
6.	This application saves time when I use it					
7.	This application suits my needs					
8.	This application works according to what I expect					
Ease of Use						
9.	This application is easy to use					
10.	This application is practical to use					
11.	This application is easy to understand					
12.	This application requires practical steps to achieve what I want to do					
13.	This application can be adjusted as needed					
14.	No difficulty using this application					

15. I can use without written instructions
16. I don't see any inconsistency as long as I use it
17. Users who rarely or regularly use it will like this system
18. I can get back from mistakes quickly and easily
19. I can use this system successfully every time I use it

Ease of Learning

20. I learned to use this application quickly
21. I easily remember how to use this application
22. This system is easy to learn how to use it
23. I quickly become skilled with this application

Satisfaction

24. I am satisfied with this application
25. I would recommend this application to a friend
26. This application is fun to use
27. This application works the way I want
28. This application is very good
29. I feel I must have this application
30. This application is comfortable to use

FINDINGS AND DISCUSSIONS

Based on the research method used, namely the system development life cycle approach (SDLC), the interoperability information system (SIPRO) of medical records is produced by putting the system ready to be operated by the system user. The page display of the medical record interoperability system (SIPRO) is seen in the Figure 2.



Figure 2 Display Login Page



Figure 3 Display the Main Menu

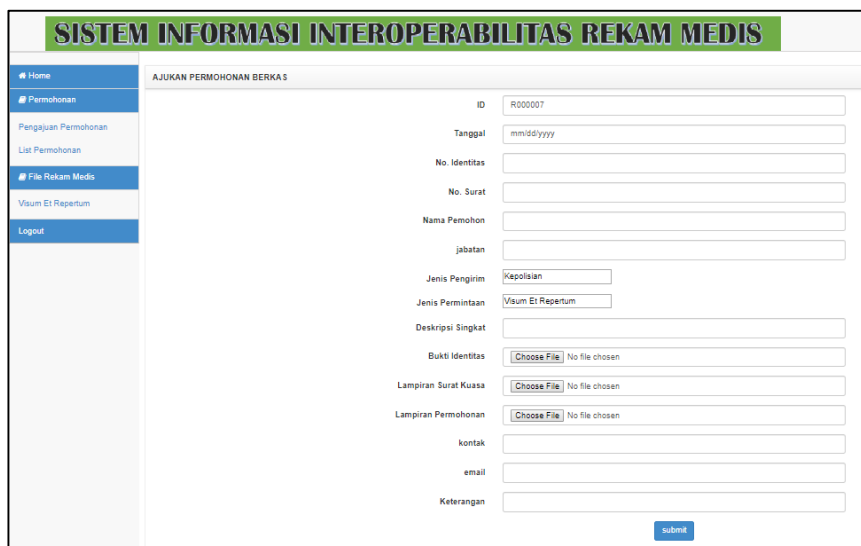


Figure 4 Display Add Request



ID	Tanggal	Nama Pemohon	Jenis Permintaan	Deskripsi	status	Pilihan
R000006	2019-08-01	Made Jaya P	Resume Medis	butuh resume medis	Pemohonan Baru	
R000005	2019-08-15	Made Jaya P	Resume Medis	butuh resume medis	Pemohonan Di Setujui	
R000004	2019-08-15	NI Wayan Sulasmi	Surat Keterangan Medis	butuh surat keterangan medis	Pemohonan Di Setujui	
R000003	2019-08-15	I Made Sunarta	Visum Et Repertum	Butuh Visum et Repertum	Pemohonan Di Setujui	
R000002	2019-08-15	I Made Sunarta2	Visum Et Repertum	Butuh Visum et Repertum 2	Pemohonan Di Setujui	
R000001	2019-08-15	I Made Sunarta	Visum Et Repertum	Butuh Visum et Repertum	Pemohonan Di Setujui	

Figure 5 Display Application Verification

SISTEM INFORMASI INTEROPERABILITAS REKAM MEDIS

Home

Pemohonan

List Pemohonan

Verifikasi

File Rekam Medis

Resume Medis

Visum Et Repertum

Surat Keterangan Medis

Logout

Create Resume Medis

Id

Id Pemohon

Tanggal Pemohonan

Nama Pemohon

Jenis Pengirim

Jenis Permintaan

No.RM

Nama Pasien

Tgl Lahir

Jenis Kelamin

Tgl Masuk


Tgl Pulang

Anamnesa

Pemeriksaan Fisik

Hasil Penunjang

Figure 6 Display Document Input



RSUD MANGUSADA
Jl. Raya Kapal Mengwi - Badung - Bali (80351) Telp. (0361) 9006812-13, Fax. (0361) 4427218


SURAT KETERANGAN MEDIS

No. RM	00 00 02
Nama Pasien	I Made Widnyana
Tanggal Lahir	1997-07-12
Jenis Kelamin	Laki-laki
Tanggal Masuk	2019-09-03
Tanggal Keluar	2019-09-08

Anamnesa	pasien dalam keadaan sadar dengan keluhan nyeri di tangan
Pemeriksaan Fisik	kesadaran normal, tekanan darah normal
Hasil Penunjang	rontgen dengan hasil peradangan pada tangan
Diagnosa	arthritis
Tindakan	rontgen
Terapi	pemberian obat antiinflamasi
prognosis	baik
Sebab Meninggal	-
Place Of Death	-

Badung, 07-Sep-2019

Dokter yang Merawat



dr. Ida Bagus Putu Arit, Sp.FDM

Figure 7 Document Display

LAPORAN PENGELUARAN INFORMASI - PIHAK ASURANSI

Tgl.	No. Id	No. Surat	Nama Pemohon	Jenis Permintaan	Kontak	Status
2019-08-01	15120901077	8/01/VIII/2019	Bayu	Surat Keterangan Medis	081900566788	Pemohonan Di Setujui

Periode: 2019-07-04 s/d 2019-08-08
Badung, 08-Aug-2019

Adi Purnama, S.PIK

 Kepala Rekam Medis

Figure 8 Display Monthly Reports

Furthermore, the authors conducted a blackbox testing to find out whether the functions, inputs, and outputs of the software match the required specifications. In this study, testing the login page, testing the main page, testing the admin page, testing the head of the medical record page, testing the doctor page, testing the police page, testing the insurance page, testing the page of the health service, testing the request page visum et repertum, testing the request page medical information, testing the medical resume application page, testing the visum et repertum page, testing the medical certificate page, testing the medical resume page, testing the monthly report page which as a whole is in accordance with the results desired by the author.

CONCLUSION

From the usability test results on SIPRO, it can be concluded that this system is suitable for use in hospitals in Bali by meeting the usability standard of 79.77% and is expected to become a new standard in the process of exchanging medical record information that can facilitate the process of exchanging medical record information between hospitals with the police, insurance and health services, improve the effectiveness of the performance of employees in charge of the exchange of information on medical records, and simplify the process of reporting medical information exchange.

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