Designing library information system using rapid application development method

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Abstract. Based on the analysis of the system that is running there are some weaknesses in the system running as a result of manually processing data. Such gratitude can be overcome by developing computer-based systems. There are two major groups of approaches in system development that are conventional and object-oriented. One method categorized into the conventional approach is Rapid Application Development. The main advantage of using this method is to use a relatively faster processing time of about 60 working days. Based on the menu structure that can be displayed, it can be seen that there is a relevant relationship between business process and interface display system generated, so it is believed that system development has a positive impact on service to its members. From the results of this research can be concluded that the development of computer-based systems will improve the performance of management, especially in providing services to members.

1. Introduction
Through the analysis activities aimed at the system is running there are some weaknesses as a result of data processing done manually, the weaknesses include the accuracy, response time and ease of access to information needs. Such gratitude can be overcome by developing computer-based systems [1]. There are two major groups of approaches in system development that are conventional and object-oriented [2,3]. One method categorized into the conventional approach is Rapid Application Development. So, in this research will take title designing library information system by using method of rapid application development [4].

The complexity of transactions that occur will lead to an increasing need for data and information [1]. In such conditions the response time and accuracy can be obstacles. Managing the information system manually has some weaknesses, one of which is data redundancy which can result a long time in searching and processing data. Besides, accuracy is the next problem that may occur as a result of human error.

To overcome the problem, one of the alternative solutions is through the development of computer-based information system. A key feature of developing computer-based system is the use of database technology. By designing the correct database then there will be no data redundancy which refers to several researches, an information system has a high capability in decision making, the system has an accurate data accessibility [2], efficient run-time [3], high accuracy [4] and to support a proper decision, low cost [5], extended accessibility [6], intensify user knowledge, increase productivity [7], provide a better data and information [8] and used as data storage [9].
The library information system includes several interrelated business processes, among others, starting with registration and member management, and then continuing with borrowing and returning books transactions through bookkeeping through replacement and addition of new books [10]. When viewed from a series of business processes that occur, with increasing number of members, it will increase the complexity of data and information needs. Thus, need to be developed information system based on computer. then the purpose of this study is the development of information systems library by using rapid application development method.

2. Methodology
In general, the development of computer-based information system based on the approach is grouped into two, namely conventional and object-oriented [11]. One of the methods included in the conventional category is Rapid Application Development (RAD) [12]. It is believed that the use of this method can clarify every step taken so that the use of this method can save time in the design process. In this research the system development method is Rapid Application Development (RAD) with the step as shown in Figure 1.

![Image](image.png)

**Figure 1.** Rapid application development method [9].

- **Business Modelling:** Business modeling was presented using narrative descriptive and flow map diagram.
- **Data Modelling:** Data modeling is done by using ER diagram
- **Process Modelling:** Process modeling is illustrated by using Process Flow Diagram
- **Application Generation:** Starting with the design of the menu structure and then followed by database design and user interface.

3. Results and discussion

3.1. Business modelling

Description of borrowing and returning books processes [13]:

- The member submits the Member Identity Card (MIC) to the librarian of the borrowing and returning section of the book.
- The officer checks the validity of the KTA, if it is expired then it is rejected, but if it is still valid then it is continued with the checking of the borrowing status, if it is being borrowed then it will be rejected but if not, then the borrowing list form is submitted.
- The member writes down a list of books submitted for borrowing.
- The officer checks the availability of books submitted by members, if they do not exist then the list is returned for revision or discharged, but if available then the officer writes the list of borrowings and the due date for the returning of the books.
- The officer gives the book submitted by the member along with the borrowing evidence written in the borrowing report and then signed by the member
- Periodically the officer will make a report of borrowing books completed with the limit of returning.
- Reports are forwarded to the head of the library for follow-up.
- Based on the description of business processes presented in narrative, the documents required or generated can be identified. Based on identification, the document can be continued to create a classification of files that are grouped into master file, transaction file, and report file.
3.2. Data modelling
To emphasize and evaluate the identified documents of the business process, the data modeling using the ER diagram is developed (Figure 2.)

![Figure 2. ER diagram [14].](image)

Based on the ER diagram, books entity and related members can be identified through the transactions of lending and returning books. Identified entities and relationships are relevant to the identified documents in the business process.

3.3. Process modelling
To recognize the parties related through various interactions that occur in accordance with existing business processes then process modelling using process flow diagram is developed

![Figure 3. Process flow diagram [14].](image)

Notes:
- P1 : borrowing submission
- P2 : checking
- P3 : recording of borrowing
- P4 : submission and signing
- P5 : writing of borrowing and returning report

Based on the diagram above, it is identified that the relevant documents within the system are among others related to MIC, the list of borrowers, borrowed book notes, list of available books, borrowing reports, returning reports, and books being borrowed [13].

3.4. Application generation
At this stage, the design of the menu structure is developed (Figure 4.).

![Figure 4. Structure of main menu [14].](image)

Based on the design of the above menu structure there is an obvious relevance since the presentation of business processes, the data modeling and process modeling. Thus, the application system of design results is expected to be accordance with management needs.
3.5. Designing of user interface

![Figure 5. Book interface.](image1)

![Figure 6. Member interface.](image2)

![Figure 7. Borrowing interface.](image3)
4. Conclusion

Based on the results and discussion it can be concluded that the development of library information system can improve the service to the members. The implementation of library information system development method by using Rapid Application Development can accelerate the process of system design.

Based on the structure of the menu that can be designed, there is conformity with the needs of business processes so that the use of this system is expected to increase service to library members, especially in the process of borrowing and returning of books.

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