

## DEVELOPING INFORMATION SYSTEM OF LIBRARY ON E-SCHOOL QR-CODE BASED IN 13 NATIONAL HIGH SCHOOL USING EXTREME PROGRAMMING METHODOLOGY

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### ABSTRACT

*School is a formal built to get the learning to students with the supervision. To improve the quality of teaching in the school then there needs to be the curriculum regulate how teaching standards. One of the curriculum is curriculum latest 2013. Secondary school the state junior 13 Bandung is one school curriculum pilot 2013 where this curriculum promote the use of technology in all the process or activity school. One of the essential part of a process existing in in school is the library. In the state junior high school 13 Bandung is still using conventional process. All process still manually from absentee visitors, data collection books, lending and return. The best solution to address the problem by applying system or application governing the whole process in the library so that all the process of effective. The process can be settled by a system based on the web. System developed with concepts model-view-controller (mvc) that using programming language php with framework codeigniter and database mysql. System development uses the extreme programming consisting of the exploration, planning, iteration to release, and productionizing. The result of this research is web application based that will help all process in library like management of books, lending, book return, warning fine, and library reporting.*

*Keywords: e-school, extreme programming, library system on school*

### 1. INTRODUCTION

Based on a survey conducted the BBC Indonesia in May 2015, Indonesia is ranked the 8th or 69 from under the top of the global education (Coughlan, 2015). To address the Government's learning curriculum that became the standard of each school to do the learning. One of the most recent curriculum is a curriculum with the 2013. In accordance with the contents of the curriculum 2013 Government-issued on 15 July 2013, tanggal stated that the subjects of information and communication technology not as subjects but as a medium of learning that can support all the existing processes in the school. It is emphasized that by 2013 the entire curriculum process that exists at the school was supposed to use the technology. One of the six pilot schools that implement curriculum 2013 is SMP 13. This is in line with the vision that is owned by SMP Bandung 13 like develop national and international standards of learning and improving facilities and infrastructure IT-based learning. The

existence of the assignment then automatically SMP Bandung 13 applying the concept of e-school in all the processes that are in school. E-School is the school's management information system that uses technology that consists of different modules integrated application that serves to manage the activities of the administrative, management or academic learning in a school. With the e-school then mengatakan the quality of education and created an integrated system that is owned by the school portal from either the e-administration, e-e-financial, academic, and hybrid library.

One of the things that is very important in the strategy of education and learning in schools that implemented the e-school is the library. Currently the library information systems running on SMP Bandung 13 found that SMP 13 using a process which is still manual of the recording system, visitor management books, borrowing and repayment. The book often sought was not found because of the difficulty

in finding and takes a long time in the search so that students become distress and even be lazy for a visit to the library. This condition is less supportive of the mandatory read program that's in SMP 13 Bandung where schools establish the existence of a target read to students every week who are seen by the existence of a mandatory schedule of visiting every classroom to the library so that if the system is still manually create programs target read these students become less effective and the process of pengabsenan visitors came to the library will result in a long queue. In addition the current library is not just limited to the physical library that provides a physical book book but also provides a list of online books that can be downloaded as needed.

Based on these problems, needed a library information system can integrate the entire process that is in the library of the Manage Books, ranging from pengabsenan visitors, borrowing and repayment. Development of library size is measured from the application of information technology that is used instead of the size scale, such as the magnitude of the library building, the number of collections that are available as well as the number of users (Sugiharto, 2011). Information technology needs is absolutely necessary and related to the functions and role of the library as a means of delivering information, and science.

Information systems built a web-based library that integrates the entire process that exists in the library. By having this system then processes that are implemented in schools becomes more effective. Not only support library in the service process but with this system so it supports also the library functions as a source of information. With the system then the information about the book, a history of borrowing can be known quickly by simply accessing the system. Library system built using QR code technology. QR code pasted on your student card and also on the books. Qrcode on student card will function to process pengabsenan visitors so that the process is faster and does not cause the queue, whereas a QR code posted on the book serves to the process of borrowing and repayment. Qrcode will store the id of the book so that the process of borrowing and

repayment staying scans id books. QR code has the advantage over the other technologies as it is often used when the Identifiacation Radio Frequency (RFID) that can accommodate information electronically in the form of a chip and can be read via radio waves. But the development of RFID is pretty pricey for the size of SMP Negeri if compared to the cost of development of the QR code. For example in doing the scan of the RFID must use special tools to read the chip while QR code only requires the camera to read the QR code where the cameras are in use can use the mobile phone. The combination of the QR code and mobile phones more is recommended as an option for improvement of prodktiitas and the use of technology in the classroom (Rivers, 2009). So too with Tseng stated et al. in the journal's Greg Forster that using QR code technology replaces the previously used RFID to provide access in penyediaan material for the practice of the construction of the personal computer (Foster, 2014).

Based on the issues and the technology that has been described so the purpose of this research is to build a library information system terotomatisasi and integrate the entire process that is in the library by using the QR code technology as support the whole process of bisns which is in the library.

By having the system then delivers benefits to qualify for in school books, loan repayment, and pengabsenan visitors, helping the school to achieve the goal of becoming an international school, and help school achieve technology as a supporter of the existing processes in the school as the impact of the implementation of curriculum 2013.

## 2. THEORETICAL BACKGROUND

### 2.1 E-school

E-school is an electronic-based application that helps the Organizer units of primary and secondary level education are implementing school-based management (SBM) in accordance with national standards of education (Yulrizka, et al., 2008). E-School is a management information system web-based school which consists of various modules of integrated applications to manage

the whole of the activities of the Administration and academic management in a school.

E-school is made in the context of social information, and created as a system that will realize the sharing of information resources, improve the efficiency of various departments, improving decision support leadership and serves students and staff using modern information and communication technologies. The main goal is to optimize and make parts in school become one unity and work based on a keintegrasian through the internet or intranet.

### 2.2 Library

The library includes a collection of physical buildings or as a place for books collected and compiled according to a specific system or user needs (Lasa, 2007). More specifically the library can be defined as a unit of an educational institution in the form of storage of books that became one of the institution in the process of teaching and learning in schools. The rapid development of information technology in helping create a library so that it becomes easier. Library management functions to control the information relating to the book starting from the books that were borrowed and data books that have been returned, the process in the search for the book and sends a message to the borrower's grace period date in loaning books and fines if the refund date has passed through the book that should have been (Andhale, Chamawar, & Hegde, 2015).

### 2.3 Hybrid Library

Hybrid Library is a transition between the perpustakaan konvensional and the digital library in which electronic resources and information sources using paper used simultaneously. The library is a new electronic sources of information and traditional hardcopy sources being used simultaneously in an integrated information services (Ogbonna, Igewsi, & Eweani, 2014).

### 2.4 QR code

QR code is a barcode that can be encoded with the data then quickly can be translated, so this QR code refers to the speed of the response. QR code is a matrix symbol consists of an array of square

modules nominally set in a square pattern overall. The format of the QR code including the unique detection pattern position located three corners of the symbol and can be used in find symbol position size and slope (Vongpradhip, 2013).

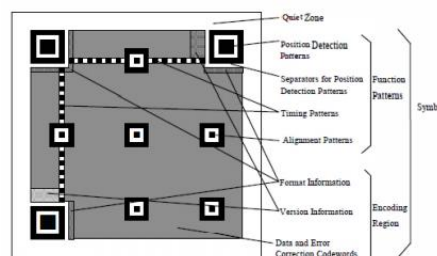


Figure 2.1 System Structure of Qrcode (Vongpradhip, 2013)

### 2.5 Systems Development Methods

Extreme programming uses a simple planning form and simple in deciding what will be done for the development of a feature that is part of the requirement of the user. Extreme Programming is used when developing application system consists of a small team. Extreme Programming is one of the most commonly used methodology in Agile Development. This method requires more cooperation with customers and involving customers in the software development cycle than other structured processes (Mohammadi, Nikkahan, & Sohrabi, 2009). Research on the construction of the system is divided into three increments are divided over the scale of priorities defined by the user.

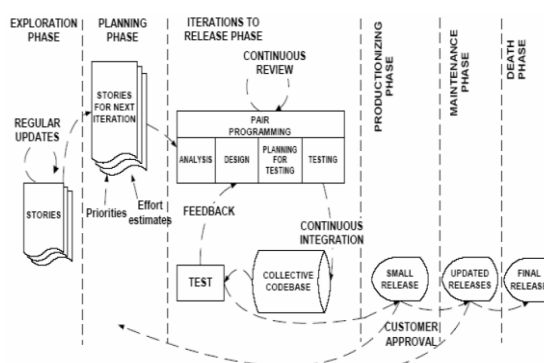


Figure 2.2 Siklus Pengembangan Metode Extreme Programming (Awad, 2005)

### 3. RESULT AND DISCUSSION

#### 1.1 Discussion

##### 3.1.1 Requirement

Education website for school SMP 13 Bandung will be built has eight needs. The first requirement is to manage a book done by librarians. This demand is one of the staples of the library. Manage books include adding new book data, editing data, delete the book of books, and also adds to the stock of books. At the time of adding the stock it will be presented also the qr code. The second need is to manage attendance of visitors conducted by the librarian. Librarians deal with attendance being performed with the system via scan or manual scan qr code. After a hiatus then can be seen the number of visitors who came in that day with a list of names who visit the library every day.

The third requirement is to manage the borrowing done by librarians. Librarians serving loaning books ranging from the input name of the borrower, scan up to book qr code store data of the borrower and books borrowed. The fourth requirement is to manage returns book done by librarians. Librarians do pengecekan book condition when returned and told the fine if you have a penalty. The fifth requirement is to manage the group read done by librarian and Chair of the library. This need is additional requirements be part of the process that is in the SMP 13. The management of this function to register the students as members of the group read, create schedules for picket and craft made absent each day. The sixth is the need to manage the online catalog which is done by the teacher, Chairman of the library, librarians and students. This function needs to upload a book that can be seen by students that can support learning. The needs of the seven is a functioning sms gateway management apprise warning if there is a delay in the repayment of the eighth book and needs is a management discipline that existed at the library.

Table 1. Application Requirement

	Require ment	Descriptio n	User
1.	Manage Book	The process for managing the entire process relating to the book.	Librarian
2.	Manage Visitor Absence	The process to manage attendance, where librarians can manage absences all visitors	Librarian
3.	Manage Borrowing Books	The process for managing the process of borrowing done by visitors	Librarian
4.	Manage Returning Books	The process for managing the process of returns of books made by visitors	Librarian
5.	Manage Reader Group	The process for managing kelompok read from either the addition of a member, the removal of a member of, and schedule	Head of Library, Librarian
6..	Manage Online Book Sharing	The process for managing the entire process relating to the book.	Librarian, Teacher, Student
7.	SMS Gateway	The process of sending information about the affected student fines	Librarian
8.	Manage Regulation of Library	The process for making and editing conduct	Head of Library, Librarian, Visitor

### 3. 1.2 Design

The entire requirement already mentioned will interact with the actor in accordance with their respective functions. Use case diagrams are created is composed of two major parts, namely use case to process returns, ranging from library lending and management while the second book is the mempelihatkan use case management group read. Use case diagrams will be shown in Appendix A.

### 3.1.3 Core Business Process

Basically, the application library is changing the concept of conventional business processes that exist in the public library into automation, ranging from process data management books, borrowing books, return the book to the library where visitors attendance management focus that most are actors on the librarian.

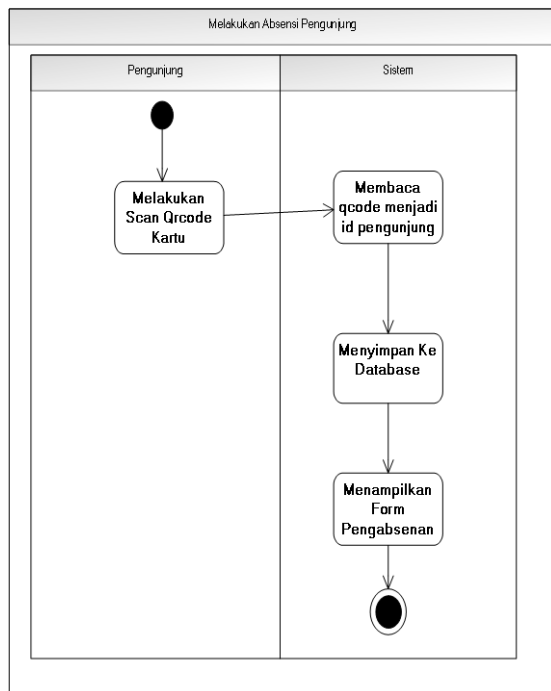


Figure 3.1 Absence Activity Diagram

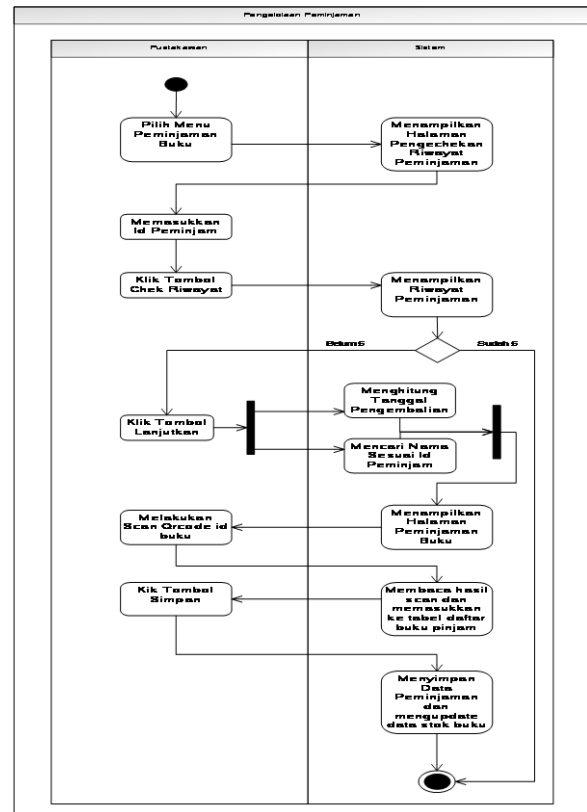


Figure 3.2 Borrow Book Activity Diagram

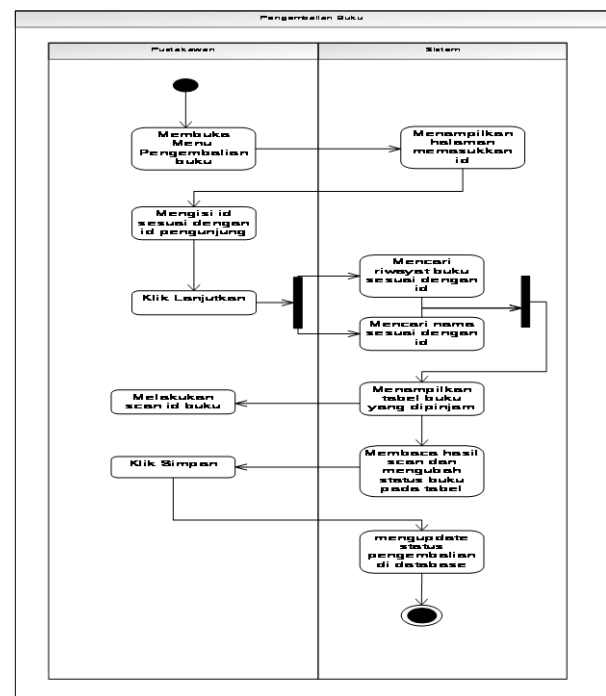


Figure 3.3. Return Book Activity Diagram

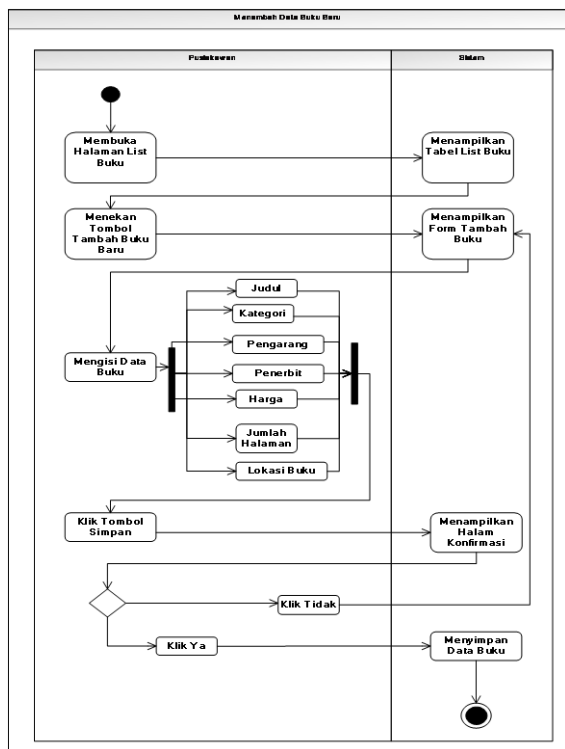


Figure 3.4. Add Book Activity Diagram

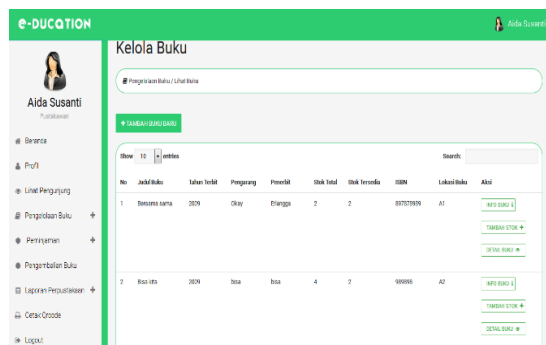


Figure 3.7 View Book Page

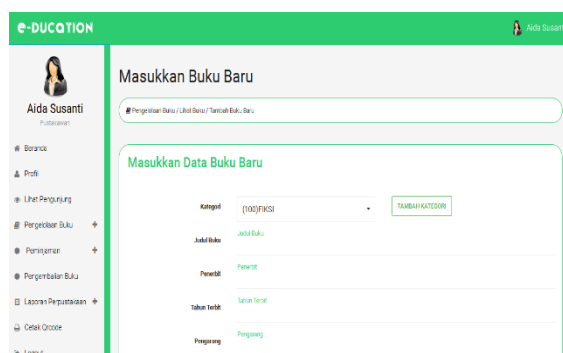


Figure 3.8 Add Book Stock Page

### 3.2 Result

Following are the results from the application interface is a web-based library for SMP 13. Only some of the images displayed in the image below.

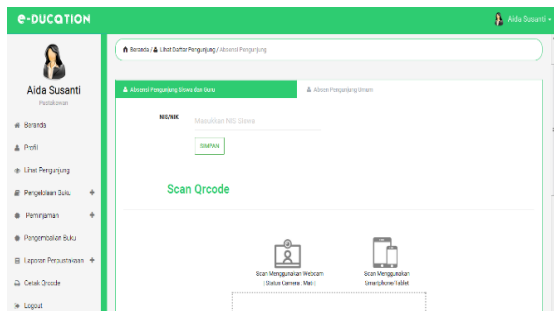


Figure 3.5 Absence Page 1

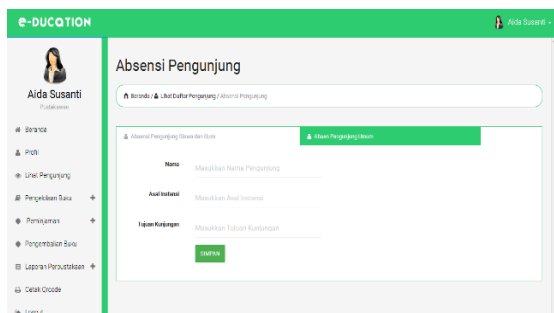


Figure 3.6 Absence Page Visitor

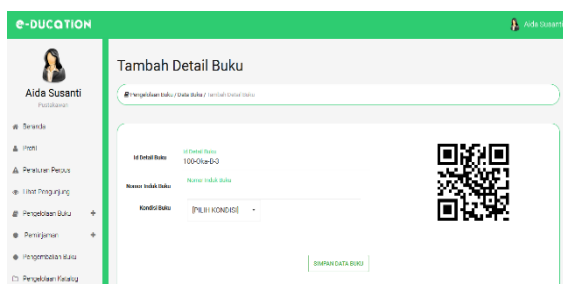


Figure 3.9 Add New Book Page

Figure 3.5 shows the visitor attendance page by category of visitors which belong to the entity of the school. The entity is composed of employees and students. To pengabsenan visitors in these pages can use scan QR code that is by doing a scan card student or employee card. In Figure 3.5 is also seen option scan cards can be scanned using the camera on your laptop or computer, the device can also use smart phones. While Figure 3.6 describes the attendance of visitors for visitors who have differing entities from outside the school. Figure 3.7 describes the page look book, after looking at the books so the actors can go into the Add books page described in Figure 3.8. For additions to stock the book then also system make QR code of



the book in accordance with the id that was generated by the system as well. This can be seen in Figure 3.9.

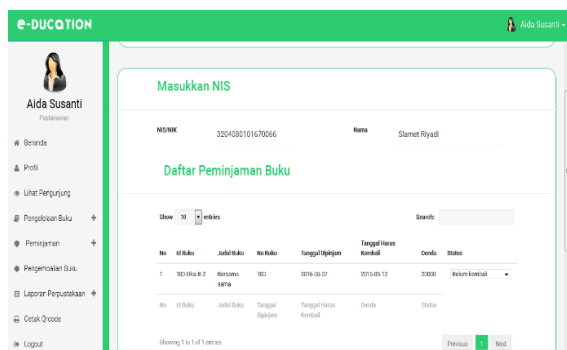


Figure 3.10. Borrow Book Page

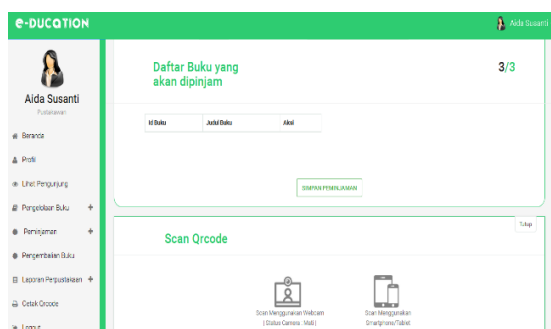


Figure 3.11. Return Book Page

Figure 3.10 describes the process of borrowing books, and Figure 3.11 describes the process of return of books. Both these processes can use scan QR code on the books to do a scan through camera laptop or mobile. On the process of borrowing the book while doing scan QR code book will be read by the system and displayed the title of the book, while in the process of return on QR code book will be read and the status will be changed to sudah back in accordance with the books id read QR codes.

#### 4. ACCEPTANCE TESTING

At this stage the system developer do the testing that is done directly to the user. By using this test will get feedback from the user by adjusting with a requirement which has been given earlier. This test is also the last test conducted after doing functional testing on the stage of iteration. Feedback gained from this test results would be suggestions for future development.

User testing conducted by using the Mozilla Firefox browser. Testing is conducted on all functions in accordance with the test scenarios that have been provided earlier. The results obtained from testing is quite satisfactory that is 93% of the features provided by the user and received 7% acceptable but with certain records in accordance with the features added or improved and become suggestions for removing deprecated.

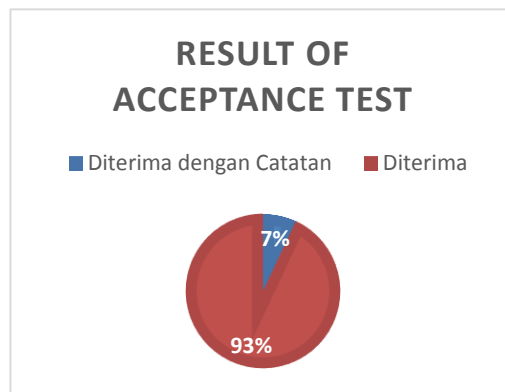


Figure 4.1 Result Acceptance Test

#### 5. CONCLUSION

The conclusion that can be drawn from this research that is the formation of a web-based system that will help all the existing processes in the school. Features of the application section of the library is now able to integrate existing processes in the library so that the data also be integrated, no duplication and data processing to be more efficient. Development of aplikasi using QR code technology on the student card, card signs an employee, and simplify business processes that were previously running it manually.

As for the suggestion in the next library application development on the feature online catalog features ditambahkan should read the book online so that students do not need to book in advance, and by the look of the application developed to become more attractive so as to make the user becomes more comfortable.

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### Appendix A Use Case Diagram

