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E-Kiosk : Digitizing the Sonobudoyo Museum Collections

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***Abstract*—E-kiosk is one of the medias in culture and tourism development in Indonesia. E-kiosks can provide information that can add to the curiosity of tourists towards cultural heritage objects, especially museum collections in Indonesia. This research aims to build e-kiosk applications with experimental design method to develop applications that are integrated with the database. The e-kiosk application was developed in collaboration with Flash programs, ActionScript, PHP, XML, and Microsoft Accsess so as to produce a multimedia application that is integrated with the database.** *(Abstract)*

Keywords: E-Kiosk, PHP, SDLC

I. INTRODUCTION

Tourism in Indonesia is an important component of the Indonesian economy as well as a significant source of its foreign exchange revenues. The natural heritage can boast a unique combination of a tropical climate. The integration of cultural affairs and tourism shows that cultural tourism is considered an integral part of Indonesia's tourism industry, and conversely, that tourism is used to promote and preserve the cultural heritage. The Central Statistics Agency (BPS) announced that foreign tourist arrivals to the country was recorded at 4.039.799 million in 2017 [1].

Both nature and culture are major components of Indonesian tourism. Places that present historical relics are one of the tourist destinations in Indonesia. One of them is a museum that stores historical objects. But not all objects from the museum can be exhibited openly. This is because the collection objects are in poor condition because of their age.

Information Technology has played an important role in government and tourism industry over the last decade. It has helped reduce costs, enhance operational efficiency, and improve services and customer experience. It also can help reduce the problems that occur in tourism development. E-kiosk is one of the medias in culture and tourism development in Indonesia. E-kiosks can provide information that can add to the curiosity of tourists towards cultural heritage objects, especially museum collections in Indonesia.

II. THEORITICAL BASIS

A. E-Kiosk Concept

A kiosk is a small, free-standing physical structure that displays information or provides a service. The term of e-kiosk always refers to the use of electronic media to present various information. E-kiosks in tourism and culture aim to help to help users to obtain information effectively. E-kiosks are expected not only to present cultural objects, but also to increase tourists' interest in culture and tourism and can be used as a means to develop culture and tourism.

B. Flash and Action Script

Adobe Flash is a proprietary application development platform developed by Adobe Systems. The primary focus of the Flash platform is the creation of Rich Internet applications (RIA), which combine graphics, animation, video and sound into projects that may be artistic, entertaining, and informative. It is a software development platform that allows programmers to create the powerful but easy-to-use aapplications. Adobe flash is the authoring environment for creating rich, interactive content and advertisements for digital, web delivery [2].

ActionScript is the main scripting language of the Flash Platform. ActionScript is an programming language based on ECMAScript like JavaScript that can be used easily for developers who are familiar with object-oriented programming. ActionScript 3.0 introduces a lot of new features, including a new way to manage display types, runtime error handling, runtime data types, method closures, an intrinsic event model, regular expressions, and a new way of working with XML [3].

C. PHP (PHP Hypertext Preprocessor)

PHP is a server scripting language, and a powerful tool for making dynamic and interactive Web pages. It is very flexible and has a lot of innovative features. It is the fastest resource available for creating dynamic websites. PHP proved so useful and popular, it rapidly grew to become the full-featured language that can be used to write general-purpose scripts. Scripts are computer files containing instructions in the PHP language that tell the computer to do things [4].

PHP code may be embedded into HTML, or it can be used in combination with various web template systems,web content management systems and web frameworks. PHP code is usually processed by a PHP interpreter implemented as a module in the web server or as a Common Gateway Interface (CGI) executable. PHP can perform any task that any CGI program can do, but its strength lies in its compatibility with many types of databases. Also, PHP can talk across networks using IMAP, SNMP, NNTP, POP3, or HTTP.

D. SDLC (System Development Life Cycle)

Application or system development is a process or procedure that must be followed to carry out all steps in analyzing, designing, implementing and maintaining a system. These development processes are known as the System Development Life Cycle (SDLC). The System Development Life Cycle is a limited term that explains the phases of creating a software component that integrates with other software components to create the whole system [3]. The System Development Life Cycle involves conceptualizing, building, implementing, and improving hardware, software, or both. The System Development Life Cycle also must take into consideration both the end user requirements and security concerns throughout all its phases (Fig 1).

The analysis phase is the phase of gathering information about system requirements, then analyzed and defined needs that must be met by the system to be developed. This phase must be done in full so that it will produce a complete design. After the needs are collected in full, information about these

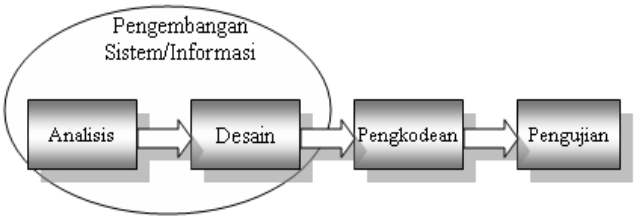

Figure 1. SDLC

needs is changed into the data structure using several tools (tools) such as DFD (Data Flow Diagram), ERD (Entity Relationship Diagram) and STD (State Transition Diagram).

Then in the implementation phase, system design is translated into codes using predetermined programming languages. Then testing the units produced.

In the testing phase, these units are unified and tested as a whole. Then the operation of the system in the real environment and maintenance or maintenance of the system.

III. RESEARCH METHOD

The research method in this study is an experimental design method for building e-kiosk applications. This method refers to the classic system development life cycle or SDLC (System Development Life Cycle). This research uses computer hardware and software as a tool in research. While the course of the research includes:

A. Literature Studies and Requirement Analysis

Literature studies are conducted to study theories related to research, so that the data to be collected for analysis is more accurate. The theories related to this research include the concepts of e-kiosk, Flash, ActionScript, and PHP. Requirement analysis is done to collect data needed in research based on theories that have been studied before. This stage also aims to obtain information from application users completely so that the application will be developed in accordance with user expectation.

B. Application Design

The design of the application aims to make a skeleton or sketch of several elements, then put together into a unified whole. At this stage an application design will be made such as application architecture, data flow design, database design, and user interface design.

C. Implementation

At the implementation stage, application development is based on the system design result. The implementation phase includes programming or coding of sketches or frameworks that have been made in the previous phase. The design must be translated in a form that can be understood by the machine using a programming language.

D. Testing and Evaluation

After the application is implemented, the application will be tested to obtain conformity between the results of implementation and the needs of the user. At this stage, you will also get the advantages and disadvantages of the application produced.

IV. SYSTEM DESIGN

The design of the application aims to obtain an overview and sketch or arrangement of several separate elements into one whole and functioning unit [5]. In designing this application requires several tools that can be used in data modeling, including DFD (Data Flow Diagram) and ERD (Entity Relationship Diagram). This design also includes application architecture and user interface design.

A. Application Architecture

The e-kiosk application that will be developed in this study refers to the three-tier architecture model. At the bottom, there is a database module that will store all data and information regarding the e-kiosk application. The database used in this module is Microsoft Access 2003. As for connecting with the layer above, Microsoft Accsess uses ODBC Data Source.

Above the database layer there is a server module that contains commands to access the database in the base layer. This layer serves as a bridge between the top layer and the base layer. This layer contains PHP Script and XML that interact with the top layer through Local Conection and database layers with ODBC Data Source.

The top layer is the client module that contains information from the database in visual form through the Flash application. This layer contains multimedia applications that have been designed to be able to interact with users. This layer contains flash programs developed with ActionScrpt. The e-kiosk application architecture can be seen in Fig 2.

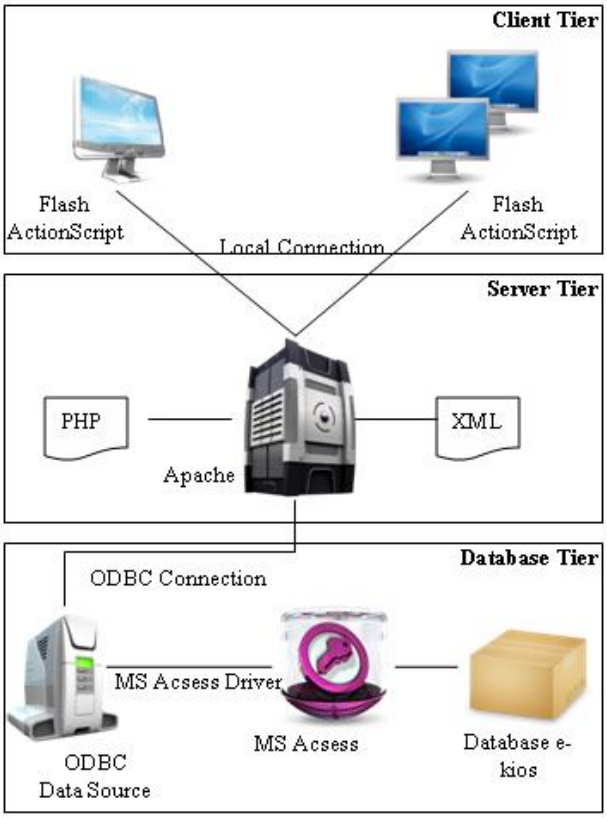

Figure 2. E-Kiosk Application Architecture

B. DFD Design

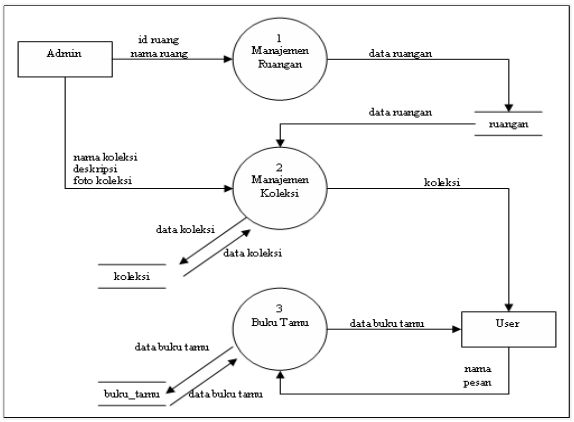

Figure 3. E-Kiosk Application DFD Design

DFD design is a design that represents the processes in the application. In this e-kiosk application there are 3 main processes, namely the room management process, collection management, and guest book.

The process of managing a room is a process that handles room data. These data will be used as reference data in the collection management process. The collection management process is a process that processes collection data from the admin and room data from the room management process. While the guest book process is a process that handles guest book data inputted by the user and then returned back to the user becomes more meaningful information. E-Kiosk application DFD design can be seen in Fig 3.

C. Database Design

Database design is closely related to ERD (Entity Relationship Diagram), which is the transformation of the universe of data in the real world into a data diagram using conceptual devices. This design describes the data involved in the application. The ERD design of the e-kiosk application can be seen in Fig 4.

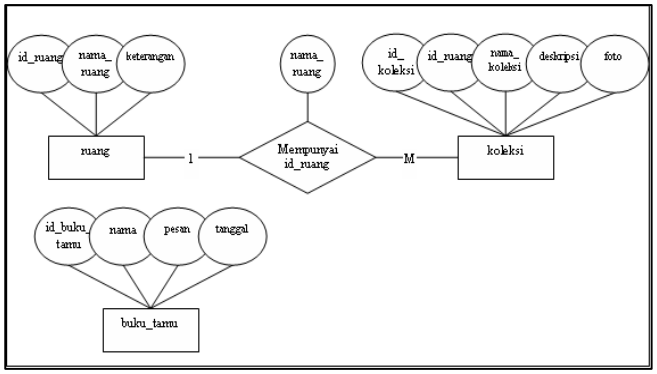

Figure 4. E-Kiosk Application ERD Design

Table 1. Room Table Design

Field	Type	Null	Extra
Id_ruang	Int(11)	No	auto_increment
nama_ruang	varchar(30)	No	
keterangan	Text		

Table 2. Collections Table Design

Field	Type	Null	Extra
id_koleksi	int(11)	No	auto_increment
id_ruang	int(11)	No	
nama_koleksi	varchar(60)	No	
deskripsi	text		
foto	varchar(30)	No	

From the design of the DFD and ERD in figure 3 and figure 4, three storage places are implemented in a table. The tables formed are tables of space, collections, and guest books.

Space table consists of 3 fields, namely space id, space name, and description with id_ruang field as primary key. Space table design can be seen in table 1.

The collection table consists of 5 fields, namely collection id, space id, collection name, collection_name, description, and photo with id_collection as primary key. The collection table design can be seen in table 2.

The guest book table consists of 4 fields, namely guestbook id, name, message, and date with id_book_tamu as primary key.

D. Layout and Navigation Design

Layout design and navigation are used to determine the position of menus and content in the actual application. This design aims to make it easier to manage the application components, both the position and function of these components. The layout and navigation design of the e-kiosk application can be seen in Figure 5.

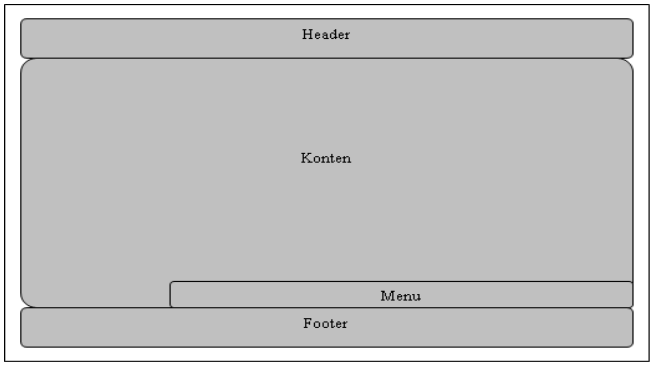

Figure 5. E-Kiosk Application Layout and Navigation

V. RESULT AND DISCUSSION

Figure 6. E-Kiosk Application Front Page

From the results of the design to implementation, an e-kiosk application that integrates flash programs, PHP, XML, and DBMS Microsoft Accsess is produced. Access will communicate with PHP by utilizing the ODBC Data Source that has been provided by Microsoft Windows. Then the data in the database will be processed by PHP in the form of variables. These variables will be sent to a flash program with Local Connection provided by Flash.

The user interface page is developed by utilizing a flash program that is equipped with a script-based programming language, namely ActionScript. Interactions between users and applications are handled by ActionScript in flash programs. Users can operate the application by selecting different menus on the front page of the application. These menus are used by applications to navigate content within the application.

The front page also contains information about museums, collections, and facilities in the museum. The front page of the e-kiosk application can be seen in Fig 6.

From this front page, users can interact with other menus. Another menu is the museum collection gallery page. This page is the core of the e-kiosk application aimed at digitizing museum collections. On this page will be displayed museum collections.

The objects of the Sonobudoyo museum collection are divided into several rooms, where each room represents the types of museum collections. For example in the first room, the introduction room exhibited objects representing the entire museum collection. Or the second room is a prehistoric room that exhibits relics in prehistoric times.

From the reasons above, the gallery page is divided into several sections based on the room where the collection is stored or exhibited. The e-kiosk application gallery page can be seen in Fig 7.

Figure 7. E-Kiosk Application Gallery Page

Photographs of collection objects are displayed in the form of thumbnails and in larger sizes. Users can see the entire collection in section thumbnails. This section displays all the collections in each room. Whereas to see collections more clearly, users can tap on the image or photo in the form of thumbnails located on the right side of the main photo so that the main photo section will change to the selected collection photo.At the far left is a description of the collection object that is being seen in detail. With the scroll facility, it is expected to make it easier for users to operate this application.Another menu is the guestbook page. This page is intended to get feedback from users. Users can input their comments through the form provided. This page is also equipped with on-screen keyboard facilities that can provide convenience if this application is installed on a computer with a touchscreen monitor. The guestbook page can be seen in figure 8.

Figure 8. E-Kiosk Application Guestbook Page

VI. CONCLUSIONS

Based on the activities carried out by the author during the design until the implementation of the e-kiosk application, then the following conclusions can be taken

1. The e-kiosk application was developed in collaboration with Flash, ActionScript, PHP, XML, and Microsoft Accsess programs so as to produce multimedia applications that are integrated with the database.
2. Preservation of museum collection objects can be done by utilizing information technology.

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