Designing Virtual Reading Room (VRR Digi_Litikon) for learning batik in Vocational High Schools: Curriculum material improvement

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Abstract. This study aimed at designing Virtual Reading Room (VRR Digi_Litikon) for learning batik in Vocational High Schools in Indonesia. The design was also a part of curriculum material improvement with the touch of information technology. As a web-based application, VRR Digi_Litikon saved all the contents and database on its server. It was also proven that it had frontend as its user interface. The user interface was also PHP-based with Code Igniter framework. The application was designed using Software Development Life Cycle (SDLC) method consisting of such phases as system engineering, analysis, design, coding/implementation, testing, and maintenance. The results of the application design were digital books equipped with scientific journal articles in relation to batik. The digital platforms designed for VRR Digi_Litikon enabled students to have information not only in a form of texts but also in audio/voices of the contents of a book they were learning. The application was tested in various devices and had been proven to be eligible to use as a learning media application particularly for learning batik in vocational high schools.

1. Introduction
One of the most important aspects in curriculum development is curriculum material improvement. Curriculum materials as one of the learning resources for students are in need of more systematic documentation [1], more up-to-date content development [2], and mass digitization [3]. It is believed that curriculum materials documented digitally are able to help teachers save, update, and distribute their learning materials everywhere and everytime [4,5]. In relation to this, one of the most well-known curriculum materials are books. Books that are made digital have potentials to be easily documented and widely distributed. In addition, digital books also have more interesting reading experiences for students [6].

Digital books integrated in the digital library setting are proven to be able to provide information in a various forms such as text documents, images, videos, and audios [7]. In addition, digital libraries are also learning resources with significant usability level, entertaining aspects, and enjoyable situation for learners [8]. One of the digital book platforms in the context of digital library is Virtual Reading Room (VRR). It is a space where students can access digital books in full-text contents on the open web [9,10]. It is also a digital book reading room where students can borrow books with more free access and unlimited time and space [11]. VRR in the context of digital library is also able to give students more discipline in learning [12].
This study aimed to design a VRR used for learning batik in vocational high schools. The VRR created in this study is a part of a digital library of Batik Ikonik which is a batik learning media application to help vocational high school students have various learning resources. It is expected that the VRR created in digital books is able to bridge the limited availability of books on batik which are relatively expensive and difficult to find. In addition to books related to batik, the VRR also contains journal articles discussing batik, particularly one within the area of West Java province, Indonesia.

2. Method

The VRR Digi_Litikon virtual reading room application was an application used as batik learning media which is also a part of the development of Digital Library Batik Ikonik (Digi_Ikonik) application. VRR Digi-Litikon basically consisted of digitized books, scientific works, and journal articles related to West Java batik.

The application aimed to gives students easy access to find resources and literature in relation to West Java batik. It was made web-based so that all the contents and database would be saved on its server. The application also had fronted as its user interface [13]. The user interface was PHP-based with Codeigniter framework.

The application was developed using Software Development Life Cycle (SDLC) with waterfall model [14,15] (see Figure 1). The model consisted of the following phases: system engineering, analysis, design, coding/implementation, testing, and maintenance [16,17].

![Figure 1. SDLC Method with Waterfall Model.](image)

In a more detailed explanation, the VRR application for learning batik was designed as shown by Fig 2.
Figure 2. The design of VRR application.

Figure 2 shows that the designing process of the VRR application basically consisted of digital book room containing books, journals, and scientific articles related to West Java batik. Students as
prospective users would have an account and password to be able to login. They would be able to access the digital books available after choosing the “rak” which means shelves for books and articles on the menu. After that, the students had to choose which category out of those three (books, scientific works, and journal articles) with full pdf versions of each category.

3. Results and discussion
The VRR designed in this study is a web-based digital learning resource for vocational high school students learning batik. Specifically, the VRR is an application whose primary focus is providing digital books on West Java batik especially in three areas covering south coastal areas, north coastal areas, and non-coastal areas [18].

Figure 3 shows the example of VRR display with various menu options of digital books. There are three types of digital books on the initial menu. Those types of books contain information of batik from three different places in West Java, Indonesia. The digital tools on the menu gives students easy access to choose in accordance with their needs. This phase is a special phase in the context of digital learning supporting self-determined learning model (heutagogy) with learning independence as its main feature [19].

![Figure 3. The display of VRR when choosing menu.](image)

Figure 4 is the next display after students choose “Lorong Buku” (which means aisles of books) on the application. Unlike the cover of printed books, the cover of the digital books available on the application also provides brief explanations of the books. The description includes information on which batik is categorized into south coastal areas. The tools available in this part will be able to guide the students to select the areas of batik which seem more interactive and meeting their needs as well [20].
Figure 4. VRR on the book cover display.

Figure 5 presents the books when they are read. One of the strengths of the VRR is that not only are the books able to be read manually, they are also equipped with audio (voice) tools. The tools will give students different experiences in addition to visual ones. Students are able to solely listen to the books without looking at them. This design of the VRR enables students to learn everywhere and everytime. This fact actually accommodates the principles of multi resources as one of the benefits of digital library [21].

Figure 5. The Display of the VRR when the books are read.

The VRR application developed in this study has also been tested. The test was conducted using a variety of platforms and devices. The results show that the application is able to be operated by various devices.
4. Conclusion
The VRR application designed in this study is basically aimed to gives an easy access for students to find learning resources on batik. Nowadays, the learning resources on batik are limited and even if they are available, they come with relatively expensive costs. To cope with this issue, this study has developed a VRR application containing digital books which are able to be saved by many students within a long time period. The VRR is also able to be distributed widely; not only in one class or one school, it is able to be used by students with the same competences everywhere. Last but not least, the VRR is designed in an entertaining way so that students of vocational high schools enjoy using it.

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