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## Designing Digital Certificate Issuance Information System

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# Designing Digital Certificate Issuance Information System

**D Albar<sup>1</sup>, B F F Perdana<sup>2</sup>**

<sup>1</sup>Departemen Desain Komunikasi Visual, Universitas Komputer Indonesia, Indonesia

<sup>2</sup>Fakultas Teknik dan Ilmu Komputer, Universitas Komputer Indonesia, Indonesia

Email: deni.albar@email.unikom.ac.id

**Abstract** - Nowadays, some training and webinars are conducted frequently. Especially during the Covid-19 pandemic, online training and webinars became rational choices in the education sector. Evidence of participation from training and webinars is usually a digital certificate. Manual digital certificate creation will usually take a lot of time. It will be easier if the process is made systematically. This research aims to design a website-based application that can publish digital certificates that event participants can download. The method used in designing and making this website is descriptive. It is expected to present a complete picture of the subjective or objective of the related phenomena. The result of this research is a website-based application design to make it easier to issue digital certificates. Automation of the system can help simplify work and broad accessibility due to the website platform's use. From the results obtained, it can be concluded that by using this application, making certificates utilizing the system is more efficient than the manual method and can reduce the amount of paper usage. With this application, it is hoped that it will make it easier for the event committee to process the issuance of digital certificates and make it easier for participants to get their certifications.

## 1. Introduction

Nowadays, when a pandemic occurred in Indonesia and other countries in 2020, many activities have shifted from offline to online. Seminar activities usually held in the community, in the educational and non-educational world, which are typically held onsite, have been converted into online activities. Seminar activities, which are usually held by gathering many people in one place, were blocked by the pandemic, replaced by webinars. Webinars are one of many training methods. According to Gegenfuther and Ebner, webinars are defined as web-based seminars, where students and teachers are connected virtually together and interact in real-time [1]. Currently, course service institutions that provide specific competency courses online hold many webinars. In each of these online competency course activities, usually, this course service offers certificates to the participants, presenters, and committee [2]. A certificate is a documentary proof of a person's participation in the event [3]. An electronic certificate contains an Electronic Signature that shows the status of a legal subject issued by the Operator [4]. Digital certificates are used because, currently, seminars are being held online. After all, electronic certificates can be used [5]. Manual digital certificate creation will usually take a lot of time; it will be easier to make the process in a systemized manner. The use of a QR-code, which stands for "Quick Response," is a matrix barcode containing text data or a URL that can be used to verify the digital certificate's authenticity [6].

Several studies on digital certificate creation have been done before. For example, research by Nureni et al. concluded that making digital certificates requires the use of QR-codes on electronic certificates to create the certificate verification process simpler [2]. It is supported by Erick's research, which concludes that QR-Code can be used as a certificate verification system [7]. It is also proven by the emergence of an average SUS score of 83.33 from questionnaires taken from 40 respondents [7]. For

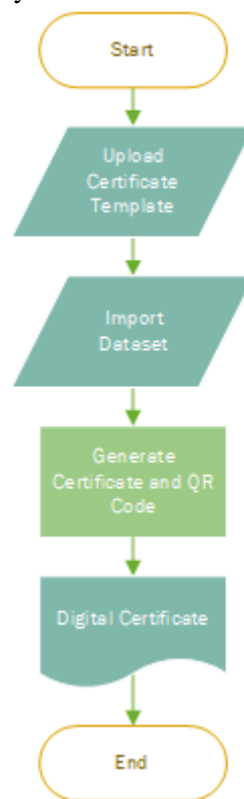


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further research by Rafi, this study describes more complicated and safer security with blockchain technology [8]. Based on previous research, research regarding designing the printing system of the digital certificate. Most of the previous research focused on certificate security using QR-code as well as blockchain. Meanwhile, this research is focused on designing an information system that supports the online digital certificate printing process.

## 2. Method

This research focused on designing a digital certificate printing system and using QR-code technology to support the verification of the authenticity of certificates using the Laravel framework at PT. Someah Kreatif Nusantara. The method used in this research was the descriptive method. It is used by presenting subjectively or objectively a situation description related to business architecture planning and planning and development of information systems. In the end, a definition of the linkages and benefits of Business Architecture Planning (EAP) is found with information system development. The workflow of the Digital Certificate Issuance information system can be illustrated as shown in Figure 1.



**Figure 1.** Digital Certificate Issuance Workflow.

This information system has three main processes: uploading the certificate template, importing the dataset, and generating the certificate template and the dataset into a digital certificate in a .pdf file. This information system is created with the Laravel framework, making website development easier, elegant, simple, and fun because of Laravel's excellent features such as the Template Engine, Routing, and Modularity [9].

### 3. Results and Discussion

#### 3.1. Designing Certificate Template Design

This digital certificate issuance system's flow starts with creating a template using the Microsoft Word application with a background made with a graphic editing application. In this section, several variables must be entered so that the certificate results match each person's data (datasets). This template depends on the certificate design that will be printed (see Figure 2).



**Figure 2.** Template Digital Certificate

In Figure 2, if the template is created, variables are inserted, which will be printed based on each dataset. Therefore, each dataset will display different data from one another with the same template.

#### 3.2. Interface

The user interface is one of the essential parts of the application. The user interface must satisfy user needs. Appropriate interface design must meet users' needs, capabilities, and limitations in using the information system [10]. On the front view, the webinar participants are presented with the display as shown in Figure 3.

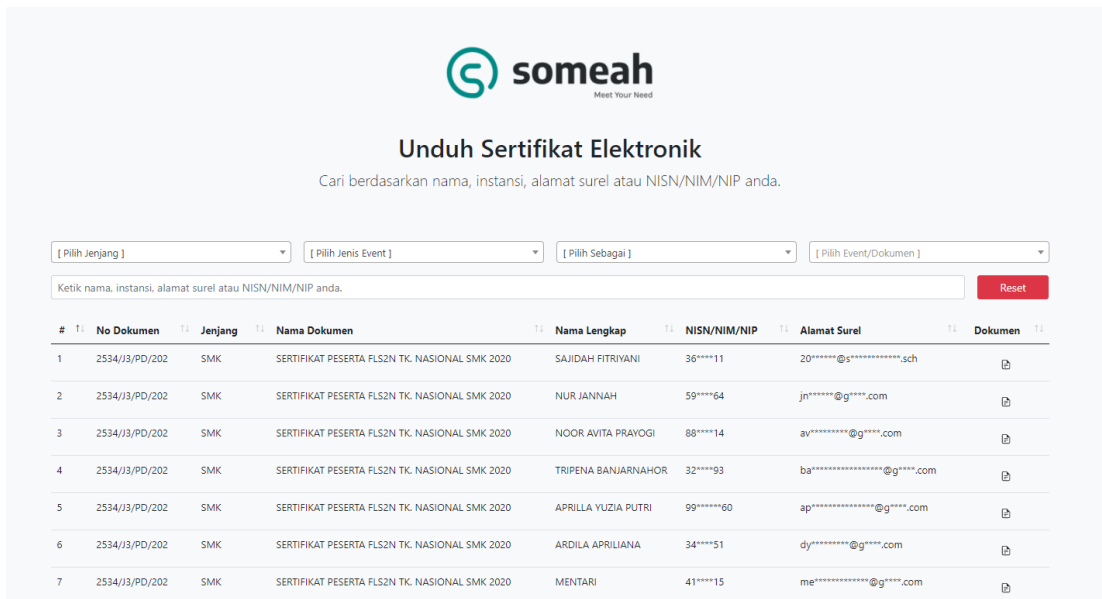


Figure 3. Participant User Interface

Meanwhile, the administrator interface is more complex because it requires an interface that can cover the data requirements as are necessary for issuing digital certificates. It is shown in Figure 4.

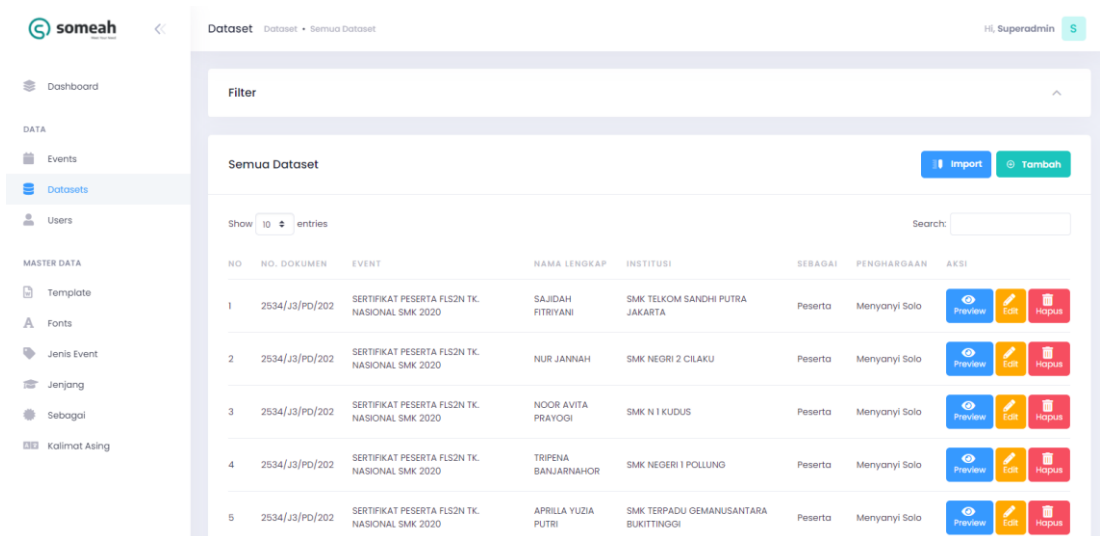


Figure 4. Admin User Interface

### 3.3. Digital Certificate Printout

Each registered participant can download the results of the digital certificate printing process (see Figure 5).

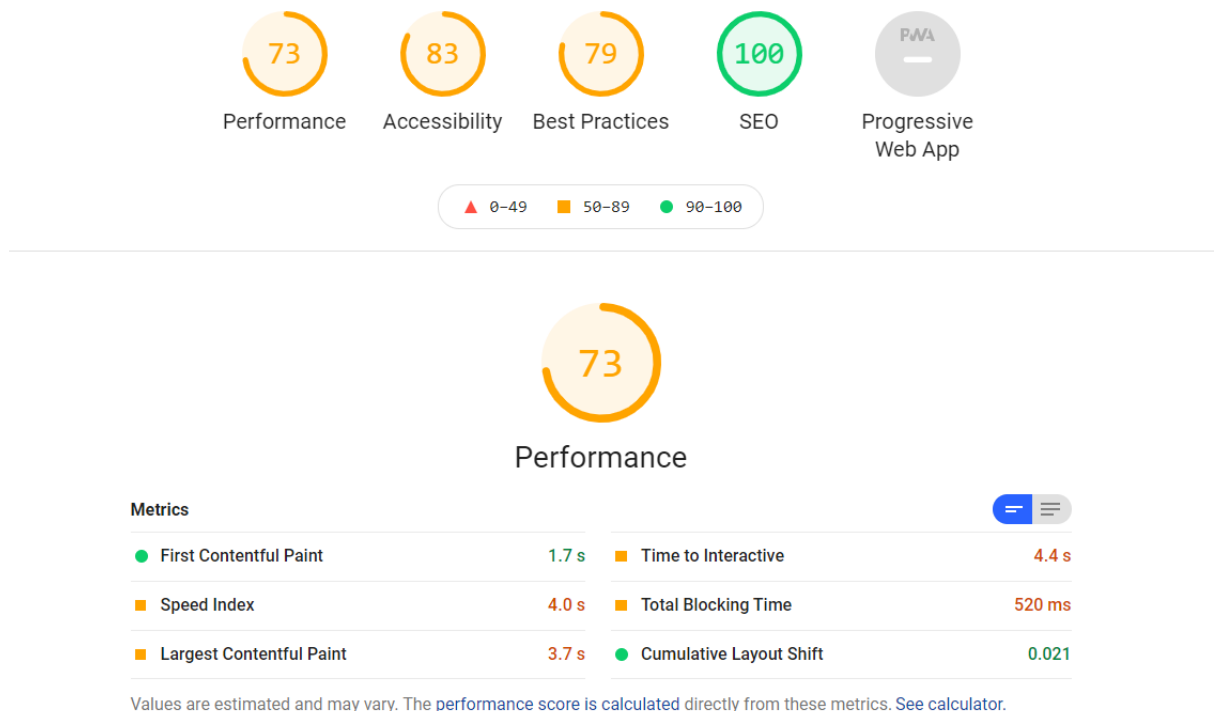


**Figure 5.** Digital Certificate Printout

In Figure 5, each registered participant can download the digital certificate printing process results, and the webinar organizer inputs the data.

**3.4. Performance Benchmarks**

In measuring the Digital Certificate Issuance information system's performance using Google Lighthouse, the following performance is obtained (see Figure 6).



**Figure 6.** Performance Benchmark with Google Lighthouse

Using the Laravel framework and several plugins such as QR-Code generators and converters from Docx to Pdf, the results are promising, with an average value above 70. This result can describe the information system's performance regarding the excellent or bad technical implementation of the information system. Yu stated that the experimental and simulation proved that web design based on a Laravel framework has scalability and robust scalability to improve the developing efficiency [11].

#### 4. Conclusion

In conclusion, it is found that using certificate templates can be helpful and easy because they can be reused on other people's certificates. The use of a QR-code can be a means of validating a certificate that has been issued so that the certificate can be checked for the authenticity and conformity of the information stated on the digital certificate. For further development, it is recommended to make comparisons on blockchain as a form of security and data validity from digital certificates. Therefore, we can get the truth or not the use of blockchain technology in digital certificate certificates

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