Online Diploma Supplement Information System Modelling for Indonesian Higher Education Institution

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Abstract. According to the Regulation of the Minister of Education and Culture of the Republic of Indonesia in 2014 at article number 81, a Higher Education Institution must include a Diploma Supplement along with a Diploma document and the Grade Transcript document. Diploma Supplement should contain data about academic achievements and qualifications of students during lectures. A mechanism is needed to collect the data. This study objective is to recognise the minimum system requirement that compliant to the current regulation and then create design an information system that can support data for creating Diploma Supplement document. This research used descriptive qualitative method. The result of this study is to create a system model for a Diploma Supplement information system based on current information system of a higher education institution.

1. Introduction

The Diploma Supplement is a document issued to graduates by the awarding institution in addition to the degree or diploma document. The purpose is to make the qualification more portable and its value more transparent by providing a description of the nature, level, context and status of the studies that were pursued and completed by the graduate, as well as information about the education system to which the qualification belongs [1].

The origins of the Diploma Supplement lie in the particular European need for an improvement in the recognition of higher education degrees originating from a relatively large number of quite diverse higher education systems [1]. It began with the Sorbonne Declaration in 1998 by ministers from 4 European countries followed by a meeting in 1999 in Bologna attended by ministers from 30 European countries that produced the Bologna Declaration [2]. When the European ministers of education signed the Bologna Declaration in June 1999 they committed themselves, and engaged their countries, to fundamental changes within their higher education system [3]. Last Ministerial conference was held in May 2018 in Paris.

Now the Bologna Declaration is 20 years old and has spread and made influence globally [4], including in Indonesia. According to the Regulation of the Minister of Education and Culture of the Republic of Indonesia in 2014 at article number 81, a Higher Education Institution must include a Diploma Supplement along with a Diploma document and the Grade Transcript document. Diploma Supplement is an official statement issued by the Higher Education, containing information about the academic achievement or qualifications of higher education graduates where graduate qualifications are described in the form of descriptive narratives that state the achievements of graduate learning at the relevant to the Framework of Indonesian National Qualification [5] level, in a standard format that is easily understood by general public.

Some universities in Indonesia have provided Diploma Supplement. Generally, the data that will be printed on the Diploma Supplement is collected based on data collected from students, both conventionally (spreadsheet format) or even through information systems provided by universities. For
example, at the University of Indonesia supporting data for Diploma Supplement using information systems called SIPRESMA UI (student achievement information systems, University of Indonesia), while in Bandung Institute of Technology uses the SI-PRESTASI (Student achievement and activities information system) [6], and in Bogor Agricultural Institute uses SIMAWA (Student Information System).

2. Method
The research methods used in this study include the following. This stage is used to recognize the minimal requirement for developing/designing a system that will produce diploma supplement. In this step a review will be made of the government regulations underlying the issuance of the diploma supplement which is the Minister of Education and Culture of the Republic of Indonesia Regulation No. 81 of 2014. Analysis of the current system, in this stage, the current system will be analyzed, to see what already exists and what does not yet exist. Analysis is carried out on ongoing procedures, information systems and database. Designing of new system, in this stage, a new system design is created. The step taken is how to apply the rules for issuing Diploma Supplement so that it can be implemented in the current system.

3. Results and Discussion
3.1. Understanding the Regulation
According to the Regulation of Minister of Education and Culture of Indonesia No. 81 of 2014, a Diploma Supplement at least consists of:

a. Higher education institution logo
b. Name of higher education institution
c. Higher education institution establishment number
d. Name of department
e. Full name of the owner
f. Birth date and place of the owner
g. Student identification number
h. Entry and graduation date
i. Diploma serial number
j. Title and its abbreviation
k. Type of education (academic, vocational or profession)
l. Education program (diploma, applied bachelor, applied master, applied doctorate, bachelor, master, doctoral, professional, or specialist)
m. Achievement of graduate learning in accordance with the framework of Indonesian National Qualifications in narrative style
n. Indonesian National Qualification Framework
o. Minimum acceptance requirement
p. Lecture language
q. Assessment system
r. Study Period
s. Advanced higher education type and program
t. Higher education system schemes,
u. Additional information about graduates' achievements during their student status (optionally)
v. Positions in the profession. (optionally)

Diploma Supplement can be written in Bahasa Indonesia and English, and must be signed by Rector, Dean or Head of Department. In the regulation, Diploma Supplement must be printed on special paper (barcode / hologram security paper) with logo of Higher Education, which is issued specifically by Universities. This means that this document must have high validity which is not easy to fake.
3.2. Analysis of the current system

In general, higher education institution already have an information system that records academic activities, starting from the process of admitting new students to graduation activities. A research suggesting an e-Diploma system [7]. A system information in a higher education institution usually already have a system that can support for creating of Diploma Supplement such as student management subsystem, achievement management subsystem and graduate management subsystem. Figure 1, 2, and 3 illustrate the procedures that currently used in the institution.

Figure 1. Student management procedure.

Figure 2. Achievement management procedure
Figure 3. Graduates management procedure

Database relation scheme from an academic information system used by institution can be seen at Figure 4.

Figure 4. Relation scheme of higher education system information database.

Current conditions are not sufficient to support the diploma supplement manufacturing system. There are some parts that have not been handled, which are the Indonesian National Qualification Framework data collection, learning achievement, Indonesian higher education schemes, data collection on internships, and additional training / certification.

3.3. Design new system
The new system developed to obtain and facilitating higher education institutions in issuing Diploma Supplement as a companion letter to their graduates' diplomas. The system is designed to be a web based system, so that they can be accessed by various parties (users) whenever and wherever they are. System users are entities contained within the higher education institution environment in accordance with their functions and roles. This system is designed to retrieve data from systems that have been developed
previously. This is intended to avoid repeated data entry. The system to be developed is required to have a high level of security because it deals with important documents that cannot be easily faked. This can be realized by applying a layer of security on the server side [8].

The basic functionalities in this system including functional data input, data validation, Diploma Supplement printing and Diploma Supplement signing. In order to complete the user’s Diploma Supplement data, students can complete the profile of their students regarding achievements, workshops, training and certification in the system [9,10]. While the department (Study Program) and Academic Staff are tasked with inputting the Indonesian Qualification Framework data. The Curriculum Division and the Secretariat of Department are tasked with verifying Indonesian Qualification Framework data other supporting data. Figure 5 shows the architecture of proposed system.

![Figure 5. System Architecture](image_url)

There are six user that involved in this system, such as:

1. Student (Mahasiswa): students can enter training data, workshops, seminars, certifications and internships, including data that supporting the achievements and activities that was followed while being a student.
2. Student affairs (Bagian Kemahasiswaan): Manage student achievement record.
3. Curriculum Division: validate department’s Indonesian Qualification Framework.
4. Department Staff (Prodi): validate Diploma Supplement data.
5. Academic Affair (Bagian Akademik): Prints Diploma Supplement
6. Dean/Head Of Department (Dekan/Kaprodi): Signing Diploma Supplement
Figure 6 illustrate the Use Case diagram of the proposed system that show connection between involved procedures (indicated by use case) and users.

![Use Case Diagram](image)

**Figure 6.** Use Case Diagram.

The database model used in the development of this system uses databases that already exist in the university's academic system, coupled with several new tables to produce the Diploma Supplement format that complies with the regulations. The proposed database changes in this application can be seen in Figure 7.
Figure 7. Proposed Database Relation Schema

The lower part of database relation schema is the additional tables to accommodate data supporting for Diploma Supplement system.

4. Conclusion
The development of a business model / procedure that can be used for implementing in issuing Diploma Supplement for Indonesian higher education institution. Model development has functions that have been adjusted to access rights and interests with users so that they are used easy to adapt to the application developed. The data model developed uses data from existing systems, so that the issuing Diploma Supplement becomes more effective and efficient.

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