

# Development of Information Systems Models Management for Students

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## ABSTRACT

Student management is an important part that must be considered by schools. The government has made standardized rules for how schools can manage students so that they are in accordance with National Education Standards. Student management activities start from registration, until student services that have been arranged neatly, may not run optimally, if schools are still manual in tidying student data collection. By him the role of student management information systems is very important for every school to have. This study aims to determine how schools can create student management information systems that are feasible and effective.

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## 1. INTRODUCTION

School is an institution that accepts students as input and how to manage it with various existing components to become outputs that are needed in the community. Schools must refer to all aspects contained in Permendiknas No. 19 of 2007 concerning the management of the education system, starting from how schools plan, implement, supervise and make evaluations (Thomas & Asselin, 2018; Sengkey *et al.*, 2019; Suhada *et al.*, 2019).

In the stages of the process, schools are required to perfect education standards including the standards of educators and teaching staff, curriculum, finance, facilities and infrastructure, as well as management. Of course, it was made so that the Government can easily assess how an educational institution is managing its education well (García Redondo, 2016). In addition to achieving national education goals, the Government to achieve also strives equitable distribution of education at various levels, from various locations both in cities and villages, as targeted.

The management aspects of students certainly become quite urgent. Students as objects that get treatment from the environment and various other instruments are the outcomes expected by the community. The government regulates how schools plan, recruit students, placement, guidance, administration, evaluation and provide services

to students (Ochwo, 2018; Ikawati *et al.*, 2019).

Student management activities start from registration, until student services that have been prepared carefully, do not always produce results as expected. Although in the stages of the function management, the school principal has tried to do the directing well and motivates optimally to achieve educational goals, it is not yet perfect, if the school is still manual in tidying the student database. Therefore, the role of management information systems for students is very important for every school. Schools in implementing a management information system should carry out a series of activities, namely; capturing, verifying, classifying, summarizing, calculating, storing, retrieving, reproducing and disseminating (Paragina, Paragina, Jipa, Savu, & Dumitrescu, 2011).

This study aims to determine how the feasibility and effectiveness of the information system model of students using the spiral model.

## Model Development

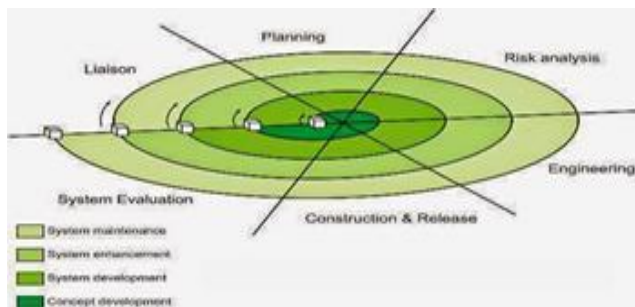
Model as a simplification of forms, processes, physical phenomena or complex ideas. Because the reality that is too broad can be described and complexity simplified into unique and specific situations. Ideas or manifestations of something so broad, by the designer with the ability and

creativity, are simplified into patterns interesting or specific images.

Development is the process, way, and implementation of developing. then the development of the model in this study is a process of thought patterns in the form of designs consisting of interrelated components and represented in graphical or narrative form that is used as a reference guide to realizing a concept that is developed in a measurable manner (Holland, 2018; Gartika *et al.*, 2019). Development of the model at least there are components of needs analysis, the purpose of model development, systematic model development, and evaluation of the development of the model.

## Spiral Model

The spiral model originally proposed by Boehm is an evolutionary software process model that assembles the iterative nature of prototypes using control and systematic aspects of linear sequential models. Iterative models are characterized by behaviours that allow developers to develop more versions of the software to gradually complete. Stages of the spiral model, namely communication to users, planning, risk analysis, engineering, construction, and evaluation (Sommerville, 2016).



**Figure 1.** Model SDLC System with Spiral

The stages can be explained as follows: User communication (liaison), namely tasks to establish communication between users and the needs of the needs desired by the user. Planning tasks that are to define resources, timeliness, and project information other relevant. Risk analysis that the tasks required to assess risks and technical management. Engineering that is the task needed to build one or more representations of

the application. Construction that the tasks required to construct, test, install, and provide service to the user. Evaluation. namely, tasks to get feedback from customers (Pressman, 2017).

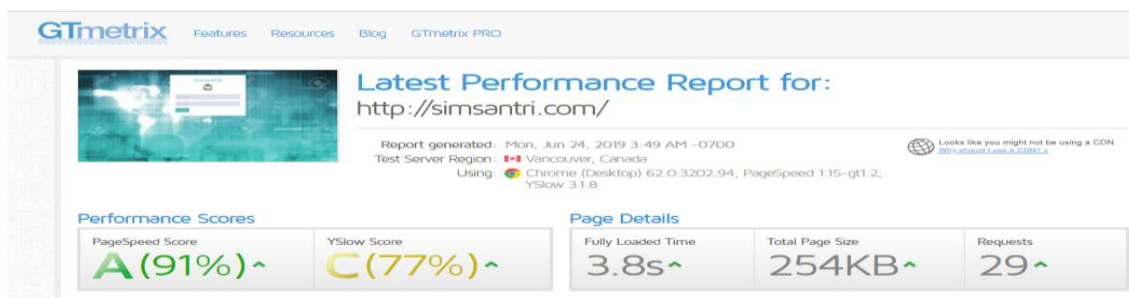
## Management Information System

An information system is a collection of information components that are collected, processed, prepared and distributed to support organizational decision making and control. Information is collected and then management is taken into consideration by managers in the organizational decision-making process (Ezell *et al.*, 2019).

The information system that has been managed can be in the form of reports and can be displayed to managers in managing the organization. The information that is managed should be complete, accurate and up to date. Because changes in the environmental organizations both externally and internally so quickly affect organizational performance. Information management is an appropriate strategy in dealing with organizational change and transformation, so that needed complete, accurate and up-to-date information is. Management information systems function to develop, implement and manage information technology, software and portfolio applications that are used to support the progress of the organization. system management Information is managing information using information technology (website, digital, e-mail, software, etc.), with the use of information technology, it can accelerate and facilitate the (latest) update of information in organizational development (Akaranga, 2016).

## 2. METHODS

The approach in this study uses a research and development approach. The method used is the system development life cycle or better known as SDLC is a methodology generalised to develop information systems. SDLC consists of several phases starting from the planning, analysis, design, development, testing, implementation and system maintenance phases. The concept SDLC underlies various types of software development models to form a framework for planning and controlling the making of information systems. The SDLC model that will be used in this study is the spiral model.



**Figure 2.** On the GTMetrix report home page

The spiral model originally proposed by Boehm is an evolutionary software process model that assembles the iterative nature of the prototype using control and systematic aspects of the linear sequential model. Iterative models are characterized by behaviours that allow developers to develop more versions of the software to gradually complete. The spiral model becomes a realistic approach to the development of systems and large-scale software. Because software continues to work during the process of movement, developers and users understand and react better to risks at each level of evolution. The spiral model uses prototype 2 Fonna et al. International Journal for Educational and Vocational Studies as a risk reduction mechanism (Sommerville, 2016).

This research was conducted at the Al Ashriyyah Nurul Iman Islamic Boarding School Foundation, Parung Bogor. The level of education that is the object of research is the level of elementary schools (SD) and junior high schools (SMP), and senior high schools (SMA), Nurul Iman Islamic High School (STAI) for approximately 12 months from the initial stage (analysis needs, data collection) to the final stage (testing model).

### 3. RESULTS AND DISCUSSION

#### 3.1 Aspects of Performance Efficiency

Testing aspects of performance efficiency using tools from GTMetrix online. The standard values given are from A to F with an average percentage of 79% seen from the PageSpeed Score and rules YSlow Score.

Figure 2. on the GTMetrix report home page explains the measurement results with PageSpeed of 91% grade A, YSlow 77% grade A, the response time of 3.8 s, the total page size of 254KB and 29 requests

#### 3.2 Aspect of Usability

Usability testing using the USE Questionnaire has 10 statements as measured by a Likert scale. The USE Questionnaire Questionnaire was given to 30 respondents consisting of Principals, Teachers, Parents and Students.

The recapitulation of the usability aspect test results is shown in table 1.

**Table 1.** Calculation of Test Scores

Choose	Amount	Score	Amount X Score
SS	286	5	1430
S	545	4	2180
KS	67	3	201
TS	0	2	0
STS	0	1	0
			3811

Usability: Maximum score = number of respondents x number of questionnaires x 5. So the percentage is 84.69%. The results of the percentage of usability aspects testing are 84.69% which is then converted to a qualitative scale which means "Very Eligible" and meets the standard aspects of usability.

#### 3.3 Aspects of Security

In testing security using the application Acunetix Web Vulnerability Scanner 10. Security testing on information systems reports student learning outcomes to have a level of vulnerability to attacks that are at level 1. Vulnerability to level 1 or low-level attacks indicates the vulnerability comes from a lack of encryption traffic data or directory path disclosure (Acunetix, 2013).

Based on the test results shown it can be concluded that the management information system of students has met the security standards because the level of a vulnerability is below level 2 or medium.

#### 3.4 Aspects of Reliability

In reliability testing performed with the WAPT 9.3 tool, a scenario with 20 virtual users created in 10 minutes was. Tests for the admin profile show 100% success results, with sessions 20, pages 2430 and 3179 hits as described in Figure 3.



**Figure 3.** Aspects of Reliability

#### 3.5 Aspects of Maintainability

Testing the maintainability aspect is carried out using the

Semantic Design tool to measure Halstead Volume, Lines of Code and Cyclomatic Complexity values which are then used in calculating the values Maintainability Index. The

test results maintainability of on the module. the controller data analysis was obtained from the average results of the calculation of the two values of maintainability index all existing modules.

#### 4. CONCLUSION

The study concluded that the development of management information system model learners tested through aspect Efficiency Performance, aspects, Usability aspects, security aspects of Reliability and Maintainability aspects as feasible and effective.

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