Design of school development information system in the district

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Abstract. The development of primary schools in a district needs to be monitored to make it easier for the education office to manage primary school resources effectively. This monitoring can be done through a system that provides information about the profiles of principals, teachers, and students in each elementary school in the district area. Documents containing primary school data are sometimes so numerous that a paper-free computerized information system can be chosen to overcome them. Based on these problems, the purpose of this study is to build an information system for elementary school development in web-based districts. This information system is designed using the Unified Approach method which consists of stages of object-oriented analysis, design and programming. The results of the study are systems that can store school data, school principals, teachers and students to make school progress reports per school year. The resulting system can be studied by users in the education office in about two hours with an absorption rate of 87%. The benefit gained is that it is known that the development of elementary school conditions in all districts is used to plan further development of primary schools.

1. Introduction

The primary school data development information system in the district is the primary school data processing system in Garut Regency. This information system is a system that is needed by the Sub Division of Planning, Evaluation and Reporting of the Garut Education Office to help smooth the collection of schooling data with a limited scope that includes principals, teachers, and students. The school data was obtained from all elementary schools in Garut Regency, totalling 1584 spread in 42 districts [1].

The use of information technology for school administration in Indonesia has been carried out through the Basic Education Data (Data Pokok Pendidikan, Dapodik), an integrated national scale school data collection system [2]. The Dapodik system has been developed since 2006 and experienced several obstacles and was even stopped in 2011 and was rebuilt and developed until now into a complex system. This system tries to meet schooling information needs including scholarships, BOS funds and teacher careers. In addition to having advantages, Dapodik also has shortcomings that reap dissatisfaction with stakeholders [3]. Deficiencies in the development of information systems for national scale governments are, among others, strongly influenced by policy changes, slow decision making, difficult to coordinate between institutions and so on [4].

This needs to be overcome by creating a custom information system, which is a system that is made according to the needs of the department that needs it, in addition to its scope only in the district, the
data it manages can also be limited [5]. Based on all these considerations, this study aims to design and develop information systems for data development in elementary schools in the district. The existence of a primary school development information system in the district will encourage the facilitation of primary schools in remote areas to access ICT. This will open up opportunities for increasing the level of the economy to remote sub districts [6].

2. Methodology
The design of the school development system uses the Unified Approach (UA) [7] development method which consists of the Object-Oriented Analysis (OOA) and Object-Oriented Design (OOD) stages [8]. The analysis phase includes the stages of identifying actors developing activity diagrams, use cases, and sequence diagrams, as well as identifying classes, relations, attributes and methods. The design phase includes designing design classes, attributes, methods, access layers, interface layers and business layers. This system is designed using UML and is built using PHP and My SQL, with appropriate hardware. The integration between analysis methods and object-oriented design is used to anticipate the development of the next system if it is increasingly complex. As is known object-oriented programming is very efficient for complex systems [9]. This system is built based on the web with the aim that the system can be accessed by school operators so that they can fill in data from each school.

3. Result and discussion
The design results are described according to the UA method which consists of two stages, first the OOA stage followed by the OOD stage. In processing primary school development data there is a description of the system used by the Garut Regency Education Office. At the OOA stage the overall system is depicted through a business process with the main objective to find the classes needed in system development. The business process of processing primary school development data in the Garut Regency Education Office is shown in Figure 1.

![Figure 1. Business process system in Garut Regency Education office.](image-url)
The business process shows that the school collects school data, school principals, teachers and students to be submitted to the District Education Office. The officer at the Education Office checks the data. If it is incomplete, then the data is returned to the school. Complete data by the Education Office is recapitulated. The Office of Education operator processes the data collected to make a report on the progress of elementary school education.

The OOA phase consists of the process of identifying Actors, compiling Activity Diagrams, Use Cases and sequence Diagrams, identifying Classes, Relationships, Attributes and Methods. Actors involved in this system are School Operators and Education Service Officers as shown in Figure 1. School Operators / External receiving actors are tasked with receiving school data entry forms, filling in school data forms and submitting school data to the Garut District Education Office.

The official of the Education Office is in charge of receiving school data entry documents, carrying out data recapitulation and making elementary school data development reports. In the first OOD stage, design classes, attributes, methods, and structures are carried out, namely the examination of the classes obtained from the results of the analysis phase. In designing this stage, adding attributes and visibility to each attribute and operations are performed to complete the class diagram.

Figure 2 is a class diagram drawing in the UA design. This class diagram provides information on the relationship between class districts, schools, principals, teachers and students. The relationship in the form of cardinality is shown in Figure 2 in the form of values 1 and n (many). Examples of cardinalities between districts and schools state that one district has one or more schools, and so on. Class Diagrams are used to build a database, where each class has attributes and methods that are adapted to the elementary school development report [10].

The results of the design view and access layers are shown in Figure 3. Design View illustrates the system interface design in the form of menus that can be accessed by users. Users can enter and change data districts, schools, principals, teachers, and students. In addition to filling out and processing data, users can obtain school condition reports within a certain time unit. The system was built using PHP software with the My SQL database builder language [11] on a computer with the appropriate specifications. The information system that was built was tested with school operators and service operators. The level of mastery of the system by the operator was tested using tests before and after training giving very satisfying results that is 87% within 2 hours of training.
Figure 3. Access and business layer of system.

Application testing phase is carried out by testing the system's functions from charging all data to the test reports generated by this system [12]. Management of data entered, including adding data, editing data, and deleting data. The system output is a reliable report, so the report must be able to be printed and signed by the authorities [13]. This system can also search data on school data, school principal data, teacher data and student data as material for primary school data reports per school year. The resulting system prototype is shown in Figure 4, Figure 5 and Figure 6.
As an information system for developing elementary school district data this system has worked well, because the basis of the educational development plan is information about students, teachers, and school principals [14]. This information can be used for developing learning methods [15], preparing infrastructure [16], and preparing better human resources [17]. Nevertheless this system still needs to be equipped with a chat feature between school operators and administrators in the District Service, so that filling in primary school data runs smoothly [18].

4. Conclusion
This study shows that the UA method has been used successfully to analyse and design Information Systems for Developing Primary School Data in the District. The resulting information system can assist the Office of Education in recording school data which includes data on school principals, teachers, and students as well as producing periodic school condition reports. The system is easy to use so operators can quickly learn it.

References
[1] Badan Pusat Statistik Garut 2020 Kabupaten Garut dalam Angka 2020 (Garut: Badan Pusat Statistik Garut)
[2] Andi N and Sarwati R 2019 Using OwnCloud and LibreOffice in supporting the making of
DAPODIC REPORT books International Journal of Open Information Technologies 7(12)  
[3] Wibowo T 2017 Study of User Acceptance and Satisfaction of a Mandatory Government-Regulated Information System CommIT (Communication and Information Technology) Journal 11(1) 41-44  
[4] Anthopoulos L, Reddick C G, Giannakidou I and Mavridis N 2016 Why e-government projects fail? An analysis of the Healthcare gov website Government Information Quarterly 33(1) 161-173  
[5] Supriatna A D, Kurniawati R, Fatimah D D S, Irfan M Zulfikar W B, Alam C N and Slamet C 2018 Designing academic advising information system using prototyping method In IOP Conference Series: Materials Science and Engineering 434  
[6] Fatimah D D S, Kurniawati R, Farida I and Pariyatin Y 2019 Website for remote village empowerment in developing countries In Journal of Physics: Conference Series 1402(7) 077009  
[7] Bahrami A 1999 Object Oriented Systems Development (Singapore: Mc Graw Hill)  
[8] Sari Y S 2018 Analysis and Design Outpatient Administration Information System With Object Oriented Methodology International Educational Journal of Science and Engineering 1(4)  
[9] Kaplanoğlu V 2016 An object-oriented approach for multi-objective flexible job-shop scheduling problem Expert Systems with Applications 45 71-84  
[10] Latukolan M L A, Arwan A and Ananta M T 2019 Pengembangan Sistem Pemetaan Otomatis Entity Relationship Diagram Ke Dalam Database Jurnal Pengembangan Teknologi Informasi dan Ilmu Komputer  
[11] Fatimah D D S, Tresnawati D and Rahayu R E G 2019 Body weight anthropometry expert system for disease diagnosis In Journal of Physics: Conference Series 1402(7) 077007  
[12] Amalfitano D, Riccio V, Tramontana P and Fasolino A R 2020 Do Memories Haunt You? An Automated Black Box Testing Approach for Detecting Memory Leaks in Android Apps IEEE Access 8 12217-12231  
[13] Guimaraes T and Madeira G 2018 Testing some important factors for city e-gov implementation success Electronic Government an International Journal 14(4) 340-358  
[14] Nousiainen T, Kangas M, Rikala J and Vesisenaho M 2018 Teacher competencies in game-based pedagogy Teaching and Teacher Education 74 85-97  
[15] Pirhonen J and Rasi P 2017 Student-generated instructional videos facilitate learning through positive emotions Journal of Biological Education 51(3) 215-227  
[16] Chapman J D, MacDonald S T, Arnold A G and Chapman R S 2018 An Analysis of Higher Education Facility Expansion Journal of Business and Educational Leadership 8(1) 66-85  
[17] Oke T I and Kefas S R 2019 Education and Human Resources Planning for Sustainable National Development in Nigeria KIU Journal of Humanities 3(4) 17-25  
[18] Baharon B M, Yap C S, Ashar S F E, Hanafi M H H M and Hazmi M S R M 2017 Citizen Satisfaction with E-Government Portals in Malaysia International Journal of Business and Information 12(3) 289-309