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Ade Gafar Abdullah
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# Advanced Research in Innovation Engineering and Vocational Education

Proceedings of The 2nd International Conference on Innovation in Engineering and Vocational Education (The 2nd ICIEVE 2017)
25–26 October 2017, Manado, Indonesia

IOP Conference Series

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## Preface

The 2nd ICIEVE 2017, the International Conference on Innovation in Engineering and Vocational Education, held on October 25-26, 2017 at Aryaduta Hotel, Manado, North, Sulawesi, Indonesia, is hosted by Universitas Pendidikan Indonesia (Indonesia), Universitas Negeri Manado (Indonesia), and Rajamangala University of Technology Thanyaburi (Thailand).

The conference was a platform for scientists, scholars, engineers, industrial professionals, and researchers to exchange, share, and discuss their innovation, experiences, research works and problem solving techniques in all issues in engineering and vocational education.

The participants of ICIEVE 2017 were from around the world with a variety of background, including academics, industry, and even well-known enterprise. In general, there were 140 papers discussing such various topics as engineering and technology innovation (mechanical engineering, chemical engineering, civil engineering, etc.), engineering education (basic science in engineering education, engineering education reforms, new technologies in education, etc.), and vocational education and training (industry-driven training programs and collaborations, lifelong learning – reskilling and upskilling, government and policy, etc.).

We would like to thank all of those who helped and supported ICIEVE 2017. Each individual and institution's support was very important for the success of this conference. Specifically, we would like to acknowledge the advisory board, scientific committee, and organizing committee for their valuable advice, help, suggestions, and support in the organization and helpful peer-reviewing process of the papers. This year, we would like to express our deepest gratitude for all the co-hosts of ICIEVE 2017, UNIMA, Indonesia, and Rajamangala University of Technology Thanyaburi, Thailand for the collaboration. We would also extend our best gratitude to keynote speakers for their valuable contribution for sharing ideas and knowledge in the ICIEVE 2017.

We sincerely hope that ICIEVE 2017 will be a forum for excellent discussions for improving the quality of research and development in relation to innovation in engineering and vocational education. We also hope that this forum will put forward new ideas and promote collaborative researches among participants. We believe that the proceedings can serve as an important research source of reference and the knowledge. Indeed, the proceedings will lead to not only scientific and engineering progress but also other new products and processes for better science and technology in vocational education.

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### Preface



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# Job and Workload Analysis System for Civil Servants in North Sulawesi Province, Indonesia

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**Abstract.** This study aims to create automation system to assist sub division of job analysis and workload of North Sulawesi, Indonesia in completing its annual tasks to record all civil servants. The method used in this research is prototyping where a system will be developed according to the revision supplied by the user. The result of this research is a system used to generate reports and calculations based on user filled forms. The result gathered from the interviews, users can make reports faster and easier. Users can also optimise reports on time using the built system.

## 1. Introduction

In the effort to build clean and good government, the improvement of usability, effectiveness, transparency and accountability of government administration becomes very important and urgent [1]. But it would be a utopian joke if the governance work is still abstract, unspecified, and overlapping [2]. As a result, work aspects such as workload, work, implementation mechanisms and workflows become irregular and unpredictable, which ultimately raises major doubts about the accuracy, precision and reliability of government performance [3].

The provincial government of North Sulawesi is one of the provinces experiencing difficulties in conducting job analysis. The problems faced by North Sulawesi government today are the job analysis model and the workload is still done manually, which is very time and energy consuming. As a result, the level of achievement of North Sulawesi Government position analysis does not reach 100%, for example achievement analysis and work load in 2015 which is still at 90% level even though it has been done for full year. This makes the North Sulawesi government difficult to obtain complete information to make adjustments to the amount of remuneration and performance allowances for civil servants.

To solve the problems, several researchers have suggested the following strategis: using metadata analysys [4] assessment by simulation [5], managed acceleration for In-Memory database analytic workloads [6], and classifies the current cognitive task analysis methods for job or task design and analysis [7]. However, several problems still persisted. So building a modern system, effective and easy to use in conducting job analysis becomes an urgent need [8] for the Government of South Sulawesi. Information technology strategy is proposed as a solution to the problems that occur. An

information technology-based system will be built to link human components and performance, hardware, and software. The mechanism of job analysis is stipulated in a standardized, consistent and reliable program, which is expected to be a useful application of information technology model to support the performance of local government, especially in North Sulawesi .

Specifically this research aims to build a system that helps the implementation process of job analysis and analysis of civil servant's workload in North Sulawesi Provincial Government and its report of recapitulation.

## 2. Methods

Tools (software) designed in this study, is expected to overcome the problems obtained from problem analysis by providing the following functions; (1) Provide easy-to-fill job analysis forms and easily accessible guides and dictionaries. (2) Establish inspection methods performed during charging, in an effort to build a consistent database. (3) Produce reporting results right after completion of the filling, so that the inspection and reporting time can be shortened.

System development is done using prototyping method which is used stages to build it [9]. These stages including: (1)Interviewing users in Job and Workload Analysis Department for new system requirements, (2) A preliminary design is created for the new system, (3) A first prototype named Sistem Informasi Analisis Jabatan dan Beban Kerja (SINJAB) built based on the design, (4) The users thoroughly evaluate the first prototype, noting its strengths and weaknesses, what needs to be added, and what should to be removed. Revision made mostly at interface design and form, (5) The second prototype is evaluated in the same manner as was the first prototype, (6) The preceding steps are iterated three times, until the users are satisfied that the prototype represents the final product desired, (7)The final system is thoroughly evaluated and tested. Routine maintenance is carried out on a continuing basis to prevent large-scale failures and to minimize downtime.

There are two types of positions that need to be analyzed in accordance with the structure of North Sulawesi provincial government. Both types of positions are structural positions and general functional positions. Process Analysis on Sub Division of Position Analysis is done to know the flow of each process of implementation analysis of civil service positions in the Government of North Sulawesi province.

The design of information technology-based systems using Windows platform with Visual Studio media [10]. Visual Studio.NET is an integrated environment to build and perform Testing and Debugging of various applications. The Visual Studio .NET platform, will be easier to create applications because in Visual Studio .NET there are new support facilities added, including Integrated Development Environment (IDE), Microsoft Intellisense, better debugging and capabilities in XML Web Services.

Table 1 shows analysis of needs to be built in accordance with the needs of Sub Division Job Analysis.

**Table 1.** Needs analysis.

| Data source | Process | Outcome |
|---|---|---|
| Job description and specification in each regional level work units, Dinas, and Bureau | Conducting suitability checks and similarity of input data according to position analysis guidance | Job analysis document and workload analysis |
| Workload in each regional lever work units, Dinas, dan Bureau | | Database of job analysis and workload |

Then it can be concluded that the main data needed is the job description information, job specifications and workload of regional level work units, service, and bureau. As per the form, the filled data consists of 34 points. Each point must be a process of examination both in terms of conformity and similarity of data input. This is necessary because the result of filling in the job

analysis form will be attached along with the recapitulation of job analysis report and work load. This report will then determine the performance allowances and remuneration of civil servants.

## 3. Results and Discussion

The result of the research is a system called Sistem Analisis Jabatan dan Beban Kerja (SINJAB). This system needs to be installed on the user's computer with Windows operating system with version 7.0 and above. Figure 1 shows the menus of SINJAB. SINJAB can be used after the user enters the username and password. The SINJAB system consists of 4 menus, but the analysis uses only 1 menu.


**Figure 1.** SINJAB's home screen.

SINJAB consists of the following functions : (1) Provide easy-to-fill job analysis forms and easily accessible guides and dictionaries, (2) Make a method of inspection conducted during charging takes place so that the data input entries can be guaranteed, and (3) Make reporting results right after the completion of the filling, so that the examination time and preparation of reports can be shortened.

Table 2 shows how the system works can be described as follows:

**Table 2.** SINJAB's works.

| Input | Process | Output |
|---|---|---|
| a. Position data of Work Unit Regional, Department, and Bureau<br>b. Data on workload of Work Unit Regional, Department, and Bureau | - Conduct fit and suitability inspection of input data according to dictionary and position analysis guide | - Job analysis document and workload analysis.<br>- Recapitulation Report of job analysis result and work load |

Based on Table 2, in Job analysis document and workload analysis, the test is divided into two phases, where the first phase will be tested by the sub-division head and staff of job analysis and workload of the North Sulawesi governor's office. The second phase will be tested by staff of job analysis and workload of several work units in North Sulawesi.

In the first phase the tester acknowledges that the system shortens the processing time because the form is populated digitally and the report automatically fills out based on form fields. however, some user interfaces improvements are made to facilitate form filling.

The second phase was conducted directly on the staff of various work units in North Sulawesi Province, inviting 50 analytical staff from various municipalities and districts. Before using SINJAB, the participants were trained and assisted with the installation on their respective laptops.

Most of the test participants in the second phase (48 out of 50) felt helped by the new system being used. The average time required to fill both forms (occupation and workload) is 30 minutes, compared to the previous 5 hours. The participants were also satisfied that the work could also be taken home. Tab order makes the data charging process more organized and not confusing. Report templates in the form of word and excel automatically generated after the data is stored in the application.

## 4. Conclusions

The results of this study indicate that information technology can speed up the analysis and documents required in government. Job analysis and workload are part of the North Sulawesi provincial government offices that benefit from this. While still under consideration, it is likely that this system will be diverted through the web so that it is easily accessible to all parts of government in the province. Also implementation in other provinces needed to improve national performance

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