Development of Workload Analysis Model According to Job Mapping for Human Resources Optimalization Based on Employee's Competencies at Bbppmpv Bmti

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Article Information:

Abstract

All of employees at Vocational Education Quality Assurance Development Center from the Leadership to the Executor structure, work in accordance with the job mapping whose number and workload have been determined by the government. However, in daily tasks there are still employees who work overload and some are underloaded. So far, the workload of employees is determined by regulations which mostly calculate the employee's burden based on the physical workload, while the calculation of the workload based on the mental workload has barely been touched. The purpose of this study is to understand how to develop a workload analysis model according to job maps for optimizing human resources based on employee competencies. The formulation of the issue on this study is how to develop a workload analysis model according to the job map for optimizing human resources based on employee competencies. Analysis of the models is done by examining the existing workload analysis models, then making comparisons between each model, where the research step begins with a literature study and field observations. The development of the model is carried out by the following steps: determining the objectives or defining the problem, making a conceptual model, formulating the model, analyzing and the model solving, as well as the use of models. where the research step begins with a literature study and field observations. The development of the model is carried out by the following steps: determining the objectives or defining the problem, making a conceptual model, formulating the model, analyzing and the model solving, as well as the use of models. where the research step begins with a literature study and field observations. The development of the model is carried out by the following steps: determining the objectives or defining the problem, making a conceptual model, formulating the model, analyzing and the model solving, as well as the use of models.

A. INTRODUCTION

The administrative division at The Center for Quality Assurance Development of Vocational Education in Mechanical and Industrial Engineering (Balai Besar Pengembangan Penjaminan Mutu Pendidikan Vokasi/BBPPMPV BMTI) carries out functions, among others: the affairs of the preparation of program plans and budgets, the implementation of financial affairs, the implementation of correspondence and archival affairs, the implementation of household affairs and public relations, the implementation of administrative and staffing affairs, and the implementation of state property affairs, in accordance with Permendikbud No. 26 of 2020.

BBPMPPV BMTI is a government education and training institution that organizes training for educators and education personnel in the field of vocational education and guarantees the quality of vocational education. BBPMPPV BMTI currently has Human Resources consisting of 164 civil servants and 84 PPNPN. The 164 civil servants have positions including: structural, trainer, planner, manager of procurement of goods and services, developer of learning technology, librarian, and implementing staff. The 86 PPNPNs carry out their duties, among others as: medical personnel, administrative staff, drivers, technicians, public service units,room boy in dormitories, and cleaning staff. Knowledge of resource management, especially about human resources is needed to achieve organizational goals. Furthermore, analytical techniques related to human resources and existing workloads are expected to maximize the function of the institution.

1. Background

All employees at BBPPMPV BMTI in their work, from the Leadership to the Executor, work according to the job mapping whose number and workload have been determined by the government. The job map is then filled in by the staff in accordance with their competencies. Competence is based on: education level, work experience, and competency test certificate. Employees who occupy positions according to the Job Mapping, have been selected by the staffing supervisor according to competence. However, in daily tasks there are still employees who work overload and some are underloaded. This incident, according to the author's observations, often occurs in similar government training institutions.

According to Dwiyanto (2012), the public bureaucracy in Indonesia has not been oriented towards performance and quality resulting in poor government performance. The poor performance of the bureaucracy is due to the weakness of public service human resources. As a result, the excellent performance that the government wants to realize is constrained by the weakness of public service bureaucratic human resources, so that the community is disadvantaged in their right to obtain excellent performance from the bureaucratic apparatus. This is related to the poor image and performance of the bureaucracy and the low public trust in government administration (Muhammad Deni, 2018).

So far, the workload of employees is determined by regulations which mostly calculate the employee's burden based on the physical workload, while the calculation of the workload based on the mental workload has barely been touched. Other factors that have often been studied apart from physical workload in employee performance are mostly limited to discipline and work motivation, while mental workload will explore more and more in terms of influencing factors.

The author views that physical workload and mental workload are two things that are very influential for an employee, therefore through this research it is hoped that a formula can be produced that can be used to maximize employee performance.

Research on the development of workload analysis models for mapping human resources has been carried out a lot, but the development of workload analysis models according to job maps for optimizing human resources based on employee competencies at government education and training institutions that organizes training for educators and education personnel in the field of vocational education and quality assurance Vocational education, as far as the author knows, has never been done.

Research on the Development of Workload Analysis Models According to Job Mappings for Optimization of Human Resources Based on Employee Competencies at

the Center for the Development of Quality Assurance for Vocational Education in the Mechanical and Industrial Engineering Sector, is expected to be a scientific reference in mapping human resources working in vocational training institutions, as well as training institutions in general.

2. Problem Formulation and Research Objectives

a. Formulation of the problem

The formulation of the problem in this research is how to develop a workload analysis model according to the job map for optimizing human resources based on employee competencies.

b. Research purposes

The purpose of this is to understand how to develop a workload analysis model according to the job map for optimizing human resources based on employee competencies.

B. THEORETICAL REVIEW

1. Model Development

According to Prawiradilaga (2008), the term model can be interpreted as an object or concept in the form of a graphic display, regular and systematic work procedures, and contains explanatory thoughts and suggestions used to present a thing.

Model development is an attempt to obtain a new model that has more capabilities in several aspects. Methods for analysis of workload calculations, among others:

a. Method Full Time Equivalent (FTE)

According to Adawiyah (2013), the workload calculation method with Full Time Equivalent (FTE) is a method where the time used to complete various jobs is compared to the effective working time available. FTE aims to simplify work measurement by converting workload hours to the number of people needed to complete a specific job. To get the FTE value from a work process is as follows:

$$\text{FTE} = (\text{Total working hours per year} + \text{Allowance}) / \text{Effective working hours per year} \tag{1}$$

b. Operational Audit (OA) Method

According to Sinambela (2016), this method is carried out to ensure the ability of each employee to be compared with the demands of the work to be carried out. This activity will ensure that existing human resources are over in workload or under in workload that can cause conditionsunmotivated. the stage of measuring the workload of the entire organizational unit using the OA method becomes a series of data for several years which is the demand for implementing regression analysis where the need for labor is the independent variable, while the workload is the dependent variable. The regression formula is implemented with the equation:

$$Y = a + bX \tag{2}$$

Y is the need for manpower and X is the workload, where the determination of HR needs can be done by dividing the workload needs with effective working hours per month for each person.

c. Approach Method Demand

Approach method demand calculate the workload that must be done on the basis of demand to produce units of product or service per time required. Thus, the workload also depends on the volume of business transactions that must be carried out by each workforce or organizational unit.

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To calculate the workload of organizational personnel, accurate information is needed about: the clarity of the main or supporting business transactions of each personnel and organizational unit; clarity of time required for each main or supporting business transaction; type and number of business transactions per day, per week, per month, or per year; the number of effective works per day in the organization; and the number of effective working days in a year in the organization. The formula for calculating the Workload/BK unit or personnel per day according to Ilyas is as follows:

$$\text{BK = Number of transactions per day X Time of each transaction} \qquad (3)$$

d. NASA-TLX method

According to Widiasih & Nuha (2018), the NASA-TLX method (National Aeronautics and Space Administration Task Load Index) is a method used to analyze the mental workload faced by workers who have to perform various activities in their work. The NASA-TLX method was developed by Sandra G. of the NASA research center and Lowell E. Staveland of San Jose State University in 1981. This method was developed based on the emergence of the need for subjective measurement consisting of a nine-factor scale: task difficulty, time, type of activity pressure, physical exertion, mental exertion, performance, frustration, stress, and fatigue.

NASA-TLX is a subjective method that is often used to measure the mental workload of individuals in various industries. In the NASA-TLX method, there are six components that will be measured from each individual, namely mental needs, physical needs, time needs, frustration levels, performance, and finally the level of effort. From each workload size, there is a scale that the respondent must fill in later. This is the first step in measuring workload. On the components of mental needs, physical needs, time integrity, and frustration levels, the scale used is low to high. Meanwhile, for performance measurement, a good to bad scale is used. For more details will be shown in Table 1 below.

Table 1. Qualifications of Workload Components, Scale, and Definition

Workload Component	Scale	Definition
Mental Needs (KM)	Low - High	Mental activity and perception are required to perform a task
Physical Needs (KF)	Low - High	Physical activity is required to perform a task
Time Requirement (KW)	Low - High	The time it takes to do a task
Frustration Level (TF)	Low - High	Mental and physical activity is needed to perform a task at a certain time
Performance (PF)	Good - Bad	Stress and/or overall satisfaction related to task complexity
Effort (U)	Low - High	The level of success or satisfaction and the level of completion of the given task

Source:Workload Analysis Using Work Sampling and NASA-TLX for Employee of Private University in Surabaya (2019)

After knowing the scale used to measure each component, the next step is data processing to obtain a workload (Hart, 2006). The steps are as follows:
Calculates the product value by multiplying the rating by the weighting factor for each descriptor, so that there are six product values for the six descriptors (KF, KM, KW, PF, U, and TS).

$$\textbf{Product = Rating x Weight Factor} \qquad (4)$$

Calculating the value of WWL (Weighted Workload) namely the workload caused by each descriptor with the equation:

$$\textbf{WWL = Product} \qquad (5)$$

Calculates the average WWL by dividing the WWL by the total number of weights 15.

$$\textbf{Average WWL = WWL / 15} \qquad (6)$$

In this study, NASA-TLX will be used as a method to determine the optimal number of employees. The determination of this amount will be based on the average WWL of each employee. There is a mental workload category, which can later indicate whether a job that is charged has a high or low load. Categorization follows Table 2.

Table 2. Range of Workload Category Values

No.	Value Range	Workload Category
1.	0% - 9%	Very low
2.	10% - 29%	Low
3.	30% - 49%	Moderate
4.	50% - 79%	High
5.	80% - 100%	Very high

Source:Workload Analysis Using Work Sampling and NASA-TLX for Employee of Private University in Surabaya (2019)

2. **Workload Analysis**

According to the Regulation of the Minister of State Apparatus Empowerment and Bureaucratic Reform of the Republic of Indonesia Number 1 of 2020 concerning Guidelines for Job Analysis and Workload Analysis, workload analysis is a management technique that is carried out systematically to obtain information regarding the level of effectiveness and efficiency of an organization's work based on work volume.

It is further explained in the Attachment to the Regulation of the Minister for Empowerment of State Apparatus and Bureaucratic Reform of the Republic of Indonesia Number 1 of 2020 concerning Guidelines for Job Analysis and Workload Analysis as follows: Efficient and effective governance is a demand in the era of globalization which is full of competition and limitations in all fields. This fact demands the professionalism of apparatus resources in the implementation of government affairs.

Singgih and Dewita (2008), also talked about the importance and how to increase efficiency in the field of human resources. Efficiency in the field of human resources is related to work activities and the time required by employees to complete their duties in accordance with the job description that has been requested by management. The method that can be used to measure work efficiency and effectiveness is called workload analysis. Workload analysis is a description of the workload required in an organization.

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With this method, it is also an effective way of providing information about the allocation of employee resources in an organizational unit. Workload is a consequence of the activities provided to workers.

The workload consists of physical workload and mental workload. Physical workload is a workload that has an impact on health problems such as the physiological system, heart, respiration and sensory organs in a person's body caused by working conditions. The indicators of physical load are: physiological physical load and biomechanics physical load. Physical workload measures the pulse of work and rest with the help of a stopwatch. Pulse rate is used to indicate workload and calculate % CVL/Cardiovascular Load Percentage (Suryoputro et al, 2018). Mental load is the workload that arises when employees perform mental/psychic activities in their work environment. The indicators of mental burden are: concentration, confusion, vigilance, and accuracy of service.

Currently, Mental Workload (Mental Workload/MWL) has been considered an important topic that greatly affects human performance in complex systems. Excessive and low MWL can degrade human performance and lead to human error. The relationship between operator performance and MWL is similar to an inverted U-shape where the best performance occurs at a reasonable level of task demand. For the purpose of safe and efficient operation, it is important to monitor the operator's MWL during the operation phase. Several methods have been developed to measure MWL and can be classified into three main categories: performance-based measures (e.g. primary and secondary task measurements), subjective measures (e.g. NASA's Task Load Index (NASA-TLX), and physiological measures (e.g.: wink,electroencephalogram/EEG, and heart rate). Each measurement group has strengths, weaknesses, and applications.

According to Longo (2018), Human Mental Workload (MWL) is a fundamental design concept to explore the interaction of people with technological devices, interfaces, and systems. The foregoing has a long history in psychology with several applications to human life in sectors: transportation, environmental security, automation and manufacturing, medicine, and health care. Mental workload is the load per unit time, including cognitive, judgmental, and emotional loads (Ma et al, 2013). The increasing need for mental workload optimization on the factory floor resulted in an impressive increase in theoretical and applied references to the concept of mental workload (Young et al., 2014). Mental workload is a working condition where there is a need for information to be processed in the brain that requires creativity. According to Indrawati (2017), mental workload can be evaluated from the difference between the workload demands of a task and the maximum mental load capacity of workers in a motivated condition. Excessive mental workload will cause work stress such as fear, anxiety, guilt, anger, sadness, hopelessness and boredom.

3. **Aspects in Workload Analysis**

In accordance with the Attachment to the Regulation of the Minister for Empowerment of State Apparatus and Bureaucratic Reform of the Republic of Indonesia Number 1 of 2020 concerning Guidelines for Job Analysis and Workload Analysis, the aspects in the workload analysis are as follows:

a. **Time Norm**

The time used to produce/complete work products/products is relatively fixed so that it becomes a fixed variable in the implementation of workload analysis. The time norm needs to be set in the Working Time Norm Standard with the

assumption that there is no change that causes the time norm to change. Changes in time norms can occur due to: changes in policies, changes in equipment, changes in the quality of human resources, changes in organization, changes in systems, and changes in procedures.

In profile-oriented companies, working time is estimated to the maximum so that the costs incurred are in accordance with the rules of wages and productivity levels (Fransesco, 2020).

b. Working Volume

The work volume is obtained from the task implementation target to obtain the work/product. Each work volume that varies between units/positions is a variable in the implementation of workload analysis. The minimum work volume is determined based on the analysis of the above regulations.

c. Effective Working Hours

To be able to carry out a workload analysis properly and correctly, it is necessary to first determine the measuring instrument, so that its implementation can be carried out transparently. This openness/transparency is a requirement so that the implementation of workload analysis can be carried out objectively, so that the report on the results of the workload analysis is truly accurate and can be accounted for.

4. Job Map

According to the Regulation of the Minister of State Apparatus Empowerment and Bureaucratic Reform of the Republic of Indonesia Number 1 of 2020 concerning Guidelines for Position Analysis and Workload Analysis, a job map is the arrangement of names and levels of high leadership positions, administrative positions and functional positions that are illustrated in the organizational unit structure from the most basic level. low to the highest. Central Agencies and Regional Agencies are required to carry out job analysis and workload analysis as a prerequisite for compiling job maps, job descriptions, and the number of ASN needs.

Competency mapping recognizes the qualities and shortcomings of human resources to enable understanding and showing where vocational improvement efforts need to be coordinated (Yuvaraj, 2011). Retaining employees is a basic hurdle for organizations: the amount associated with the recruitment, selection, and preparation of new workers exceeds nearly one hundred percent of the annual salary for the position filled. Competence is incomplete without commitment. Commitment exists at three levels, namely affective, normative and continuity. To retain an employee in the organization, it is important to have affective commitment. This can be developed through various employee engagement programs and organizational behaviour development.

In general, two groups of variables can be distinguished in any type of work, namely job demands and job resources. Jones and Fletcher (1996, p. 34) define demand as the degree to which the environment contains stimuli that require attention and response. A claim is a thing to do. Obviously, in every job there is something to be done. More specifically, we refer to job demands as physical, psychological, social, or organizational aspects of work that require sustained physical and/or psychological (i.e., cognitive or emotional) effort and are therefore associated with certain physiological and/or psychological costs. .

According to Serena Midha et al. (2020), one of the human characteristics that can be seen is limited capacity, meaning that humans can only process a limited amount

of information at a time, so the job map will help employees to focus more on work because they only handle specific fields.

5. **Human Resources**

According to Priyono (2010), organizations have various kinds of resources as inputs to be converted into outputs in the form of goods or services. These resources include capital or money, technology to support the production process, methods or strategies used to operate, people and so on. Among the various kinds of resources, human or Human Resources (HR) is the most important element.

Human Resource Management is an acknowledgment of the importance of the organization's workforce as a very important human resource in contributing to organizational goals, and the use of several functions and activities to ensure that these human resources are used effectively and fairly for the benefit of individuals, organizations and society. .

According to Badriyah (2015) human resource planning aims to ensure that the required resources, both quantity and quality, are available when needed. The number of companies that have excessive resources causes the burden to become too heavy and less responsive to environmental changes.

According to Osibanjo (2012), HR management and development includes various types of training, such as induction/orientation of new employees and the development of all categories of employees without exception to prepare for future challenges of the organization. Managing careers assists employees in pursuing their career paths as they grow with the organization.

Human resources in addition to being improved in terms of ability, health must also be considered, so that they are productive at work. In the last two decades there has been an increase in the use of complementary and alternative medicine, including therapies such as dietary supplements, and acupuncture in order to maintain a healthy workforce (Wells, 2015).

6. **Employee Competence**

Definition of Competence according to Law no. 13 of 2003 concerning employment, work competence is the work ability of each individual which includes aspects of knowledge, skills, and work attitudes in accordance with established standards. Competence is a fundamental characteristic possessed by a person that directly affects or can predict excellent performance.

Meanwhile, the definition of Competency Standards according to the Regulation of the Minister of State Apparatus Empowerment No. 38 of 2017 concerning competency standards for state civil apparatus (ASN) positions is a description of the knowledge, skills and behaviour required by a State Civil Apparatus in carrying out their duties.

Boyatzis (2008) defines competence as a person's underlying characteristics which can be in the form of motives, traits, skills, aspects of self-image, social roles, or the body of knowledge they use. Taylor (2017) provides another definition of competence as a means to be able to perform work roles with specified standards with reference to the real work environment.

According to Mubarok (2018) competence is the ability to carry out a job based on knowledge, skills and attitudes at work. With competence, a person will be able to carry out his work responsibly and effectively, so that the quality of his work increases and is able to provide impressive performance.

C. RESEARCH METHODOLOGY

1. General

This research was conducted to find out how to develop a workload analysis model according to the job map for optimizing human resources based on employee competencies.

The method used in this study is a qualitative research where this research emphasizes descriptive analytical data obtained in the form of narratives, pictures, and is inductive in nature where the researcher builds abstractions, and theories from details.

2. Research stages

In summary, the steps in this research can be described in the flow chart in Figure 1. as follows:

Figure 1. Flowchart of steps in research
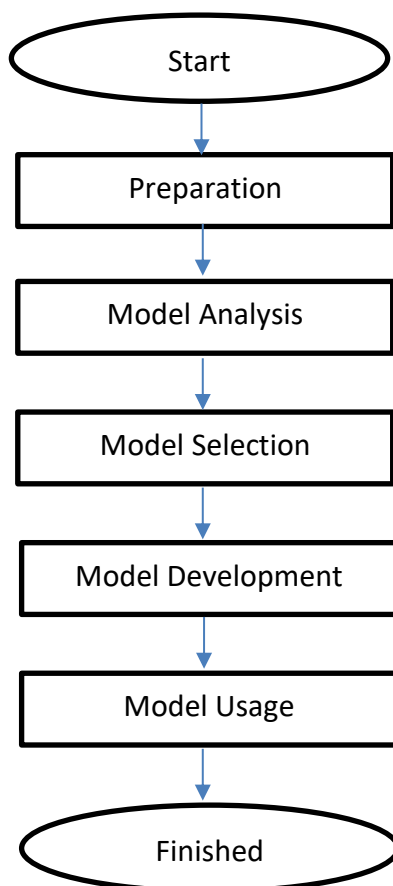
The explanation of the flow chart above can be described in detail as follows:

a. Preparation phase

The types of activities in the preparation stage are the initial research preparation stage and the tool preparation stage.

1) Initial research preparation stage

The initial preparation stage is the stage carried out before the research begins. These preparatory activities include: literature review, data collection, and preparation of data entry forms.

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Data collection techniques aim to obtain data or information, descriptions, and data needed. This study uses data collection techniques and instruments as follows:

a) **Primary data collection techniques**

Primary data collection techniques are data collection techniques that are carried out directly at the research site. Primary data collection was carried out using a questionnaire instrument, namely a data collection technique carried out by distributing a list of questions equipped with several alternative answers that were already available which were distributed to 11 BBPMPPV BMTI employees in the Planning and Budgeting Unit.

b) Data collection techniques

The data collection technique was carried out on all populations, namely all employees at BBPMPPV BMTI in the Planning and Budgeting Unit, totaling 11 (eleven) people, with different positions, according to the predetermined job map.

Secondary data collection technique is data collection which is done through literature study which consists of: library research and documentary study.

2) **Preparation of tools and materials**

The equipment used in this study were as follows: stationery, computer, and paper.

b. **Analysis of Models**

Analysis of the models is done by examining the existing workload analysis models, then making comparisons between each model.

The research step begins with a literature study and field observations. After that, data processing is carried out by means of a task load approach per position in accordance with the Regulation of the Minister of Administrative Reform and Bureaucratic Reform of the Republic of Indonesia Number 1 of 2020 concerning Guidelines for Job Analysis and Workload Analysis and or other methods, while workload analysis and workload calculations mental calculations used the NASA-TLX method and or other methods.

c. **Model Selection**

Model selection is the models selected during the implementation of the research. The model selection was carried out according to the characteristics of the workload analysis at the Center for Quality Assurance Development for Vocational Education in the Mechanical and Industrial Engineering fields.

d. **Model Development**

Model development is carried out with the following steps: goal setting or problem definition, conceptual model creation, model formulation or mathematical modeling, model analysis and solution, and model use. Based on several calculation models, a model was developed to determine the optimal number of employees. This calculation uses the X variable which shows the value of the physical workload from the calculation of the task load approach per position and the Y variable from the NASA-TLX calculation and or others which shows the mental load value, to determine the workload coefficient, Z.

e. **Model Usage**

The use of the model is a model obtained from research results. The use of the model is implemented in the workload analysis according to the job map for optimizing human resources based on the competence of employees at the Center for the Development of Quality Assurance for Vocational Education in the Mechanical and Industrial Engineering fields.

D. DISCUSSION

Calculation of workload in this study using the method of calculating mental work based on the NASA-TLX method. The NASA-TLX method is a questionnaire developed based on the emergence of the need for subjective measurements that are easier but more sensitive in measuring workload. With this calculation, the mental workload that has not been or has not been paid attention to is an important part that is taken into account, in addition to calculations based on the physical workload that has been carried out so far.

The NASA Task Load Index (NASA-TLX) is a widely used, subjective, multidimensional assessment tool that rates perceived workload in order to assess a task, system, or team's effectiveness or other aspects of performance. NASA-TLX originally consisted of two parts: the total workload is divided into six subjective subscales that are represented on a single page, serving as one part of the questionnaire: mental demand, physical demand, temporal demand, performance, effort, and frustration.

In this study, data collection was carried out on all employees of the BBPMPPV BMTI Planning and Budgeting Unit with position as Sub coordinator of Planning and Budgeting, Budgeting and Reporting Program Writer, treasurer, Financial Verifier, and Financial Administration. The total number of employees in this unit is 11 people with data on names and positions as described in table 3 below:

Table 3. Planning and Budgeting Unit Employee Data

No.	Name	Position
1.	Sumarna, S.E.	Sub Coordinator of Planning and Budgeting
2.	Agus Suparman, S.ST.	Budgeting and Reporting Program Writer
3.	Isnein Rajab Hanafiah, S.E.	Budgeting and Reporting Program Writer
4.	Solih, S.ST.	Budgeting and Reporting Program Writer
5.	Wawan Setiawan, S.Sos.	Treasurer
6.	Odang Budiman, S.E.	Treasurer
7.	Ika Karyawati, S.E.	Financial Verifier
8.	Febryanti Debora Pasaribu, A.Md.	Financial Manager
9.	Siti Supartika	Financial Administration
10.	Yafet	Financial Administration
11.	Marliani Rinti	Financial Administration

Based on the recapitulation of paired comparison questionnaires for 6 (six) indicators, through questions on 15 (fifteen) paired indicators related to the employee's choice of one indicator from each paired comparison that is felt to be the most influential in doing work, it can be seen that mental needs in general are more than physical needs. In

general, indicators of mental needs are above indicators of physical needs. Complete data regarding the number of details on each indicator can be seen in Table 4 below:

Table 4. Recapitulation of Pairwise Comparison of Planning and Budgeting Units

No.	Name	Mental Needs	Physical Needs	Time Requirement	Work Performance	Frustration Level	Physical and Mental Effort
1.	Sumarna, S.E.	5	0	4	3	2	1
2.	Agus Suparman, S.ST.	5	0	4	3	2	1
3.	Isnein Rajab Hanafiah, S.E.	3	0	5	3	3	1
4.	Solih, S.ST.	4	0	3	5	2	1
5.	Wawan Setiawan, S.Sos.	3	0	5	2	4	1
6.	Odang Budiman, S.E.	3	0	5	2	4	1
7.	Ika Karyawati, S.E.	2	0	5	3	3	2
8.	Febryanti Debora Pasaribu, A.Md.	2	0	5	3	3	2
9.	Siti Supartika	2	0	5	1	3	4
10.	Yafet	2	0	5	1	3	4
11.	Marliani Rinti	1	1	5	1	3	4

The data recapitulation of the indicator weighting questionnaire is the number of indicators multiplied by the rating in the form of a percentage of the workload category of each employee. The number of each indicator is obtained from the recapitulation of 15 (fifteen) questions for paired indicators, while the percentage rating is in accordance with the category of the amount of workload felt by each employee according to his position. The division of perceived workload categories are: very low (0% to 9%), low (10% to 29%), moderate/moderate (30% to 49%), high (50% to 79%), and very high (80% to 100%). For example: Sumarna, S.E., with 5 (five) mental needs indicators and a rating for the mental workload category of 60, the weighting is 300, and Agus Suparman, S.ST., with 5 (five) mental needs indicators and a rating for the mental workload category of 60, the weighting is 300, also Isnein Rajab Hanafiah, S.E., with 3 (three) mental needs indicators and a rating for the mental workload category of 60, the weighting is 180. Complete data can be seen in Table 5 below:

Table 5. Recapitulation of Questionnaire Data Weighting of Planning and Budgeting Unit Indicators

No.	Name	Mental Needs	Physical Needs	Time Requirement	Work Performance	Frustration Level	Physical and Mental Effort
1.	Sumarna, S.E.	300	0	320	240	160	20
2.	Agus Suparman, S.ST.	300	0	280	210	160	30
3.	Isnein Rajab Hanafiah, S.E.	180	0	400	210	240	30
4.	Solih, S.ST.	280	0	240	400	160	30
5.	Wawan Setiawan, S.Sos.	150	0	400	160	320	20
6.	Odang Budiman, S.E.	120	0	400	160	320	30
7.	Ika Karyawati, S.E.	40	0	250	90	60	40
8.	Febryanti Debora Pasaribu, A.Md.	40	0	300	120	90	40
9.	Siti Supartika	80	0	300	70	150	120
10.	Yafet	100	0	350	70	120	160
11.	Marliani Rinti	40	40	300	60	120	160
	Total	1630	40	3540	1790	1900	680

The average result of WWL is the total number of paired indicator weightings of each employee divided by the total indicator of each paired comparison, which is 15 (fifteen) indicators. For example: Agus Suparman, S.ST., with a total weighting of 980, the WWL obtained is 65.33. The complete average WWL results for each employee can be seen in Table 6 below:

Table 6. Recap of Average WWL Results of Planning and Budgeting Unit

No.	Name	Position	WWL Average	Workload Category
1.	Sumarna, S.E.	Sub Coordinator of Planning and Budgeting	69.33	High
2.	Agus Suparman, S.ST.	Budgeting and Reporting Program Writer	65.33	High
3.	Isnein Rajab Hanafiah, S.E.	Budgeting and Reporting Program Writer	70.66	High
4.	Solih, S.ST.	Budgeting and Reporting Program Writer	74.00	High
5.	Wawan Setiawan, S.Sos.	Treasurer	70.00	High
6.	Odang Budiman, S.E.	Treasurer	68.66	High
7.	Ika Karyawati, S.E.	Financial Verifier	32.00	Moderate
8.	Febryanti Debora Pasaribu, A.Md.	Financial Manager	39.33	Moderate
9.	Siti Supartika	Financial Administration	48.00	Moderate
10.	Yafet	Financial Administration	53.33	High
11.	Marliani Rinti	Financial Administration	48.00	Moderate
	Average		58.06	High

The final recapitulation of each indicator is calculated by adding up the total of each indicator divided by the total number of staff. For example, for mental needs, the total weighting of all employees is 1630, so the average is 1630 divided by the number of staff, namely 11 (eleven) employees, so the result is 148.18 and occupies a percentage of 17% of all total weighting. In the table below, it can be seen that the workload on the planning and budgeting unit which occupies the indicator with the largest percentage is on the time requirement indicator. This occurs mainly because all matters relating to planning and budgeting are based on an existing schedule, and the performance of planning and budgeting is always assessed from the compatibility between the absorption plan and the realization of activities.

Table 7. Final Recapitulation for All Indicators

Indicator	Total Products	Average	Percentage
Mental Needs	1630	148.18	17%
Physical Needs	40	3.63	0.4%
Time Requirement	3540	321.81	37%
Work Performance	1790	162.72	18.7%
Frustration Level	1900	172.72	19.8%
Physical and Mental Effort	680	61.81	7.1%

By looking at the workload category for each employee, for the high average category with a choice of several very high indicators, it is necessary to add personnel. This adjustment in the number of employees is expected to maximize work not only in terms of quantity, but also in terms of the quality of work. Complete data on the number of employees based on mental workload according to the NASA-TLX method can be seen in Table 8 below.

Table 8. Combination of Mental Workload Results with Optimal Number of Employees in Planning and Budgeting Unit

Position	Existing		New	
	WWL Average	Number of Employees According to RB Regulation No. 1 Year 2020	WWL Average	Appropriate Number of Employees (NASA-TLX Method)
Sub Coordinator of Planning and Budgeting	69.33	1	79 69.33	2
Programming and Budgeting and Reporting	69.99	3	79 69.99	4
Treasurer	69.33	2	79 69.33	3
Financial Verifier	32	1	32	1
Financial Manager	39.33	1	39.33	1
Financial Administration	49.77	3	49.77	1

Based on the minimum education requirements according to the grade of the position, all employees in the planning and budgeting unit are in accordance with the requirements for occupying positions, there are even employees whose education level is above the

requirements. In order to improve employee performance, employees who have sufficient education and work experience are needed. Education has an influence on employee performance, the high and low level of education will affect its performance. In order to maximize employee performance, employees who have an adequate level of education are needed in accordance with their field of work. In addition to educational background, employee performance can also be influenced by years of service and work experience of employees. The longer the tenure of an employee, the more experience he will gain. and with more experience gained, the employee concerned can work effectively and efficiently. In the end, it is hoped that education that meets the requirements in a position can realize maximum competence in supporting professionalism.

Table 9. Mapping of Employee Competence Based on Educational Requirements

No	Name	Minimum Education	Education of Current Position Holder
1.	Sumarna, S.E.	D4/S1	S1
2.	Agus Suparman, S.ST.	D4/S1	D4
3.	Isnein Rajab Hanafiah, S.E.	D4/S1	S1
4.	Solih, S.ST.	D4/S1	S1
5.	Wawan Setiawan, S.Sos.	D4/S1	S1
6.	Odang Budiman, S.E.	D4/S1	S1
7.	Ika Karyawati, S.E.	D3	S1
8.	Febryanti Debora Pasaribu, A.Md.	D3	D3
9.	Siti Supartika	SMK/SMA	Senior High School
10.	Yafet	SMK/SMA	Senior High School
11.	Marliani Rinti	SMK/SMA	Senior High School

E. CONCLUSION

The conclusion of the research entitled Development of Workload Analysis Model according to Job Mapping for HR Optimization Based on Employee's Competence at BBPMPPV BMTI, are as follows:

1. WWL in the Planning and Budgeting Unit is in the category of high mental workload, with a composition of 37% rather high and 63% high.
2. For each indicator, the final average result is obtained, in the following order: 37 % of time required; 19.8% frustration rate; 18.7% work performance; 17% mental needs; 7.1% physical and mental effort; and only 0.4% of physical needs.
3. There is an increase in the number of employees in several positions with calculations based on (NASA-TLX Method) from the number of existing employees which is calculated based on the Workload in accordance with Permenpan RB No. 1 of 2020, from 11 people to 14 people. The position of sub-coordinator of planning and budgeting, according to the map there can only be 1 (one) even though based on the calculation is 2 (two), then the solution is the existence of job delegation.
4. Mental workload has a significant effect on the calculation of workload.
5. Competence based on educational background is sufficient.

BIBLIOGRAPHY

Boyatzis, R.E. 2008. Competencies in The-21st Century. *Journal of management development Vol. 27 Issue 1 page 5-12*.

Fallatah, F., et al. 2017. The Effects of Authentic Leadership, Organizational Identification, and Occupational Coping Self-efficacy on New Graduate Nurses' Job Turnover Intentions in Canada. *Nursing Outlook, doi: 10.1016/j.outlook.2016.11.020*.

Jefrri, N.F.S., et al. 2019. A Review of Augmented Reality Systems and Their Effects on Mental Workload and Task Performance. *Heliyon*.

Jones, F., at al. 1996. *Job Control and Health*. Chichester, Wiley.

Longo, L. 2018. Experienced Mental Workload, Perception of Usability, Their Interaction and Impact on Task Performance. *PLoS ONE 13(8): e0199661*.

Kupczyk, T., et al. 2017. *Competency Management*. University Businnes in Wroclaw, Wroclaw.

Manani, E., et al. 2019. Effects of Employee Competencies on Employee Job Performance in Humanitarian Organizations; A Case Study of The World Food Programme, Kenya. *Global Scientific Journals Vol. 7 Issue 10*.

Ma, Q.G., et al. 2013. Manufacturing Process Design Based on Mental and Physical Workload Analysis. *Applied Mechanics and Materials Vol. 345*.

Midha, S., et al. 2020. Measuring Mental Workload Variations in Office Work Tasks using fNIRS. *Elsevier*.

Mubarok, E.S., dkk. 2018. The Influence of Training, Competence, and Motivation on Employees Performance of Workers Social Security Agency in Banten Province, Indonesia. *Journal of Economics and Sustainable Development Vol. 9 No. 4*.

Nugraha, R., dkk. 2019. Employee Needs Planning Based on Workloads Analysis in the Procurement Goods and Services of PT PLN (Persero) Unit Induk Pembangunan Pembangkit Sumatera. *International Journal of Research and Review Vol. 6 Issue: 7*.

Osibanjo, A.O., et al. 2012. *Human Resources Management: Theory & Practise*. Pumark Nigeria Limited, Lagos.

Ozkeser, B. 2019. Impact of Training on Employee Motivation in Human Resources Management. *Elsevier*.

Shivanjali, Singh M., et al. 2019. Competency Mapping: A Strategic Perspective in Employee Retention. *International Journal of Recent Technology and Engineering (IJRTE) Vol. 8 Issue 2*.

Schaufeli, W.B., et al. 2004. Job Demands, Job Resources, and Their Relationship with Burnout and Engagement: A Multi Sample Study. *Journal of Organizational Behavior Vol. 25 Page 293 – 315*.

Suryoputro, M.R., dkk. 2018. Combining Time and Physical Workload Analysis on Cold Press Working, *MATEC Web of Conferences 221*.

Taylor E.W. 2017. *Transformative learning theory, In Transformative Learning Meets Bildung (pp. 17-29)*. Sense Publishers, Rotterdam.

Widiasih, W., dkk. 2019. Workload Analysis Using Work Sampling and NASA-TLX for Employee of Private University in Surabaya. *Jurnal Ilmiah Teknik Industri Vol. 18(2)*.

Wells, E.V., et al. 2015. Public Health and Preventive Medicine Meet Integrative Health. *American Journal of Preventive Medicine*.

Ye, W., et al. 2019. Financial Control Supports the Co-evolution of Product Services and Employee competence: Take Haier Group as an Example. *Elsevier*.

Yuvaraj, R. 2011. Competency Mapping. *International Journal of Scientific & Engineering*.