Evaluation of Employee Mental Workload Using the Rating Scale Mental Effort and KAUPK2 Method in the Production Process of Spoon Making PT. VRIZ

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ARTICLE INFO

ABSTRACT

Ergonomics is an approach that makes humans the main actors in the smooth running of the work system. PT. VRIZ is a company that produces stainless steel spoons. The manufacture of spoon products has 8 stages of the process with one employee working at any time and not allowed to stop before break time, the working hours that apply to this company are 7 working hours with 1 hour of rest. Static work has the potential to be easily bored, saturated and sleepy. This study aims to minimize the risky process flow taken in evaluating employee mental workload, analyzing the results of the two methods used, and providing recommendations for improvements in the workplace. With a better understanding of employee mental workload, PT. VRIZ can achieve higher levels of productivity and create a healthier and more sustainable work environment. The stages in this study use the RSME and KAUPK2 methods in data collection, this approach has a tool in the form of a questionnaire that must be filled out by the object or employee. The data obtained will be an early indication to provide improvements to the work system to reduce the impact of work fatigue. The Mental Effort Rating Scale questionnaire is one method of measuring mental workload by referring to the effort expended, while KAUPK2 is one method of measuring worker fatigue. The results of the Mental Effort Rating Scale show an average value of mental load of 115 (the effort expended is very large) and employee work fatigue using KAUPK2 shows the most dominant attributes felt by 8 employees, namely being reluctant to look others in the eye, being reluctant to work diligently and feeling tired all over the body.

1. INTRODUCTION

An increase in the efficiency of the work of employees owned by the company is one of the important factors in processing the company's management [1], Research on increasing employee work efficiency has a major influence on the good or bad performance of employees. [2]. Employee work efficiency research mostly meets employee productivity factors. [3]. An important factor that really needs to be improved in increasing employee work efficiency is the evaluation of workers' mental workload, where mental workload itself is a working condition that results in an increased burden on existing cognitive abilities [4]. Discussions regarding mental workload can be evaluated directly to increase employee productivity, employee welfare, and also employee safety in the environment. [5]. Working conditions that exceed capacity can also be categorized as heavy work, but only a few aspects of the workload directly describe peak workload.

[6]. Mental and physical workload are components that cannot be separated. So excessive workload can reduce the level of work optimization [7].

PT. VRIZ, a company operating in the spoon manufacturing industry, is an organization that understands the importance of evaluating mental workload. In the context of the spoon-making production process, employees are faced with various tasks that require thinking, concentration and quick decision making [8]. The discussion in this research concludes that it causes mental workload for PT employees. VRIZ uses two methods, namely the Rating Scale Mental Effort (RSME) and the Job Fatigue Measuring Tool Questionnaire (KAUPK2). RSME method is a subjective approach developed by Zijlstra & Van Doorn, (1985) which allows employees to evaluate the level of mental workload they experience directly [9]. This RSME method requires individuals to provide an assessment of the level of mental effort they require in a task, often using a rating scale or questionnaire [10]. This assessment reflects an individual's subjective perception of the degree to which the task requires them to think, concentrate, and use mental resources [11]. KAUPK2 it's self is an objective approach that uses certain indicators to measure mental workload [12].

Evaluation of mental workload is the most important factor because it has a significant direct impact on employee productivity and well-being [13]. Research by combining the RSME and KAUPK2 methods is able to show the level of mental effort they need in a task using the RSME method and using KAUPK2 to measure the level of fatigue and job satisfaction as well as work productivity. Research using RSME with measurement results shows that the RSME values of workload and work difficulty indicators between online learning methods differ significantly, and shows that the recommended online learning method is the video recording method [14]. another study using RSME to measure the workload on nurses, by obtaining multivariate test results there is a relationship between nurse age (Sig.0.010), nutritional status (Sig.0.030), job title (Sig.0.000), work shift (Sig.0.000), length of service (Sig.0.000) to the mental workload of nurses at the Royal Prima General Hospital (RSU) in 2020 and the results of the multivariate test there is no relationship between gender (Sig.0.094), work station (Sig.0.053) to the mental workload of nurses at the Royal Prima General Hospital (RSU) in 2020 [15]. Research using KAUPK2 as a tool to analyze identity, age, length of service, length of service, work units related to noise intensity, and the results show a relationship between noise and work fatigue in employees. Cepogo Boyolali metal craft center where workers who experience high noise levels also have high levels of fatigue [16]. Another study using KAUPK2 with the results that the instrument used is very valid and reliable for measuring fatigue[17].

This research aims to minimize the risky process flow taken in evaluating employee mental workload, analyzing the results of the two methods used, and providing recommendations for improvements in the workplace. With a better understanding of employee mental workload, PT. VRIZ can achieve higher levels of productivity and create a healthier and more sustainable work environment.

2. RESEARCH METHOD

In this research, the approach methods used are RSME and KAUPK2, where the RSME method is used as a measuring tool to determine mental load based on the amount of effort expended [18], and KAUPK2 is used as a tool to measure feelings of fatigue which influence workload [19]. It is hoped that the results of this research will improve the work system which can reduce the mental workload of PT employees. VRIZ, and will automatically be accumulated into employee work productivity. This explanation is depicted in the conceptual framework in Figure 1.
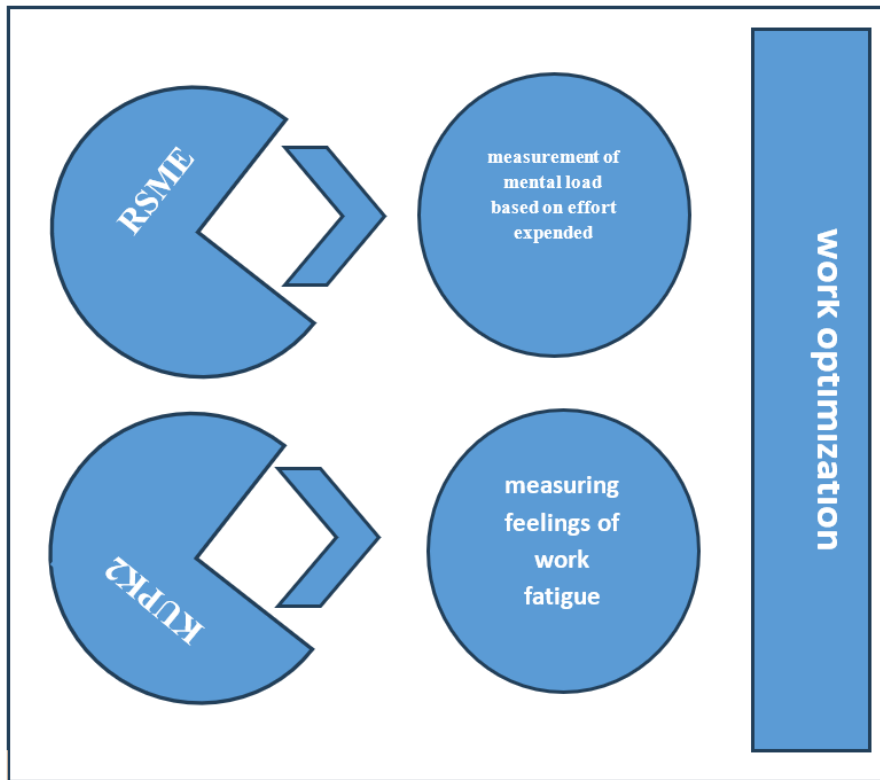
Figure 1. Research Conceptual Framework

The RSME and KAUPK2 methods in collecting data, this approach has a tool in the form of a questionnaire that must be filled in by the object or employee. The data obtained will be an initial indication for providing improvements to the work system to reduce the impact of work fatigue. The RSME and KAUPK2 questionnaires can be seen in table 1 and 2

Table 1. RSME Questionnaire [20]

No	Questionnaire
1	How hard do you feel at work (Workload) - (Fill in a score between 0-150)
2	How much difficulty do you feel at work (Job difficulty) - (Fill in a score between 0-150)
3	Bagaimana anda menilai performansi diri anda pada proses kegiatan bekerja? (Performansi/kepuasan kerja) - (Isi dengan skor antara 0-150)
4	How do you assess your own performance in the process of work activities? (Performance/job satisfaction) - (Fill in a score between 0-150)
5	How much mental effort do you think you expend to complete daily tasks at work and outside of work? (Work mental effort) - (Fill in a score between 0-150)
6	How much anxiety do you feel after doing work? (Job anxiety) - (Fill in a score between 0-150) How tired do you feel after doing work? (Work fatigue) - (Fill in a score between 0-150)

indicators for categorizing RSME scores from 0 to 150 can also be seen in Figure 2.
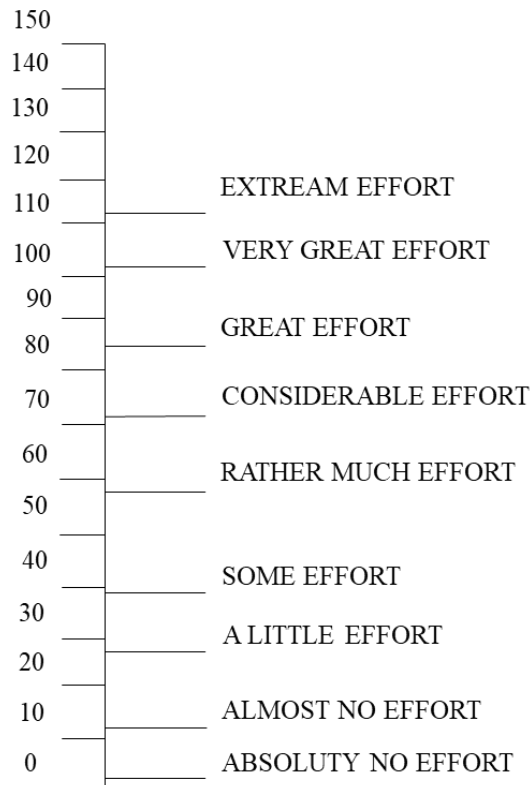
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150
140  ─
130  ─
120  ─
110  ─        EXTREAM EFFORT
100  ─        VERY GREAT EFFORT
 90  ─
 80  ─        GREAT EFFORT
 70  ─        CONSIDERABLE EFFORT
 60  ─        RATHER MUCH EFFORT
 50  ─
 40  ─        SOME EFFORT
 30  ─        A LITTLE EFFORT
 20  ─
 10  ─        ALMOST NO EFFORT
  0  ─        ABSOLUTY NO EFFORT
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Figure 2. RSME Score [9]

Table 2. KAUPK2 Questionnaire [21]

No	Question	Answer	
		Yes	No
1	Do you find it difficult to think?		
2	Do you feel tired of talking?		
3	Do you feel nervous about something?		
4	Do you feel like you never concentrate when facing work?		
5	Do you feel like you don't care about something?		
6	Do you tend to forget things?		
7	Do you feel less confident in yourself?		
8	Do you feel like you are not diligent in carrying out your work?		
9	Do you feel reluctant to look people in the eye?		
10	Do you feel reluctant to work agile?		
11	Do you feel restless at work?		
12	Do you feel tired all over?		
13	Do you feel like you're acting slow?		
14	Do you feel like you can no longer walk?		
15	Do you feel tired before work?		
16	Do you feel your thinking power is decreasing?		
17	Do you feel anxious about something?		

3. RESULT AND DISCUSSION

The initial stage of this research was to distribute questionnaires using the RMSE and KAUPK2 methods. The results of data collection using the RMSE and KAUPK2 method measurement tools can be seen in table 3 and table 5 below:

Table 3. RSME data processing results

No	Questionnaire RSME						
	K1	K2	K3	K4	K5	K6	Mean
1	100	90	110	120	110	100	105.00
2	90	60	130	120	40	100	90.00
3	150	150	150	100	100	50	116.67
4	50	50	60	70	20	50	50.00
5	10	10	10	100	50	50	38.33
6	20	75	135	75	20	10	55.83
7	80	80	90	100	50	100	83.33
8	50	50	150	150	0	50	75.00
Mean							**76.77**

From the results of RSME data processing in table 2, the average workload based on the amount of effort expended received a score of 76.77.

Table 4. RSME classification value

Respondent	Mark	Classification
1	105.00	The effort made was enormous
2	90.00	The effort made is great
3	116.67	The effort made was enormous
4	50.00	The business carried out is small
5	38.33	The business carried out is small
6	55.83	The business carried out is small
7	83.33	The effort involved is quite large
8	75.00	The effort involved is quite large

The RSME results show that the person who got the highest mental burden score was respondent 1 with a score of 105.5, respondent 3 with a score of 116.67. Both respondents fell into the very large business expenditure category. Meanwhile, the second highest is respondent 2 with a score of 90 which is included in the category of the amount of effort expended, then number 7 with a score of 83.33, namely the amount of effort expended. This first highest value needs to be corrected immediately because it has a huge mental impact. The next step is to look at table 3, the results of data processing obtained from the KAUPK2 questionnaire.

Table 5. Categories based on KAUPK2 count

Respondent	Average value	Category
1	3	Often
2	2	Sometimes
3	3	Often
4	2	Sometimes
5	2	Sometimes
6	2	Sometimes
7	3	Often
8	3	Often

KAUPK2 data processing results obtained average results from highest to lowest. These results show that the value with the largest average is in question number Q1, while the value with the smallest average is in question number Q14. The average answer was that they were reluctant to look people in the eye, reluctant to work deftly and with feeling.

KAUPK2 data processing results obtained average results from highest to lowest. These results show that the value with the largest average is in question number Q1, while the value with the smallest average is in question number Q14. The average answer was that they were reluctant to look people in the eye, reluctant to work deftly and with feeling [22].

The work environment includes organizational culture, a conducive workplace, ergonomic arrangement of tools and work facilities, and work motivation from superiors to employees which also has an influence on increasing work productivity [23], Motivation is given not only verbally, but can also be given by providing employee rewards [24].

4. CONCLUSION

The results of the Mental Effort Rating Scale show an average mental load value of 115 (the effort expended is very large) and employee work fatigue using KAUPK2 shows the most dominant attribute felt by 8 employees, namely being reluctant to look others in the eye, being reluctant to work diligently and feeling tired all over the body. The proposed improvements given to the company management look at the results of the data analysis from the RSME and KAUPK2 methods, first the company holds an office employee outing, training to strengthen working relationships between employees so as to produce maximum work optimization and eliminate fatigue, second provides a conducive work environment for employee work comfort, third provides motivation, appreciation and awards for employee achievements or accomplishments in order to spur work enthusiasm..

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