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Analysis Of Mental Workload With NASA- TLX Method On Employees Of Kareb Bojonegoro Cooperative

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Abstract

The human body is designed to perform daily work activities that allow humans to be able to move the body and perform. The presence of muscle mass whose weight is almost more than half the weight of the body, allows us to be able to move and do work. NASA – TLX is a widely used assessment tool, at the time of assessing perceived workload to assess the effectiveness of tasks, systems, or teams or other aspects of performance. This method is in the form of a questionnaire developed based on subjective measurement needs that are easier but more sensitive to workload measurement. Based on the calculation results in table 5 on employees of the KAREB Bojonegoro Cooperative outlet, it can be seen that the highest NASA-TLX score was obtained by respondents with the initials WA with a score of 82, while the lowest score was obtained by respondents with the initials MR with a score of 41.33. Based on the results of determining the category, it can be seen that as many as 1 respondent is categorized as having a very high workload, while 14 respondents are categorized as having a high workload, while 10 respondents are categorized as having a medium workload. The age attribute consists of 7 respondents aged 17 – 25 years, 14 respondents aged 25 – 40 years, 4 respondents aged 41 – 55 years. From the results.

Keywords: nasa - tlx, workload, respondent.

INTRODUCTION

The human body is designed to perform daily work activities that allow humans to be able to move the body and perform. The presence of muscle mass whose weight is almost more than half the load of the body, allows us to be able to move and do work. Work on the one hand has an important meaning for progress and improvement of achievement, so as to achieve a productive life as a life goal. On the other hand, work means that the body will receive loads from outside its body. In other words, every job is a burden for those involved. (Soleman 2011)

Workload measurement is one of the factors needed by companies to determine the workload of their employees. Because workers are one of the important factors in the process that affect the quality of each job, this physical and mental activity has consequences, namely the emergence of the workload contained in each employee. The research that will be carried out leads to the mental workload on employees who are in the KAREB Bojonegoro Cooperative

This research was conducted at the Bojonegoro KAREB Cooperative which is engaged in tobacco drying service midwives, this research will be conducted on employees of the Bojonegoro kareb cooperative by measuring the mental workload experienced by each employee. This study used the NASA-TLX method which was used later in each measure of mental workload, using questionnaires in the form of employee respondents who were at the Bojonegoro KAREB Cooperative

METHOD

NASA – TLX is a widely used assessment tool, at the time of assessing perceived workload to assess the effectiveness of tasks, systems, or teams or other aspects of performance. This method is in the form of a questionnaire developed based on subjective measurement needs that are easier but more sensitive to workload measurement. Using a multidimensional assessment procedure, NASA - TLX achieved an overall workload score based on a weighted average of six subscale scores. (Hancock, 1998)

The NASA-TLX method is a method used to analyze the mental workload faced by workers who have to perform various activities on their job. This method was developed by Sandra G. Hart of NASA-Ames Research Center and Lowell E. Staveland of San Jose State University in 1981 based on the emergence of subjective measurement needs consisting of a scale of nine factors (task difficulty, time pressure, type of activity, physical effort, mental effort, performance, frustration, stress and fatigue). From these nine factors, it is simplified again to 6, namely Mental demand (MD), Physical demand (PD), Temporal demand (TD), Own Performance (PO), Effort (E), Frustation level (FR). NASA-TLX (Nasa Task Load Index) is a method of subjectively measuring mental workload (Table 1.). The measurement of the NASA-TLX method is divided into two stages, namely the comparison of each scale (Paired Comparison) and the assignment of values to the work (Event Scoring). (Pradhana and Suliantoro 2018).

Factor	Rating	Information
Mental demand (MD)	Low, high	How much mental and perceptual activity is needed to see, remember and search.
Physical demand (PD)	Low, high	The amount of physical activity needed (example: pushing, pulling, controlling the spin)
Temporal demand (TD)	Low, high	The amount of time-related stress felt during an element of work.
Performance (OP)	Not exactly, perfectly	How successful a person is in his work and how satisfied with the results of his work
Frustation (FR)	Low, high	How insecure, hopeless, offended, disturbed, compared to feelings of security, contentment, comfort, and self-satisfaction felt
Effort (EF)	Low high	How hard mental and physical work is needed to get the job done

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1. Giving Ratings

In this section, respondents were asked to rate the six indicators of mental load. The score given is subjective and depends on the mental load experienced by respondents To get the NASA -TLX mental load score, the weight and score of each indicator are multiplied, then added up and divided by 15 (the number of paired comparisons. (Arasyandi and Bakhtiar 2016)



1. Weighting

In this section, respondents were asked to circle one of two indicators that were perceived to be more dominant, causing a mental workload on the work. The NASA-TLX questionnaire is provided in a paired comparison format and consists of 15 paired comparisons. From this questionnaire, an overall score is calculated for each indicator that is considered the most influential. The total score is the weight of each indicator of mental load.

No	INDICATOR	CODE	VS	INDICATOR	CODE
1	Mental Needs	KM	VS	Physical Needs	KF
2	Mental Needs	KM	VS	Time Needs	KW
3	Mental Needs	KM	VS	Performance	Р
4	Mental Needs	KM	VS	Business Level	YOU
5	Mental Needs	KM	VS	Frustration Level	TF
6	Physical Needs	KF	VS	Time Needs	KW
7	Physical Needs	KF	VS	Performance	Р
8	Physical Needs	KF	VS	Business Level	YOU
9	Physical Needs	KF	VS	Frustration Level	TF
10	Time Needs	KW	VS	Performance	Р
11	Time Needs	KW	VS	Business Level	YOU
12	Time Needs	KW	VS	Frustration Level	TF
13	Performance	Р	VS	Business Level	YOU
14	Performance	Р	VS	Frustration Level	TF
15	Business Level	TU	VS	Frustration Level	TF

Table 2. Weighting

1. Calculating Product Value

At this stage the product value is obtained by multiplying the weight and rating given by respondents, so that it will produce the product value of each indicator.

Product value = rating x weight

- Calculating Weighted Workload (WWL) Calculate WWL by summing the six indicators of each respondent WWL=Σ Product value
- 3. Calculating WWL Averages Obtained from dividing the wwl obtained by the total weight

Score = $\sum \frac{\text{Nilai Produk}}{15}$

The value 15 is the number of pairs – pairs of weights like the table above

RESULTS AND DISCUSSION

							Rating			
							Results			
							х		Value Result	
No	initials	Age	Indicator	Ratings	WWL	Results	weight	For	WWL (%)	Category
1	М	23	KM	80	5	400	1110	15	74	Tall
			KF	70	2	140				
			KW	60	4	240				
			Р	80	3	240				
			TU	70		0				
			TF	90	1	90				
2	R	29	KM	70	2	140	980	15	65,33	Tall
			KF	60	3	180				
			KW	60	4	240				
			Р	55	2	110				
			TU	80	3	240				
			TF	70	1	70				
3	NK	30	КМ	80	4	320	1070	15	71,33	Tall
			KF	55	4	220				
			KW	50	1	50				
			Р	90	1	90				
			TU	90	3	270				
			TF	60	2	120				

Table 3 Results and Discussion NASA -	ΓΓΧ 1

4	R	26	KM	80	5	400	1130	15	75.33	Tall
			KF	90	2	180				
			KW	60	3	180				
			Р	80	1	80				
			TU	70	3	210				
			TF	80	1	80				
5	S	55	KM	70	4	280	930	15	62	Tall
			KF	60	4	240				
			KW	60	2	120				
			Р	70		0				
			TU	40	2	80				
			TF	70	3	210				
6	PN	19	KM	55	3	165	775	15	51,66	keep
			KF	45	3	135				
			KW	50	3	150				
			Р	65	1	65				
			TU	40	3	120				
			TF	70	2	140				_
7	SU	55	КМ	80	5	400	1055	15	70.33	Tall
			KF	70	3	210	1000	10	10,00	
			KW	60	2	120				
			Р	70	3	210				
			TU	50	1	50				
			TF	65	1	65				
8	TN	32	KM	80	2	160	1170	15	78	Tall
			KF	70	3	210				
			KW	80	3	240				
			Р	80	4	320				
			TU	80	3	240				
			TF	70		0				
9	DK	27	KM	80	3	240	1120	15	74,66	Tall
			KF	70	3	210				
			KW	80	1	80				
			Р	70	3	210				
			TU	80	3	240				
			TF	70	2	140				
10	PA	32	KM	55	4	220	750	15	50	Keep
			KF	40	4	160				
			KW	45	2	90				
			Р	60	1	60				
			TU	55	4	220				
			TF	50		0				

11	NK	25	KM	55	4	220	860	15	57,33	Keep
			KF	55	4	220				_
			KW	50	3	150				
			Р	65		0				
			TU	80	3	240				
			TF	30	1	30				
12	RM	25	KM	70	4	280	990	15	66	Tall
			KF	60		0				
			KW	70	3	210				
			Р	60	2	120				
			TU	70	2	140				
			TF	60	4	240				
13	DW	24	KM	50	5	250	760	15	50,66	Keep
			KF	75	3	225				
			KW	40	3	120				
			Р	45	1	45				
			TU	40	3	120				
			TF	50		0				
4.4	D.4	10				22 0	0.05	4 -		T/
14	DA	43	KM	55	4	220	825	15	55	Кеер
			KF	55	3	165				
			KW	60	3	180				
			Р	40	2	80				
				60 50	3	180				
15	TA7 A	07		50	0	0	1000	15	02	X7 TT 1
15	WA	27	KM	80	3	240	1230	15	82	very High
				90 80	3 1	2/0				
				80 80	2 1	100				
			Г ТТТ	80	1	80				
				80	1	400				
			ТГ	80	5	400				
16	WB	26	КМ	70	3	210	1085	15	72.33	Tall
10		_0	KF	65	3	195	1000	10	,	
			KW	80	1	80				
			Р	80	1	80				
			TU	80	5	400				
			TF	60	2	120				
17	WJ	28	KM	80	3	240	1080	15	72	Tall
			KF	70	2	140				
			KW	60	3	180				
			Р	70	2	140				
			TU	80	3	240				

			TF	70	2	140				
18	AR	25	KM	50	4	200	825	15	55	Keep
			KF	50	3	150				
			KW	55	3	165				
			Р	60	1	60				
			TU	60	3	180				
			TF	70	1	70				
19	MT	17	KM	100	4	400	1000	15	66,66	Tall
			KF	50	4	200				
			KW	50	2	100				
			Р	60	1	60				
			TU	60	4	240				
			TF	50		0				
20	А	43	KM	55	4	220	940	15	62,66	Tall
			KF	100	3	300				
			KW	60	3	180				
			Р	40	1	40				
			TU	50	4	200				
			TF	50		0				
21	L	29	KM	70	3	210	870	15	58	Keep
			KF	50	3	150				
			KW	60	4	240				
			Р	50	2	100				
			TU	70	1	70				
			TF	50	2	100				
22	BK	31	KM	40	4	160	650	15	43,33	Keep
			KF	30	3	90				
			KW	60	3	180				
			Р	50	2	100				
			TU	40	1	40				
			TF	40	2	80				
23	NJ	29	KM	50	4	200	690	15	46	Keep
			KF	60	2	120				
			KW	40	1	40				
			Р	40	3	120				
			TU	30	3	90				
			TF	60	2	120				
24	Ι	29	KM	50		0	1020	15	68	Tall
			KF	70	1	70				
			KW	80	5	400				
			Р	90	3	270				
			TU	50	4	200				
			TF	40	2	80				

25	NR	32	KM	40	4	160	620	15	41,33	Keep
			KF	50	4	200				
			KW	40	2	80				
			Р	60	1	60				
			TU	30	4	120				
			TF	50		0				

Based on the calculation results in table 5 on employees of the KAREB Bojonegoro Cooperative outlet, it can be seen that the highest NASA-TLX score was obtained by respondents with the initials WA with a score of 82, while the lowest score was obtained by respondents with the initials MR with a score of 41.33. Based on the results of determining the category, it can be seen that as many as 1 respondent is categorized as having a very high workload, while 14 respondents are categorized as having a high workload, while 10 respondents are categorized as having a medium workload. The age attribute consists of 7 respondents aged 17 – 25 years, 14 respondents aged 25 – 40 years, 4 respondents aged 41 – 55 years.

CONCLUSION

From the calculation results, it is known that the highest mental workload value was 82 in respondents with the initials WA with female gender attributes, age 27 years. While the lowest mental workload value is found in the initials NR with a value of 41.33 on the male gender attribute, age 32 years. Based on workload categorization data, it is known that as many as 1 respondent is categorized as having a very high workload, while 14 respondents are categorized as having a high workload, while 10 respondents are categorized as having a medium workload.

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