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Mental Workload Analysis of Employees in the Customer Care Department of PT. XYZ Using NASA-TLX Method

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Abstract: PT. XYZ is an information communication technology (ICT) and telecommunications network company in Indonesia. The service process at the customer care section of PT. XYZ has the task of serving customers related to complaints, product installation, migration, and holding service duties at XYZ Plaza. Workers in the customer care department often complain of experiencing work stress. So it is necessary to repair and analyze the causes of mental workload using 6 factors, namely Mental Demand (MD), Effort (EF), Physical demand (PD), Temporal demand (TD), Performance (P), and Frustration level (FR). found in the NASA-TLX method. The results showed that the average weighted workload score was 71.62 from 8 workers, the score was included in the category of high level mental workload. So that some changes are needed to reduce the mental workload, in the form of considering rolling or distributing tasks evenly to each employee, especially for employees who experience overload and increase the number of workers, and provide periodic training.

Keywords: Ergonomics, Mental Workload, NASA-TLX.

Introduction

The Ministry of Industry projects that the non-oil and gas processing industry will experience growth of 3.95 percent by 2021. This estimate is based on the assumption that the COVID-19 pandemic has been controlled and vaccines are gradually becoming available in the community. The rapid development of the industry makes the company more competitive. In this case, the company is required to carry out its role well to achieve its goals and improve the company's overall performance.

One of the companies that offer the service industry is PT. XYZ. It is engaged in information and communication technology (ICT) services and telecommunications networks in Indonesia. The service process for PT. XTZ is done in two ways, namely through customer care at Plaza XYZ or by calling the service number on the XYZ website. The customer care process has a duty to serve customers related to complaints, product installation, migration, and holding service duties at Plaza XYZ.

PT. XYZ itself has a customer care section that is tasked with serving customers. This section has eight employees who work for eight hours per day, with a break of one hour, and work five days a week, namely Monday to Friday. Each job has a different level of difficulty that is felt by each worker. The workload is a process of analyzing the time used by a person or group of people in completing the task of a job (job) or group of positions (work units) carried out under normal circumstances (Kurnia, 2010). One aspect that can affect a person's workload is the level of their mental workload. Mental symptoms can be felt by workers, such as being easily forgotten and difficulty concentrating. For that, it is necessary to measure the level of mental load of a person in order to make improvements in line with the

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recommendations of the results of the measurement analysis carried out.

Mental workload measurement can be done using subjective calculations, one of which is by using the NASA-TLX method. The NASA-TLX (National Aeronautics and Space Administration Task Load Index) method is a method used to analyze the mental workload faced by workers who have to perform various activities at work. This method was developed based on the emergence of subjective measurement needs consisting of a scale of nine factors, which was simplified again to six, namely, Mental Demand (MD), Physical Demand (PD), Temporal Demand (TD), Performance (P), and Frustration Level (FR) (Hidayat *et al*., 2013).

Based on this, this study uses NASA-TLX methods to be able to measure the mental workload of customer care PT employees. XYZ aims to determine mental workload conditions through interpreting and analyzing the mental workload calculation score of the operator so as to provide recommendations related to mental workload using the NASA-TLX method.

Materials and Methods

Method of collecting data

Research conducted at PT. XYZ located in Yogyakarta with the service process through customer care at Plaza XYZ or by calling the company's service number. The initial research was conducted by surveying the situation of employees in the customer care department, data collection was carried out by interviewing employees. The results of interviews and observations in the form of filling out the NASA-TLX form to determine the mental workload of employees in the customer care department.

Mental workload

Mental workload is the workload which is the difference between the demands of the workload of a task with the maximum capacity of a person's mental load in a motivated condition, excessive workload will result in stressful events (Fahamsyah, 2017). Job stress is a feeling of pressure experienced by employees in dealing with their work.

NASA TLX

This study uses the NASA-TLX method with the aim of knowing the mental workload condition through interpreting and analyzing the mental workload calculation score on the operator. This method was developed based on the emergence of subjective measurement needs consisting of a nine-factor scale, which was simplified again to 6, namely Mental Demand (MD), Physical demand (PD), Temporal demand (TD), Performance (P), Frustration level (FR), Effort (EF) (Hidayat *et al*., 2013).

Results and Discussion

Weighting

Operators fill out a questionnaire regarding the comparison between several indicators related to their work so as to produce a weighting for each indicator as shown in table 1.

Table 1. The results of the weighting of the customer care operator

Subject	Indicator						Total
	MD	PD	TD	OP	EF	FR	
Operator 1	4	0	2	1	3	5	15
Operator 2	5	2	2	3	1	2	15
Operator 3	1	3	1	4	4	2	15
Operator 4	0	1	5	3	4	2	15
Operator 5	1	3	3	1	2	5	15
Operator 6	3	2	4	0	5	1	15
Operator 7	2	1	4	3	5	0	15
Operator 8	2	0	2	2	4	5	15

Table 1 is the recapitulation result of filling in the weights of 8 operators, consisting of Mental Demand, Physical Demand, Temporal Demand, Own Performance, Effort, Frustration. This weighting is subjective according to what the operator feels.

Rating

The rating is obtained through a questionnaire that has been filled out by the operator. Where the operator is asked to give a rating of all indicators of mental workload and this filling is subjective. The results of the rating are accumulated in table 2.

Table 2. Rating results for customer care operators

Subject	Indicator					
	MD	PD	TD	OP	EF	FR
Operator 1	80	70	80	80	70	30
Operator 2	80	85	35	50	75	25
Operator 3	60	85	90	85	85	75
Operator 4	30	70	90	20	50	50
Operator 5	80	95	95	85	90	95
Operator 6	80	85	90	80	90	70
Operator 7	50	50	70	50	50	40
Operator 8	75	30	80	80	85	100

After getting a rating for each indicator, the next step is to find the product value by multiplying the rating by the factor weight. Thus the results of the 6 indicators can be seen in table 3.

Table 3. Product value

Subject	Indicator						Total
	MD	PD	TD	OP	EF	FR	
Operator 1	320	0	160	80	210	150	920
Operator 2	400	170	70	150	75	50	915
Operator 3	60	255	90	340	340	150	1235
Operator 4	0	70	450	60	200	100	880
Operator 5	80	190	285	85	180	475	1295
Operator 6	160	170	360	0	450	70	1210
Operator 7	100	50	280	150	250	0	830
Operator 8	150	0	160	160	340	500	1310

Weighted Workload Average (WWL)

The average WWL is obtained by dividing the WWL value by the total weight, which is 15. So that the average WWL results along with the mental workload categories felt by the operator are shown in table 4.

Table 4. NASA-TLX results for customer care operators

Subject	Indicator						Total	Category
	MD	PD	TD	OP	EF	FR		
Operator 1	21.33	0	10.66	5.33	14	10	61.33	High
Operator 2	26.66	11.33	4.66	10	5	3.33	61	High
Operator 3	4	17	6	22.66	22.66	10	82.33	High
Operator 4	0	4.66	30	4	13.33	6.66	58.66	High
Operator 5	5.33	12.66	19	5.66	12	31.66	86.33	Very High
Operator 6	10.66	11.33	24	0	30	4.66	80.66	Very high
Operator 7	6.66	3.33	18.66	10	16.66	0	55.33	High
Operator 8	10	0	10.66	10.66	22.66	33.33	87.33	Very High
Average score							**71.62**	

Based on NASA-TLX calculations in table 4. It is known that all customer care operators have a high mental workload, with an average WWL score of 71.62 which is included in the high category. A high mental workload will cause frequent stress, irritability, so that it will affect the level of concentration of workers, decrease productivity at work (Anggraini *et al.*, 2019).

The cause of the high mental workload experienced by customer care operators is caused by several NASA-TLX indicators, including effort and temporal demand. Effort and temporal demand indicators have a great influence on the high mental workload, this shows that the effort that needs to be expended in completing tasks in the customer care department is very large. The temporal demand indicator is caused by erratic working hours and often additional working hours during holidays, this causes workers not to have much free time outside of working hours. In line with research that has been done by (Amir *et al*., 2019) the mental workload experienced by skeletal body workers at PT. XYZ is under pressure when working on the frame, and is led to high concentration so that there are no workmanship errors. Such mental workloads sometimes make workers feel panicked, find it difficult to concentrate, and easily find it difficult to consider things.

Conclusions

Based on the results of the processing that has been carried out, it can be concluded that the mental workload conditions of employees in the customer care section of PT. XYZ has a high to very high mental workload, this is evidenced by the average WWL of all employees having a high to very high average. The highest factor causing this high mental workload is the effort indicator (pressure related to the effort that needs to be expended), in addition to other factors that have the highest results, namely the temporal demand indicator (pressure related to time). Recommendations that can be given are to increase the number of workers and provide periodic training and counseling.

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