The mental workload analysis of gojek drivers

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Abstract. Gojek is a service that is very helpful for people's lives by opening jobs for the community and also making it easier for the community itself to live their lives. So many users of the GOJEK application, it also does not rule out the possibility of excessive passengers during rush hour. The needs of passengers who want to be fast and the needs of the company cause gojek drivers to arise workloads on the driver itself. Therefore a study was conducted by analyzing the relationship between mental workload and work stress experienced by gojek drivers using the NASA-Task Load Index (TLX) method. 30 gojek drivers were respondents in this study. By observing the indicators on NASA TLX the results obtained are as many as 3 respondents categorized as having a very high mental workload, 26 respondents having a high category and 1 respondent having a rather high category. it is necessary to improve immediately to make the work become not hampered. the workload is a significant stressor that raises a type of destructive psychological reaction.

1. Introduction
Gojek is one of the breakthroughs of online-based transportation that also combines transportation services with communication technology in Indonesian transportation [1]. Gojek is very helpful in people's lives that require movement and movement in every variety of activities. The phenomenon that currently occurs is that people prefer to use younger services to be sought and used. The nature of urban society which is generally dynamic always moves and adapts to changes or circumstances that exist. Gojek is a company engaged in technology as a social service provider and aims to improve the welfare of workers in various sectors [2].

The presence of Gojek in helping improve the welfare of workers is one of them in opening jobs as a Gojek driver. By becoming a motorcycle taxi driver, it will help the Gojek driver's family economy a little more. Gojek is the most widely used online transportation. This is based on the global research institute Growth for Knowledge (GfK) proving that Gojek online application users reached 21.6% [1]. With so many users of the Gojek application, it also does not rule out the possibility of excessive passengers during rush hour which sometimes makes customers disappointed. Like the problems faced by mass transportation without having a fixed schedule, roads that are crowded with vehicles, how to drive carelessly vehicles and customers who act arbitrarily like canceling orders can create a very high mental workload for GOJEK drivers themselves [2].

According to [3], the workload is the proportion of capacity possessed by humans to meet demands, thus producing a reaction in the form of certain performance. In general, the workload can be defined as the human capacity that is released, both physically and mentally, to fulfill a number of task demands according to predetermined targets. The amount of mental burden received by workers makes workers work not optimal so that measurement and evaluation be required to improve the work process to be more optimum. Improving work process to be more optimum can make increase productivity. One of the subjective measurement methods commonly used to analyze the mental workload of workers is the NASA-Task Load Index (TLX) method.
NASA TLX method. This method has six factors, that is mental needs, physical needs, time requirements, performance, level effort, and the level of frustration [4].

2. Literature Review

2.1. Definition of mental workload

The mental workload concept has been defined, in the contexts of interest for this review, as “the portion of an individual’s limited mental capacity that is actually required by task demands” [5]. Such an assessment could avoid the occurrence of sustained periods of mental overload during driving, which eventually may result in a drastic decrease of performance with possibly dangerous consequences [6].

Mental workload is a psychological construct, difficult to define a difficult to assess [7]. The workload is an effort that must be issued by someone to fulfill the "request" of the job. The workload in question is the size (portion) of the limited operator capacity needed to do certain work. According to [8] the number of activities that must be completed by a person or group of people during a certain period of time under normal circumstances namely workload. The other definition [9] workload is the difference between the workload demands of a task and the maximum capacity of a person's mental burden in a motivated condition. Excessive mental workload will result in work stress. According to Lazarus [10] said that work stress is events around work which are hazards or threats such as fear, anxiety, guilt, anger, sadness, despair, boredom, and the emergence of work stress due to the workload received exceeds the limit.

2.2. NASA TLX

NASA TLX is a method for measuring mental workloads. NASA TLX method has six factors there are, mental needs, physical needs, time needs, frustration, performance, and the last is the level of effort [11]. There is a scale that respondents must later fill in the factors of mental needs, physical needs, time requirements, and frustration levels. The scale used is low to high whereas for performance measurement used well to bad scale.

The NASA Task Load Index (TLX) has been shown to meet these criteria [12]. It is a subjective workload assessment technique that relies on a multidimensional construct to derive an overall workload score [13]. The NASA task-load index (TLX) was developed more than 20 years ago to measure workload in aviation [14]. The NASA TLX is one of the most widely used instruments to assess overall subjective workload [4]. NASA TLX 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 the need for subjective measurements consisting of nine factors (task difficulties, time pressure, type of activity, physical effort, effort mental, performance, frustration, stress and fatigue). These nine factors are simplified into 6 factors, there is Mental Demand (MD), Physical Demand (PD), Temporal Demand (TD), Performance (P), Effort (E), Frustration Level (FR) [14].

After taking data from 30 respondents, then the calculation is carried out through the following formulation:

\[
\text{Product Value} = \text{Rating} \times \text{Weight Factor or rating comparison} \tag{1}
\]

\[
\text{Total Value} = \sum_{15}^{\text{Product Value}} \tag{2}
\]

Then the results obtained are interpreted in the following categories:

| Score WWL | Category |
|-----------|----------|
| 0 – 9     | Low      |
| 10 – 29   | Rather High |

Table 1. Interpretation score
2.3. Regression and correlation test
Regression analysis is a method of analysis in statistics that is used to determine the causal relationship between one variable with another variable [15]. Regression analysis is also used to understand the pattern of relationships between independent variables and dependent variables and is used to predict or estimate the value of a variable against other variables.

Correlation analysis or association test is used in knowing the closeness of the relationship between two variables and knowing the direction of the relationship that occurs [16]. The closeness of the relationship is expressed by the name of the correlation coefficient (or can be called correlation only). Correlation and regression correlation analysis (both simple and multiple) is often the analytical tool used in association tests. The purpose of the correlation analysis is to find out whether there is a relationship between two or more variables, while the regression analysis predicts how far they affect. This test will be carried out on the SPSS software.

3. Research Method
This research was conducted in Yogyakarta. This activity includes an interview phase for respondents with professions as GOJEK drivers totaling 30 people to fill the NASA TLX weighting and rating table.

The tools used in this study are a form of NASA TLX, SPSS software, and Microsoft Excel Software. The steps taken in this study are as follows:

Figure 1. The research stage
4. Result and Discussion

4.1. NASA TLX Score

NASA TLX is one of the information for researchers or owners to find out the total value of the WWL. The following is data from NASA TLX with the category:

| Name | Score   | Category   |
|------|---------|------------|
| R1   | 36      | High       |
| R2   | 65.33   | High       |
| R3   | 52.67   | High       |
| R4   | 52      | High       |
| R5   | 68.67   | High       |
| R6   | 68      | High       |
| R7   | 84.67   | Very High  |
| R8   | 78      | High       |
| R9   | 62      | High       |
| R10  | 64      | High       |
| R11  | 58.67   | High       |
| R12  | 54.67   | High       |
| R13  | 47.33   | High       |
| R14  | 62.67   | High       |
| R15  | 70      | High       |
| R16  | 30.67   | High       |
| R17  | 54      | High       |
| R18  | 75.33   | High       |
| R19  | 28      | Rather High|
| R20  | 50.67   | High       |
| R21  | 82.67   | Very High  |
| R22  | 53.33   | High       |
| R23  | 74.67   | High       |
| R24  | 56.67   | High       |
| R25  | 94      | Very High  |
| R26  | 64      | High       |
| R27  | 58      | High       |
| R28  | 66.33   | High       |
| R29  | 76.67   | High       |
| R30  | 52      | High       |

The results of the classification of mental workloads indicate that all operators fall into different categories. However, all operators need further improvement because they are included in the high (86%) and very high (11%) category.

Based on the Mental Workload final score or the WWL average, the score is classified into which category the score is. Based on data taken from 30 data, only 1 person has a BKM score below 30 which is still tolerable, but 29 other respondents have scores above 30 which according to the table the interpretation of scores is included in the category of high to very high.

Based on the graph of the results of calculations using the NASA TLX method, the workload that has the highest score is the respondent named Rawdah which is equal to 94. One of the activities that make the respondent burdened is in terms of Mental Demand. Where the respondent named Rawdah is a woman who is required to work as a Gojek driver who is always faced with a busy and hot Yogyakarta highway to deliver the interests of her passengers.
4.2. Classic assumption test

The following are the results of classical assumption test calculations using SPSS software:

**Figure 2.** Residual normality test results

From the results of the SPSS calculation in Figure 2, the significance of > 0.05 then the residual data has a Normal distribution. The data used already represents the intended population. The tolerance > 0.1 and VIF <10, multicollinearity does not occur. Figure number 4 that all aspects of tolerance > 0.1 and VIF < 10 which indicate that there is no multicollinearity in the data used. Significance values of all variables> 0.05, it can be concluded that the regression model does not occur heteroscedasticity.

4.3. Regression and correlation test

The following are the results of regression tests and correlations using SPSS software:

**Figure 3.** Regression test

The table above illustrates the regression equation that appears for the results of the WWL mean value with all factors at NASA TLX.

\[
Y = 80,494 + 0.642X_1 -1.496X_2 -1.715X_3 + 1070X_4 + 0.67X_5 + 2318X_6
\]

(3)

The results of the SPSS calculation, a significance value of 0.441 is obtained. The result of the correlation test states the magnitude of the relationship between the WWL mean value variables and the dimensions that are at NASA TLX. Theoretically, the greater the correlation value, the stronger the linkages. The level of significance above explains whether or not the correlation is real. The Summary model shows the value of R which is an explanation of how much a variable affects other variables. The number of R square in the table above is 0.811. This means that 81.1% of the variation in the WWL mean value can be explained by the MD variable, PD TD, OP, EF, and FR. While the rest (100% - 81.1% = 18.9%) are explained by other causes. R square ranges from numbers 0 to 1, with a note that
the smaller the R square number, the weaker the relationship between the two variables. So that in this table it is found that the relationship between the two variables is tight.

5. Conclusion
To get the value of the mental workload of 30 respondents, the calculation was done using the NASA TLX method. Scores from NASA TLX are classified according to the NASA TLX classification table. From the results of the classification, it was found that 30 respondents had a very high level of the workload of 3 people, who had a high mental workload of 26 people, who had a rather high mental workload of 1 people.

With a level of mental workload that is high on average or even in a very high classification, it is necessary to improve immediately to make the work become not hampered. the workload is a significant stressor that raises a type of destructive psychological reaction [17].

To find out the correlation or relationship between variables or indicators at NASA TLX regression tests and correlations were performed using SPSS software. So that the results show that there is a significant relationship between variables as much as 81.1%.

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