



Research paper

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## Mental Workload Analysis Using the NASA-TLX Method at Institute X

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### ABSTRACT

This study aims to analyze the level of mental workload experienced by lecturers and educational staff at the X Islamic Institute and the influencing factors. The method used is NASA TLX which includes six workload dimensions: mental demand, physical demand, temporal demand, performance, effort, and frustration. The results showed that the average mental workload score for lecturers was 67.42 and for educational staff was 74.15, both in the high category. Contributing factors include multiple work targets, difficulty in external coordination, lack of superior direction, and poor personal problem solving. This study provides recommendations for better workload management to improve productivity.

### ABSTRAK

Penelitian ini bertujuan untuk menganalisis seberapa besar beban kerja mental yang dialami oleh lecturer dan tenaga pendidik di institusi X serta faktor-faktor yang memengaruhinya. Metode yang digunakan dalam penelitian ini adalah NASA TLX yang mencakup enam dimensi beban kerja: tuntutan mental, tuntutan fisik, tuntutan waktu, performansi, usaha, dan frustrasi. Hasil penelitian menunjukkan bahwa rata-rata beban kerja mental lecturer sebesar 67,42 dan tenaga pendidik sebesar 74,15, keduanya berada pada kategori tinggi. Faktor penyebab beban kerja tinggi antara lain banyaknya target kerja, kesulitan koordinasi eksternal, kurangnya arahan pimpinan, serta problem solving pribadi. Penelitian ini memberikan rekomendasi pengelolaan beban kerja yang lebih seimbang untuk meningkatkan produktivitas kerja.

## 1. Introduction

Human resource performance is one of the key elements in achieving organizational goals. In educational institutions, employees are not only required to work according to their duties and functions, but also to uphold the values embedded in the institutional culture. Mental workload is one of the significant challenges that is often not visibly measurable. Unlike physical workload, which can be quantified through the number of tasks, mental workload arises from task complexity, time pressure, and value or communication conflicts within the work environment.

Institute X, as an Islamic higher education institution, has a complex work structure. Employees at this institution bear administrative, academic, and spiritual responsibilities. The integration of professionalism and religious values can create its own mental pressure, especially when performance standards are not supported by good time and communication management. Excessive mental workload conditions have the potential to cause various negative impacts, such as prolonged stress, mental fatigue, decreased focus, and reduced quality of decision-making. Therefore, it is important for organizations to have instruments for measuring mental workload as a basis for formulating policies to improve work quality.

In addition to structural complexity and embedded religious values, human resource management challenges in Islamic-based institutions are also influenced by employees' optimism and perceptions toward institutional growth. As highlighted by Rianti and Syamlan (2021), positive perceptions and competency readiness among employees contribute to the practice and growth of Sharia-based institutions, including in the banking sector. This indicates that employees' perceptions and readiness are critical factors that may also reflect the level of mental workload they experience, particularly when faced with high performance targets and institutional transitions.

NASA-TLX (Task Load Index) is one of the most widely used tools for subjectively measuring mental workload. This method was developed by NASA and has been proven effective in various sectors, including education. NASA-TLX assesses six main indicators: mental demand, physical demand, temporal demand, performance, effort, and frustration. These indicators are subjectively rated by individuals based on their work experiences.

## **2. Literature Review**

### *2.1 Theoretical Framework*

In the increasingly competitive landscape of higher education, institutions are required to continuously enhance service quality, institutional performance, and the productivity of human resources. These expectations become even more challenging when accompanied by external pressures—such as a significant decline in student enrollment which can affect both the operational sustainability and public perception of the institution. Such pressures are not only managerial in nature but also impose substantial psychological burdens on academic and administrative personnel who are responsible for maintaining daily academic services.

This issue has also emerged in a private Islamic higher education institution in Indonesia, which has reported a decline of up to 50% in new student admissions over the past three academic years. Simultaneously, the institution is undergoing a transformation toward becoming a full-fledged university while upholding its commitment to embedding Islamic spiritual values across all areas of operation. Consequently, faculty and staff are increasingly expected to meet growing administrative and academic demands while preserving the institution's religious and philosophical identity factors that may significantly intensify mental workload.

Mental workload refers to the cognitive and emotional demands placed on individuals during task execution, particularly in complex or high-responsibility work environments. When left unmanaged, excessive mental workload can lead to reduced performance, job dissatisfaction, and even burnout—ultimately impairing institutional effectiveness. As such, understanding and managing mental workload has become a strategic imperative for higher education institutions aiming to sustain academic excellence and human resource well-being.

To assess mental workload systematically, this study employs the NASA Task Load Index (NASA-TLX) a well established instrument developed by the National Aeronautics and Space Administration. NASA-TLX measures six dimensions of perceived workload: mental demand, physical demand, temporal demand, performance, effort, and frustration. It captures individual experiences through subjective weighting and rating, providing a nuanced understanding of task-related mental strain.

Despite its widespread application in industrial and healthcare settings, limited research has been conducted on mental workload in higher education institutions—particularly those with an Islamic value foundation and undergoing structural transformation. This study seeks to address this gap by analyzing the mental workload experienced by faculty and staff at University X using the NASA-TLX method, and by identifying the key factors contributing to elevated workload levels. The findings are expected to inform institutional policies that support a more balanced, sustainable, and humane work environment for higher education professionals.

### *2.2 Previous Research*

Numerous studies have applied the NASA-TLX method to assess mental workload across different sectors. Saputra and Herwanto (2022) studied carton factory workers and found that repetitive tasks and insufficient facilities led to high levels of effort and time demand. Chairunnisaa et al. (2022) explored administrative staff in educational institutions and observed elevated mental workload, particularly in temporal demand and frustration, due to workload imbalance and insufficient staffing. Indra et al. (2022) assessed water meter readers and identified effort and performance as key contributors to mental workload. Their study highlighted the role of supervisory guidance in reducing frustration levels. Qonita and Laksono (2022) focused on recycling warehouse operators and reported that mental workload was primarily driven by high temporal demand and frustration, resulting from unpredictable task targets and disorganized environments. Nur et al. (2020) studied nurses in ICU and ER units and concluded that emergency conditions significantly increased mental workload, especially in temporal demand and frustration. They recommended stress management training as an intervention. Adikarana et al. (2022) examined production workers in a metal industry and revealed high mental workload caused by cognitive strain and physical exhaustion. They proposed job rotation and shift adjustments to manage workload. Zain (2019) investigated contractor staff and found that discrepancies between expectations and work realities led to high mental workload. The most influential dimensions were mental demand and frustration, particularly in high-pressure projects.

### *2.3 Conceptual Framework*

This study analyzes employees' mental workload using six indicators measured through the NASA-TLX method, employing a descriptive quantitative approach. Each indicator is rated and weighted, then calculated to obtain the final mental workload score.

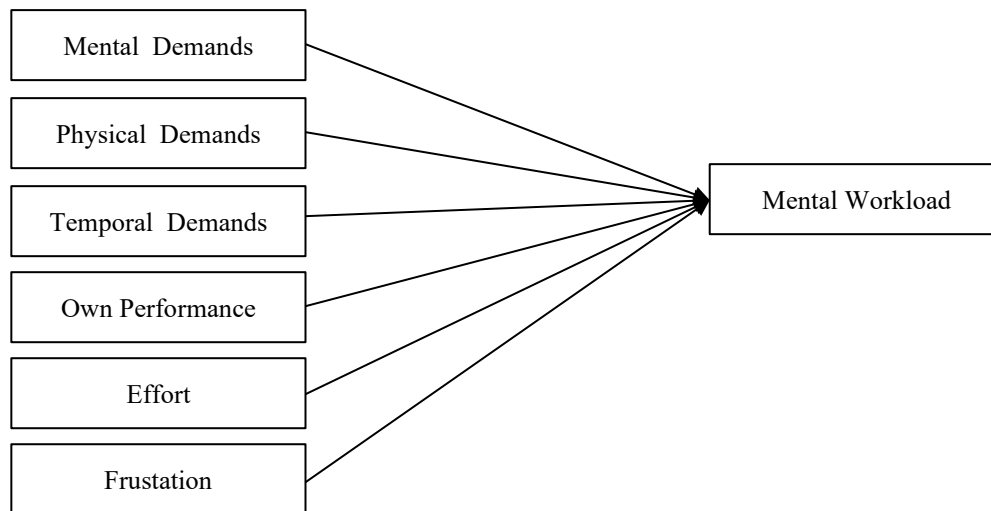


Figure 1. Research Framework

### 3. Methodology

#### 3.1 Research Design

This research adopts a descriptive quantitative approach, aimed at systematically describing the mental workload experienced by employees at Institut X. The descriptive nature of the study allows for an objective portrayal of existing conditions without manipulating variables. Through quantitative data collection and analysis, the study seeks to measure the intensity and distribution of mental workload across different staff categories using the NASA-TLX instrument.

This approach is appropriate for capturing individual perceptions in measurable terms and identifying trends or patterns that may exist within the institution. It also facilitates the classification of workload levels based on standardized scoring, enabling practical interpretation and recommendations for organizational improvement. The focus of this study is on analyzing the mental workload experienced by employees, without attempting to examine causal relationships between variables. The findings are expected to serve as a reference for future studies or as a basis for strategic planning in human resource development.

#### 3.2 Population and Sampel

The population of this study consisted of all active employees working at Institut X at the time of data collection. These employees were divided into two main categories: lecturers and administrative staff. Lecturers included permanent teaching staff from various academic departments, while administrative staff comprised employees in finance, academic affairs, student services, public relations, library, and other supporting units. The sampling technique used in this study was total sampling, in which the entire accessible population was included as respondents. This approach was chosen because the population size was relatively small and manageable, allowing for comprehensive data collection aligned with the study objectives. A total of 75 respondents participated in this study, consisting of 21 lecturers (28%) and 54 administrative staff members (72%). The use of total sampling was considered appropriate to ensure a broad representation of perspectives across all units in the institution. It also contributed to the internal validity of the research by minimizing selection bias. All participants were informed about the study and gave their consent to participate voluntarily.

#### 3.4 Data Collection Instrument

The main instrument used in this study is the NASA Task Load Index (NASA-TLX) questionnaire, which is designed to measure mental workload based on the respondent's subjective perception. NASA-TLX evaluates six core dimensions:

1. Mental Demand
2. Physical Demand
3. Temporal Demand
4. Own Performance
5. Effort
6. Frustration Level

This instrument was selected due to its proven validity and reliability in various fields, and its comprehensive structure in capturing subjective mental workload. Each dimension is assessed through a two-step process:

##### 1. Weighting of Dimensions

In this stage, respondents are asked to compare and choose one of the two paired indicators that has the greatest influence when performing their work. Among the six indicators in this method, there are 15 indicator pairs. The total number of times each indicator is selected becomes the weight for that mental workload indicator.

Table 1. Mental Load Indicator

No	Mental Load Indicator		
1	Mental Demand	VS	Physical Demand
2	Mental Demand	VS	Temporary Demand
3	Mental Demand	VS	Performance
4	Mental Demand	VS	Effort
5	Mental Demand	VS	Frustration Level
6	Physical Demand	VS	Temporary Demand)
7	Physical Demand	VS	Performance
8	Physical Demand	VS	Effort
9	Physical Demand	VS	Frustration Level
10	Temporary Demand	VS	Performance
11	Temporary Demand	VS	Effort
12	Temporary Demand	VS	Frustration Level
13	Performance	VS	Effort
14	Performance	VS	Frustration Level
15	Effort	VS	Frustration Level

2. Rating

Respondents are asked to provide ratings for each of the six mental workload indicators based on their perceived experience while performing their tasks. The rating is typically given on a scale ranging from low to high (0–100), depending on the level of mental workload experienced. The final score for each indicator is then obtained by multiplying the weight from the previous step by the rating score, which is later used to determine the overall mental workload level.

Table 2. Rating

Questions	Scale
How much mental effort is required to complete this task?	
How much physical effort is required to complete this task?	
How much time pressure did you experience to complete this task?	
How successful do you think you were in accomplishing the goals of the task?	
How much mental and physical effort was required to complete this task?	
How anxious and stressed did you feel while completing this task?	

3. Calculation of Final Score – Weighted Workload Level (WWL)

The Weighted Workload Level (WWL) is calculated using the following formula:

$$WWL = \frac{\sum(\text{Rating} \times \text{Bobot})}{15}$$

The calculation steps are as follows:

1. Multiply the weight of each dimension by its corresponding rating score.
2. Sum the results of all six dimensions.
3. Divide the total by 15 (the number of pairwise comparisons) to obtain the respondent's final Weighted Workload Level (WWL) score.

The WWL scores are then classified into five categories of mental workload intensity:

Table 3. Scale Category

Category	Scale
Low	0-9
Moderate	10-29
Slightly High	30-49
High	50-79
Very High	80-100

This structured approach enables the researcher to not only determine the overall mental workload level but also identify which dimensions contribute most significantly to the workload experienced by each respondent.

## 4. Discussion

### 4.1. Data Collection

Data collection in this study was conducted through two primary methods: the distribution of the NASA Task Load Index (NASA-TLX) questionnaire to all respondents, and a limited semi-structured interview with a representative from the Human Resources (HR) Department.

The questionnaire was distributed to 56 respondents, consisting of 21 lecturers and 35 administrative staff from various departments at University X. The NASA-TLX instrument comprises two sections: (1) pairwise comparisons among six workload indicators to determine weighting values, and (2) rating scales ranging from 0 to 100 to evaluate the intensity of perceived mental workload for each indicator.

Meanwhile, the interview was conducted in a semi-structured format with an HR representative to gather qualitative information regarding task distribution, organizational structure, and general workload conditions across divisions. This interview served as complementary data to help contextualize the quantitative results obtained from the questionnaire. The following section presents the recapitulation of NASA-TLX scoring results at University X :

Table 4. Result

No	Respondent	Division	Indicator	NASA TLX Score Calculation			Total	NASA TLX Score (WWL)
				Weight	Rating	WWL		
				(a)	(b)	(a x b)		
1	Lecturer 1	International Program	Mental Demand	2	70	140	950	63.33
			Physical Demand	1	10	10		
			Temporal Demand	4	60	240		
			Own Performance	4	80	320		
			Effort	4	60	240		
			Frustration Level	0	70	0		
2	Lecturer 2	Postgraduate Program	Mental Demand	2	60	120	1160	77.33
			Physical Demand	0	60	0		
			Temporal Demand	5	80	400		
			Own Performance	4	80	320		

			Effort	3	90	270		
			Frustration Level	1	50	50		
3	Lecturer 3	Academic Affairs	Mental Demand	1	70	70	1110	74.00
			Physical Demand	0	50	0		
			Temporal Demand	3	70	210		
			Own Performance	3	90	270		
			Effort	4	60	240		
			Frustration Level	4	80	320		
4	Lecturer 4	Lecturer	Mental Demand	4	80	320	1120	74.67
			Physical Demand	0	40	0		
			Temporal Demand	3	80	240		
			Own Performance	3	80	240		
			Effort	3	80	240		
			Frustration Level	2	40	80		
5	Lecturer 5	Postgraduate Program	Mental Demand	3	20	60	230	15.33
			Physical Demand	2	10	20		
			Temporal Demand	4	10	40		
			Own Performance	1	10	10		
			Effort	5	20	100		
			Frustration Level	0	10	0		
6	Lecturer 6	Study Program	Mental Demand	2	70	140	1100	73.33
			Physical Demand	1	50	50		
			Temporal Demand	2	75	150		
			Own Performance	4	80	320		
			Effort	4	70	280		
			Frustration Level	2	80	160		
7	Lecturer 7	Library	Mental Demand	1	30	30	810	54.00
			Physical Demand	2	70	140		
			Temporal Demand	3	40	120		
			Own Performance	4	80	320		
			Effort	5	40	200		
			Frustration Level	0	30	0		
8	Lecturer 8	Student Affairs	Mental Demand	4	70	280	960	TLC

			Physical Demand	0	40	0		
			Temporal Demand	2	65	130		
			Own Performance	5	70	350		
			Effort	1	50	50		
			Frustration Level	3	50	150		
9	Lecturer 9	TLC	Mental Demand	0	50	0	750	50.00
			Physical Demand	1	50	50		
			Temporal Demand	2	50	100		
			Own Performance	3	50	150		
			Effort	4	50	200		
			Frustration Level	5	50	250		
10	Lecturer 10	International Program	Mental Demand	1	70	70	990	66.00
			Physical Demand	0	10	0		
			Temporal Demand	4	60	240		
			Own Performance	3	80	240		
			Effort	5	60	300		
			Frustration Level	2	70	140		
11	Lecturer 11	Study Program	Mental Demand	3	70	210	940	62.67
			Physical Demand	0	40	0		
			Temporal Demand	2	50	100		
			Own Performance	5	80	400		
			Effort	4	50	200		
			Frustration Level	1	30	30		
12	Lecturer 12	LPPM	Mental Demand	3	70	210	1070	71.33
			Physical Demand	0	20	0		
			Temporal Demand	4	80	320		
			Own Performance	5	70	350		
			Effort	2	60	120		
			Frustration Level	1	70	70		
13	Lecturer 13	Lecturer	Mental Demand	3	60	180	1060	70.67
			Physical Demand	1	40	40		
			Temporal Demand	4	70	280		

			Own Performance	5	80	400		
			Effort	2	80	160		
			Frustration Level	0	30	0		
14	Lecturer 14	Study Program	Mental Demand	5	70	350	1080	72.00
			Physical Demand	1	50	50		
			Temporal Demand	2	80	160		
			Own Performance	4	70	280		
			Effort	3	80	240		
			Frustration Level	0	50	0		
15	Lecturer 15	Study Program	Mental Demand	2	90	180	1345	89.67
			Physical Demand	0	50	0		
			Temporal Demand	3	75	225		
			Own Performance	1	85	85		
			Effort	4	95	380		
			Frustration Level	5	95	475		
16	Lecturer 16	Study Program	Mental Demand	3	30	90	860	57.33
			Physical Demand	3	50	150		
			Temporal Demand	5	60	300		
			Own Performance	2	100	200		
			Effort	2	60	120		
			Frustration Level	0	20	0		
17	Lecturer 17	LPPM	Mental Demand	4	85	340	1305	87.00
			Physical Demand	0	60	0		
			Temporal Demand	1	75	75		
			Own Performance	4	90	360		
			Effort	2	85	170		
			Frustration Level	4	90	360		
18	Lecturer 18	Study Program	Mental Demand	4	70	280	850	56.67
			Physical Demand	2	40	80		
			Temporal Demand	2	40	80		
			Own Performance	4	50	200		
			Effort	3	70	210		

			Frustration Level	0	20	0		
19	Lecturer 19	Academic Affairs	Mental Demand	4	100	400	1165	77.67
			Physical Demand	1	5	5		
			Temporal Demand	0	10	0		
			Own Performance	3	100	300		
			Effort	4	100	400		
			Frustration Level	3	20	60		
20	Lecturer 20	LPPM	Mental Demand	2	90	180	1150	76.67
			Physical Demand	1	90	90		
			Temporal Demand	3	70	210		
			Own Performance	4	80	320		
			Effort	5	70	350		
			Frustration Level	0	60	0		
21	Staff 1	Study Program	Mental Demand	3	50	150	880	58.67
			Physical Demand	5	60	300		
			Temporal Demand	4	70	280		
			Own Performance	1	50	50		
			Effort	2	50	100		
			Frustration Level	0	50	0		
22	Staff 2	Study Program	Mental Demand	3	70	210	1000	66.67
			Physical Demand	0	0	0		
			Temporal Demand	4	70	280		
			Own Performance	4	70	280		
			Effort	3	70	210		
			Frustration Level	1	20	20		
23	Staff 3	Study Program	Mental Demand	0	80	0	1320	88.00
			Physical Demand	4	100	400		
			Temporal Demand	3	80	240		
			Own Performance	2	90	180		
			Effort	2	90	180		
			Frustration Level	4	80	320		
24	Staff 4	IT	Mental Demand	3	90	270	1220	81.33

			Physical Demand	1	70	70		
			Temporal Demand	2	80	160		
			Own Performance	4	80	320		
			Effort	5	80	400		
			Frustration Level	0	70	0		
25	Staff 5	IT	Mental Demand	5	80	400	1180	78.67
			Physical Demand	1	85	85		
			Temporal Demand	3	80	240		
			Own Performance	2	90	180		
			Effort	3	70	210		
			Frustration Level	1	65	65		
26	Staff 6	IT	Mental Demand	5	90	450	1320	88.00
			Physical Demand	1	60	60		
			Temporal Demand	2	90	180		
			Own Performance	0	80	0		
			Effort	3	90	270		
			Frustration Level	4	90	360		
27	Staff 7	IT	Mental Demand	4	80	320	1200	80.00
			Physical Demand	0	20	0		
			Temporal Demand	3	70	210		
			Own Performance	1	80	80		
			Effort	2	70	140		
			Frustration Level	5	90	450		
28	Staff 8	IT	Mental Demand	2	80	160	950	63.33
			Physical Demand	0	10	0		
			Temporal Demand	4	60	240		
			Own Performance	4	70	280		
			Effort	4	60	240		
			Frustration Level	1	30	30		
29	Staff 9	IT	Mental Demand	4	80	320	1190	79.33
			Physical Demand	0	20	0		
			Temporal Demand	3	70	210		

			Own Performance	1	70	70		
			Effort	2	70	140		
			Frustration Level	5	90	450		
30	Staff 10	IT	Mental Demand	3	100	300	1280	85.33
			Physical Demand	0	20	0		
			Temporal Demand	4	80	320		
			Own Performance	4	80	320		
			Effort	3	90	270		
			Frustration Level	1	70	70		
31	Staff 11	IT	Mental Demand	1	90	90	1250	83.33
			Physical Demand	0	20	0		
			Temporal Demand	2	80	160		
			Own Performance	3	80	240		
			Effort	4	90	360		
			Frustration Level	5	80	400		
32	Staff 12	IT	Mental Demand	2	50	100	940	62.67
			Physical Demand	0	30	0		
			Temporal Demand	5	70	350		
			Own Performance	3	80	240		
			Effort	4	50	200		
			Frustration Level	1	50	50		
33	Staff 13	IT	Mental Demand	2	100	200	1310	87.33
			Physical Demand	0	90	0		
			Temporal Demand	5	70	350		
			Own Performance	3	100	300		
			Effort	4	90	360		
			Frustration Level	1	100	100		
34	Staff 14	Academic Affairs	Mental Demand	2	80	160	1150	76.67
			Physical Demand	1	70	70		
			Temporal Demand	2	70	140		
			Own Performance	4	80	320		
			Effort	4	80	320		

			Frustration Level	2	70	140		
35	Staff 15	Academic Affairs	Mental Demand	1	80	80	1040	69.33
			Physical Demand	3	60	180		
			Temporal Demand	4	60	240		
			Own Performance	4	75	300		
			Effort	3	80	240		
			Frustration Level	0	30	0		
36	Staff 16	Academic Affairs	Mental Demand	2	60	120	1000	66.67
			Physical Demand	1	40	40		
			Temporal Demand	4	60	240		
			Own Performance	1	80	80		
			Effort	3	80	240		
			Frustration Level	4	70	280		
37	Staff 17	Academic Affairs	Mental Demand	5	90	450	1230	82.00
			Physical Demand	0	50	0		
			Temporal Demand	4	90	360		
			Own Performance	1	50	50		
			Effort	2	50	100		
			Frustration Level	3	90	270		
38	Staff 18	Finance	Mental Demand	5	90	450	1350	90.00
			Physical Demand	3	80	240		
			Temporal Demand	1	80	80		
			Own Performance	2	90	180		
			Effort	4	100	400		
			Frustration Level	0	100	0		
39	Staff 19	Finance	Mental Demand	4	80	320	1190	79.33
			Physical Demand	0	40	0		
			Temporal Demand	4	80	320		
			Own Performance	3	90	270		
			Effort	3	70	210		
			Frustration Level	1	70	70		
40	Staff 20	Library	Mental Demand	0	55	0	1130	75.33

			Physical Demand	5	90	450		
			Temporal Demand	4	60	240		
			Own Performance	3	70	210		
			Effort	2	80	160		
			Frustration Level	1	70	70		
41	Staff 21	Secretariat	Mental Demand	3	85	255	1295	86.33
			Physical Demand	0	50	0		
			Temporal Demand	4	90	360		
			Own Performance	2	90	180		
			Effort	2	70	140		
			Frustration Level	4	90	360		
42	Staff 22	Secretariat	Mental Demand	4	95	380	1415	94.33
			Physical Demand	3	90	270		
			Temporal Demand	2	95	190		
			Own Performance	5	95	475		
			Effort	0	100	0		
			Frustration Level	1	100	100		
43	Staff 23	Public Relations	Mental Demand	3	70	210	1210	80.67
			Physical Demand	1	60	60		
			Temporal Demand	3	80	240		
			Own Performance	2	100	200		
			Effort	4	80	320		
			Frustration Level	2	90	180		
44	Staff 24	Public Relations	Mental Demand	3	80	240	1255	83.67
			Physical Demand	0	60	0		
			Temporal Demand	4	85	340		
			Own Performance	3	80	240		
			Effort	3	85	255		
			Frustration Level	2	90	180		
45	Staff 25	Public Relations	Mental Demand	3	90	270	1320	88.00
			Physical Demand	1	90	90		
			Temporal Demand	2	80	160		

			Own Performance	5	90	450		
			Effort	3	90	270		
			Frustration Level	1	80	80		
46	Staff 26	Public Relations	Mental Demand	3	90	270	1100	73.33
			Physical Demand	0	50	0		
			Temporal Demand	3	70	210		
			Own Performance	3	100	300		
			Effort	5	50	250		
			Frustration Level	1	70	70		
47	Staff 27	Public Relations	Mental Demand	3	100	300	1410	94.00
			Physical Demand	3	80	240		
			Temporal Demand	4	100	400		
			Own Performance	1	90	90		
			Effort	1	80	80		
			Frustration Level	3	100	300		
48	Staff 28	LPM	Mental Demand	2	70	140	1210	80.67
			Physical Demand	1	70	70		
			Temporal Demand	4	90	360		
			Own Performance	4	80	320		
			Effort	4	80	320		
			Frustration Level	0	70	0		
49	Staff 29	LPM	Mental Demand	2	80	160	1065	71.00
			Physical Demand	0	50	0		
			Temporal Demand	5	50	250		
			Own Performance	4	85	340		
			Effort	1	90	90		
			Frustration Level	3	75	225		
50	Staff 30	Student Affairs	Mental Demand	3	85	255	1285	85.67
			Physical Demand	2	80	160		
			Temporal Demand	3	85	255		
			Own Performance	1	80	80		
			Effort	1	85	85		

			Frustration Level	5	90	450		
51	Staff 31	Student Affairs	Mental Demand	2	80	160	1190	79.33
			Physical Demand	1	40	40		
			Temporal Demand	4	80	320		
			Own Performance	2	100	200		
			Effort	5	80	400		
			Frustration Level	1	70	70		
52	Staff 32	International Program	Mental Demand	3	100	300	1395	93.00
			Physical Demand	0	70	0		
			Temporal Demand	1	90	90		
			Own Performance	3	95	285		
			Effort	5	90	450		
			Frustration Level	3	90	270		
53	Staff 33	Cooperation & Innovation	Mental Demand	2	95	190	1290	86.00
			Physical Demand	0	80	0		
			Temporal Demand	3	85	255		
			Own Performance	3	85	255		
			Effort	3	90	270		
			Frustration Level	4	80	320		
54	Staff 34	Cooperation & Innovation	Mental Demand	2	100	200	1430	95.33
			Physical Demand	0	80	0		
			Temporal Demand	3	100	300		
			Own Performance	5	100	500		
			Effort	4	100	400		
			Frustration Level	1	30	30		
55	Staff 35	Human Resources	Mental Demand	2	90	180	1340	89.33
			Physical Demand	2	70	140		
			Temporal Demand	4	90	360		
			Own Performance	4	90	360		
			Effort	3	100	300		
			Frustration Level	0	80	0		
56	Staff 36	Human Resources	Mental Demand	2	60	120	1015	67.67

			Physical Demand	0	40	0		
			Temporal Demand	4	60	240		
			Own Performance	3	85	255		
			Effort	4	75	300		
			Frustration Level	2	50	100		
56	Staff 37	Clinic	Mental Demand	3	80	240	1240	82.67
			Physical Demand	1	75	75		
			Temporal Demand	2	70	140		
			Own Performance	4	90	360		
			Effort	5	85	425		
			Frustration Level	0	80	0		

Based on the Weighted Workload Level (WWL) scores, the mental workload among lecturers ranged from 15.33 to 89.67. The lowest score was recorded by Lecturer 5 from the Postgraduate unit, with a WWL of 15.33, classified under the very low workload category. This low score may be attributed to the limited complexity of tasks handled, as well as minimal perceived pressure related to time constraints and performance demands.

Conversely, the highest score was obtained by Lecturer 15 from the Academic Program unit, who recorded a WWL of 89.67, falling under the very high workload category. The workload for Lecturer 15 was dominated by high values in the Effort and Frustration Level dimensions, indicating substantial mental pressure due to the significant effort required to meet work targets and emotional tension experienced during task execution. Lecturer 17 from the Research and Community Service Institute (LPPM) also showed a high score of 87.00, reinforcing the assumption that structural and strategic responsibilities contribute to increased mental workload, especially in the dimensions of Own Performance and Mental Demand.

Among administrative staff, the WWL scores also indicated high workload trends, ranging from 50.00 to 95.33. The highest score was recorded by Staff 34 from the Innovation and Partnership division, with a WWL of 95.33, classified as very high. The workload in this case was largely influenced by the high scores in Own Performance (500) and Effort (400), reflecting significant performance pressures and expectations for optimal results within limited timeframes. Staff 22 and Staff 27 from the Secretariat and Public Relations units also recorded WWL scores above 94, indicating that positions involved in external communications, institutional reporting, and program coordination contribute significantly to mental workload.

Interestingly, most administrative staff with high WWL scores were from units that provide public services or strategic support, such as IT, Public Relations, Finance, Student Affairs, and Human Resources. This suggests that job roles requiring multitasking, strict deadlines, and outcome-based expectations contribute substantially to increased cognitive and emotional demands. On the other hand, only a few administrative personnel recorded WWL scores below 60, typically from technical or supporting units such as the Library and Quality Assurance.

In general, the findings indicate that the perception of mental workload is influenced not only by the quantity of tasks but also by the nature of those tasks, the level of outcome expectations, and the individual's capacity to manage pressure. These results underscore the importance of regular assessments of individual mental workload to support fair and sustainable human resource management policies within value-based higher education institutions.

#### 4.2 Mental Workload Category

After doing various calculations starting from calculating the product/respondent value, calculating the WWL value, and calculating the average WWL score, the next step is to group the categories of each unit.

Table 5. Average WWL Score

No.	Work Unit / Department	Average WWL	Mental Workload Category
1	LPPM	78.33	High
2	Study Program	70.85	High
3	Academic Affairs	75.83	High
4	Postgraduate Program	41.66	Slightly High

5	International Program	64.66	High
6	Language Center	50.00	High
7	Library	54.00	High
8	Student Affairs	64.00	High
9	Finance	80.83	Very High
10	IT	72.00	High
11	Secretariat	93.00	Very High
12	Public Relations	82.00	Very High
13	Quality Assurance (LPM)	74.16	High
14	Human Resources (HR)	74.16	High
15	Cooperation & Innovation	85.41	Very High

Based on the data analysis using the NASA-TLX method, the mental workload levels of employees were classified according to their respective work units. The classification results are presented in Table [x], which displays the average WWL scores and corresponding workload categories. In general, the majority of work units fall under the high category, with several units exhibiting very high levels of mental workload.

Units such as Finance (80.83), Secretariat (93.00), Public Relations (82.00), and Cooperation & Innovation (85.41) recorded the highest WWL scores, placing them in the very high workload category. This indicates that employees in these divisions experience considerable pressure, particularly in terms of time constraints, performance expectations, and emotional burden. These conditions may arise from the dynamic nature of their tasks, which often involve multiple stakeholders and require rapid, cross-functional coordination.

On the other hand, the Postgraduate Program unit reported a WWL score of 41.66, placing it in the slightly high category. While lower than other units, this score still reflects a notable level of mental workload, especially during peak periods such as the beginning of the semester or graduation processing.

Other units such as LPPM, Academic Affairs, Study Programs, Quality Assurance, Human Resources, and the Library fall into the high category, indicating that employees in these areas consistently face significant mental workload in their daily tasks. This also applies to units like IT, Language Center, Student Affairs, and Muhafidzoh, which play crucial roles in supporting the institution's core operations.

These findings highlight the importance of a unit-based workload management approach, as the nature and demands of each division vary considerably. Adjusting resources, providing stress management training, and implementing flexible scheduling policies may serve as strategic steps to reduce excessive workload and sustain employee well-being across the institution.

#### 4.3 NASA-TLX Highest Indicator Analysis

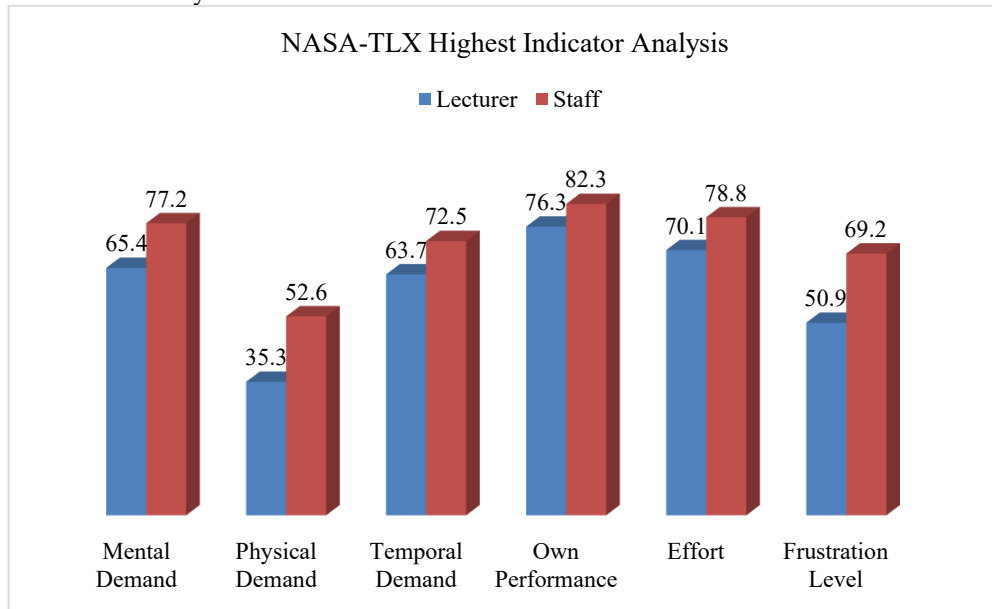


Figure 2. NASA-TLX Highest Indicator Analysis

The results of the percentage of mental workload indicators show that across all dimensions, administrative staff tend to have higher scores compared to lecturers, indicating a greater perceived mental workload. The performance dimension recorded

the highest scores in both groups, namely 76.3 for lecturers and 82.3 for administrative staff. This suggests that employees feel pressured to maintain a high level of work performance. Meanwhile, the temporal demand dimension also ranked high, with scores of 63.7 for lecturers and 72.5 for administrative staff, reflecting the pressure of completing tasks within limited timeframes. Other dimensions such as effort and mental demand also recorded high scores, indicating the intense cognitive effort and mental energy required to complete work tasks.

In contrast, the physical demand dimension had the lowest scores 35.3 for lecturers and 52.6 for administrative staff corresponding to the administrative and non-physical nature of most job roles. The score differences between the two groups may be interpreted as an indication that administrative staff face more complex pressures, both administratively and emotionally, compared to lecturers. These findings reinforce the importance of managing mental workload based on job type and work unit, taking into account the specific characteristics and responsibilities inherent in each role.

#### 4.4 Fishbone diagram

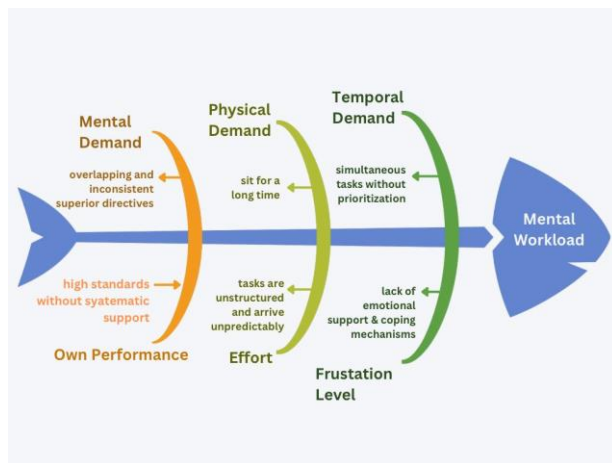


Figure 3. Fishbone Diagram

The fishbone diagram in this study illustrates the contributing factors to the high level of mental workload among employees at Institut X, categorized into six key dimensions based on the NASA-TLX method: mental demand, physical demand, temporal demand, performance, effort, and frustration. Each dimension represents a specific source of pressure that is interrelated. Mental demand is triggered by the dual expectation to fulfill both functional duties and the institution’s value-based objectives; temporal demand arises from inadequate planning and coordination; performance is pressured by the need to deliver excellent service under tight time and resource constraints; effort reflects overlapping tasks with unclear prioritization; frustration stems from imbalances between workload and emotional support; while physical demand, although lower, still emerges due to repetitive sedentary activity. Overall, the diagram highlights that mental workload is not only driven by task volume but also shaped by organizational systems, performance expectations, and individual psychological readiness.

#### Improvement Suggestions Based on Fishbone Diagram

The following are possible improvement suggestions that can be implemented as a strategy to address mental workload issues:

- Mental Demand**  
Develop an integrated job description that combines functional responsibilities with institutional values to avoid role conflict. Additionally, provide training in time management and cognitive focus to help employees manage mental demands more effectively.
- Physical Demand**  
Implement microbreak policies (short breaks every hour), improve ergonomic workspace design, and establish designated relaxation areas to prevent physical strain caused by monotonous and sedentary work routines.
- Temporal Demand**  
Introduce a centralized and scheduled digital workflow system, and establish a clear daily and weekly task prioritization structure. Cross-unit coordination can be managed using collaborative tools such as Trello or Google Workspace.
- Performance**  
Adopt realistic and measurable performance evaluations, including two-way assessments that consider not only outcomes but also work processes and contextual challenges.
- Effort**  
Improve workload planning at the divisional level, including the development of clear standard operating procedures (SOPs) and detailed task guides. Regular workload distribution evaluations should also be conducted to ensure fairness among staff

members.

6. Frustration

Institutions should provide internal counseling services, establish psychological support teams or peer support programs, and offer regular workshops on coping strategies and self-regulation to strengthen emotional resilience among staff.

## 5. Conclusion

This study concludes that the mental workload of employees at Institut X is categorized as high to very high, as measured using the NASA-TLX method with six core indicators. The findings indicate that the majority of employees, including both lecturers and administrative staff, experience a substantial level of mental workload. Based on the Weighted Workload Level (WWL) data, 81.3% of respondents fell into the high category, while 12% were classified under the very high category. These results reflect the presence of significant cognitive, emotional, and operational demands in employees' daily work routines.

Specifically, the dimensions of performance, effort, and temporal demand emerged as the most dominant contributors to the overall mental workload. Employees are expected to maintain a high level of service quality, manage multiple tasks within limited timeframes, and exert considerable work energy without clear guidance on task prioritization. In addition, the mental demand dimension also recorded a high score, as employees are required to complete administrative duties while simultaneously participating in scheduled spiritual programs, as part of institutional obligations. The differences between lecturers and administrative staff are also notable, with the latter group exhibiting higher scores across nearly all dimensions—indicating broader and more intense work complexity.

The classification by unit further revealed that certain departments—such as Finance, Secretariat, Public Relations, and Cooperation & Innovation—experience particularly high levels of mental workload. This is supported by qualitative findings from limited interviews and visual mapping through a fishbone diagram, which identifies root causes across the six NASA-TLX dimensions: the dual pressure of administrative and spiritual functions (mental demand), lack of structured workflow (temporal demand), high performance expectations from stakeholders (performance), excessive workload (effort), emotional strain and role conflicts (frustration), and inadequate ergonomic support despite low physical activity levels (physical demand).

Overall, the findings suggest that mental workload in the workplace is influenced not only by the volume of tasks but also by organizational structure, communication flow, planning systems, institutional expectations, and the limited personal capacity to cope with pressure. Therefore, a holistic mental workload management strategy is necessary—one that includes periodic WWL assessments, structured SOP development based on task prioritization, psychological support programs, and capacity building in personal management skills. These steps are essential in creating a more humane, adaptive, and sustainable work environment that supports employee well-being and institutional productivity.

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