

Analisis Beban Kerja Mental *Content Creator* dalam Sistem Kerja Jarak Jauh Menggunakan Metode NASA-TLX

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Abstrak

Pertumbuhan pesat industri kreatif digital telah meningkatkan jumlah *content creator* yang bekerja dalam sistem kerja jarak jauh, yang sering kali dikaitkan dengan tuntutan kognitif tinggi serta struktur kerja yang fleksibel. Penelitian ini bertujuan untuk menganalisis beban kerja mental yang dialami oleh *content creator* dalam sistem kerja jarak jauh menggunakan metode NASA Task Load Index (NASA-TLX). Mengingat terbatasnya penerapan NASA-TLX dalam meneliti beban kerja mental di kalangan pembuat konten yang bekerja jarak jauh, studi ini memberikan bukti empiris dari profesi digital yang sedang berkembang dan masih kurang dieksplorasi dalam literatur. Penelitian ini menggunakan pendekatan deskriptif kuantitatif dengan melibatkan 44 *content creator* di Bandung. Data dikumpulkan melalui kuesioner online dan didukung oleh wawancara untuk mendapatkan pemahaman yang lebih mendalam. Hasil penelitian menunjukkan bahwa nilai rata-rata Weighted Workload (WWL) berada di sekitar 70.32, yang mengindikasikan tingkat beban kerja mental yang tinggi. Dari enam dimensi yang diukur, effort, performance, dan temporal demand menjadi faktor dominan. Temuan ini menunjukkan bahwa pekerjaan *content creator* membutuhkan usaha yang besar secara keseluruhan, sangat dipengaruhi oleh tekanan waktu, serta tuntutan performa yang tinggi. Meskipun demikian, tingkat frustrasi yang relatif moderat mengindikasikan bahwa faktor intrinsik seperti passion mampu membantu mengurangi tekanan emosional. Penelitian ini menekankan pentingnya strategi manajemen kerja yang lebih terstruktur untuk mengurangi beban kerja mental dan mendukung produktivitas yang berkelanjutan. Rekomendasi praktis meliputi penerapan perencanaan tenggat waktu yang realistis, mengalokasikan periode revisi khusus, dan menjadwalkan istirahat teratur untuk mengurangi upaya berlebihan dan tuntutan waktu di antara para pembuat konten. Penelitian selanjutnya disarankan untuk melibatkan sampel yang lebih luas dan mempertimbangkan faktor lain yang memengaruhi beban kerja mental dalam lingkungan kerja digital.

Kata kunci: beban kerja mental, *content creator*, ergonomi kognitif, kerja jarak jauh, NASA-TLX, pekerjaan digital.

Mental Workload Analysis of Content Creators in Remote Working Systems Using the NASA-TLX Method

Abstract

The rapid growth of the digital creative industry has increased the number of content creators working under remote working systems, which are often associated with high cognitive demands and flexible work structures. This study aims to analyze the mental workload experienced by content creators in remote working systems using the NASA Task Load Index (NASA-TLX) method. Given the limited application of NASA-TLX in examining mental workload among content creators operating in remote work settings, this study provides empirical evidence from an emerging digital profession that remains underexplored in the literature. A quantitative descriptive approach was employed, involving 44 content creators in Bandung. Data were collected through an online questionnaire and supported by interviews to provide deeper insights. The results show that the average Weighted Workload (WWL) score is approximately 70.32, indicating a high level of mental workload. Among the six dimensions, effort, performance, and temporal demand were identified as the dominant contributors. The findings suggest that content creation work requires substantial overall effort, is strongly influenced by time pressure, and involves high performance expectations. However, the relatively moderate level of frustration indicates that intrinsic factors, such as passion, help mitigate emotional strain. This study highlights the importance of structured work management strategies to reduce mental workload and support sustainable productivity. Practical recommendations include implementing realistic deadline planning, allocating dedicated revision periods, and

scheduling regular recovery breaks to mitigate excessive effort and temporal demands among content creators. Future research is suggested to explore broader samples and additional factors influencing mental workload in digital work environments.

Keywords: *cognitive ergonomics, content creators, digital work, remote working, mental workload, NASA-TLX.*

1. INTRODUCTION

The rapid development of digital technology has brought significant changes to the modern work system, especially after the global disruption caused by the COVID-19 pandemic announced by the World Health Organization in March 2020. One of the most prominent changes is the increasingly widespread implementation of remote working systems, which allow individuals to work outside of conventional office environments by utilizing digital communication technology. This change not only affects organizational structures, but also reshapes work patterns, flexibility, and productivity in various sectors, especially in the digital creative industry [1]

Remote work offers various benefits, such as flexible working hours, improved work-life balance, and reduced commute time [2]. However, these benefits also come with challenges, such as blurred boundaries between work and personal life, limited in-person interaction, and increased psychological stress. In digital-based work, these challenges are further compounded by the high reliance on technology and ongoing online engagement.

In this context, the digital creative industry is experiencing significant growth, particularly in developing countries like Indonesia. The content creator profession has emerged as a key career, with roles in producing and distributing digital content through various platforms such as social media, video-sharing sites, and streaming services. The role of a content creator extends beyond content production to idea development, audience interaction, performance monitoring, and the ability to adapt to constantly changing platform algorithms. Therefore, this job is characterized by high cognitive demands, multitasking skills, and significant time pressure [3],[4],[5].

Despite its significant economic potential and growing popularity, this profession also faces a significant mental workload. The need to continuously generate creative ideas, meet tight deadlines, and maintain audience engagement contributes to ongoing cognitive and emotional stress. Furthermore, algorithm-based visibility systems create uncertainty, requiring content creators to continually produce content to remain relevant [6]. This situation increases the risk of mental exhaustion, stress, and even burnout, especially among young and productive age groups [7].

Theoretically, this condition can be explained through an ergonomics perspective, specifically cognitive ergonomics, which studies the interaction between humans and work systems with the aim of optimizing well-being and performance [8]. In the context of digital work, cognitive ergonomics becomes very important because it focuses on mental processes such as perception, memory, reasoning, and decision-making that influence human interaction with systems [9]. High cognitive demands in digital work have been shown to affect attention, performance, and increase the risk of human error [10].

Mental workload itself refers to the level of cognitive demands an individual experiences in completing a task, which is influenced by job characteristics, environmental conditions, and individual capacity [11]. In modern digital work systems, mental workload is increasingly influenced by intense interaction with technology, high information processing requirements, and multitasking work environments. This condition is in line with the view that continuous task switching in digital environments can increase cognitive load and decrease work efficiency, while also increasing mental fatigue [10].

Previous research has also shown that excessive mental workload can decrease performance, increase error rates, and trigger cognitive fatigue [12]. Conversely, excessively low workloads can lead to boredom and decreased motivation [13]. Furthermore, high mental workloads can have physical, psychological, and behavioral impacts, such as fatigue, impaired concentration, and decreased work engagement, which are further exacerbated in digital work environments with high screen exposure and irregular work patterns.

In the context of remote work, these challenges become even more complex. While offering flexibility, remote work also increases the risk of cognitive overload due to constant digital connectivity and the blurring of work-life boundaries [14], [15]. Research shows that prolonged digital engagement and frequent interruptions can increase mental workload and decrease attention stability [16]. In fact, a fragmented digital work environment can hinder an individual's ability to perform optimal deep work [17].

Furthermore, the work of content creators can also be understood within the framework of digital labor, where cognitive, emotional, and creative activities are continuously utilized within a platform-based economic

ecosystem. In this context, mental workload is not only determined by the task but also shaped by audience expectations, platform metrics, and the pressure to maintain visibility and relevance. This creates ongoing cognitive pressure and amplifies the potential for stress and burnout in digital work [18], [19].

To comprehensively measure mental workload, various approaches can be used, both objective and subjective. However, subjective methods are considered more relevant in capturing individual experiences at work [20]. One of the most widely used methods is the NASA Task Load Index (NASA-TLX). This method was developed by Hart and Staveland (1988), which measures workload based on six main dimensions, namely mental demand, physical demand, temporal demand, performance, effort, and frustration level [21]. This method has been proven valid and reliable in various complex work contexts and is able to provide a multidimensional picture of mental workload [22].

Compared with other mental workload assessment approaches, such as physiological measurements and the Subjective Workload Assessment Technique (SWAT), the NASA-TLX offers several advantages that are particularly relevant to remote digital work environments [23]. As a multidimensional instrument, the NASA-TLX allows for the simultaneous assessment of multiple aspects of workload, providing a more comprehensive understanding of workers' experiences. Furthermore, its subjective nature makes it practical for geographically dispersed participants, as it does not require specialized equipment or a laboratory settings. These characteristics make the NASA-TLX particularly suitable for examining mental workload among content creators, whose work is shaped by cognitive demands, time pressure, and performance expectations in platform-based digital environments.

However, although NASA-TLX has been widely used in traditional sectors such as transportation, manufacturing, and administrative work, its application in the context of digital creative work, particularly for content creators in remote work systems, is still relatively limited [24]. Furthermore, existing researchs have generally not integrated the dynamics of remote work, the characteristics of platform-based digital labor, and mental workload measurements within a single analytical framework. This indicates a significant research gap in understanding how mental workload emerges in rapidly evolving digital professions and how it can be comprehensively assessed.

Based on this gap, this study aims to: (1) measure the level of mental workload experienced by content creators working in remote environments using the NASA-TLX method, and (2) formulate practical recommendations for managing and reducing mental workload to support sustainable performance and worker well-being in the digital creative industry.

This research is expected to contribute both empirically and conceptually by enriching the limited body of knowledge regarding mental workload in digital professions. In addition, the findings may serve as an evidence-based foundation for developing more adaptive, healthy, and human-oriented work system within the rapidly evolving digital work environment.

To address this gap, this study utilizes the NASA Task Load Index (NASA-TLX), a subjective measurement tool widely used to assess mental workload in a variety of complex work contexts [23]. NASA-TLX measures workload based on six main dimensions: mental demand, physical demand, temporal demand, performance, effort, and frustration level [25], enabling a multidimensional and comprehensive mapping of workload. This approach is considered relevant for analyzing the complexity of content creator work, which involves both cognitive and emotional aspects simultaneously.

By achieving these objectives, this research is expected to provide both empirical and practical contributions, particularly in enriching studies on mental workload in digital professions which are still limited, as well as providing an evidence-based basis for the development of more effective work systems in remote-based creative.

2. RESEARCH METHODS

Research Design

This study used a descriptive quantitative approach complemented by qualitative interviews to analyze the mental workload experienced by content creators working in remote environments. The quantitative component aimed to measure perceived mental workload using the NASA Task Load Index (NASA-TLX), while the qualitative interviews were conducted to provide contextual explanations regarding the factors contributing to workload experiences among participants. This study focuses on content creators whose professional activities were primarily carried out through digital platforms and remote work arrangements, which are generally characterized by high cognitive demands, time pressure, and flexible work structures [26].

Participants and Sampling Techniques

Participants consisted of 44 content creators engaged in remote work within the digital creative industry in Bandung, Indonesia. A purposive sampling technique was used to ensure that participants met the criteria relevant to the research objectives. The inclusion criteria were as follows:

1. Actively working as a content creator
2. Working in a remote or digital work system
3. Have at least 6 months work experience

Data for the quantitative phase were collected through an online questionnaire distributed to eligible participants. To enrich the interpretation of the quantitative findings, semi-structured interviews were conducted with 5 (five) content creators representing different content categories, including fashion, beauty, and lifestyle content. Interview participants were selected purposively based on willingness to participate and their experience in remote content creation activities.

Data Collection Instruments

The primary instrument used in this study was the NASA Task Load Index (NASA-TLX). NASA-TLX is a standardized instrument that has been extensively validated and widely used in mental workload research across diverse occupational settings. Therefore, additional construct validity and reliability testing of the NASA-TLX dimensions were not conducted in this study. Nevertheless, prior to online distribution, the questionnaire was reviewed to ensure the clarity of instructions and comprehensibility of all items for participants working in remote digital environments. NASA-TLX is a subjective measurement tool that assesses workload based on six dimensions: Mental Demand, Physical Demand, Temporal Demand, Performance, Effort, and Frustration Level. This instrument is widely used in cognitive ergonomics and digital work research because it can capture both the cognitive and emotional aspects of workload [27].

Additionally, a semi-structured interview guide was developed based on the six dimensions of NASA-TLX to explore participants' experiences in managing remote work demands, deadlines, performance expectations, and emotional challenges faced during content creation activities.

Data Analysis Techniques

Mental workload data obtained from the NASA-TLX questionnaire were analyzed using the standard NASA-TLX procedure, consisting of weighting and rating stages. In the weighting stage, respondents completed pairwise comparisons among the six NASA-TLX dimensions to determine their relative contribution to workload. Subsequently, respondents provided ratings for each dimension according to their perceived workload experience.

The final workload score, referred to as the Weighted Workload (WWL), was calculated by multiplying the rating and weighting scores for each dimension and dividing the total score by fifteen, following the original NASA-TLX procedure.

Interview transcripts were analyzed using thematic analysis procedures involving data familiarization, initial coding, categorization, and theme development. The themes generated from the interview data were subsequently integrated with the quantitative findings to provide contextual explanations for the dominant NASA-TLX dimensions.

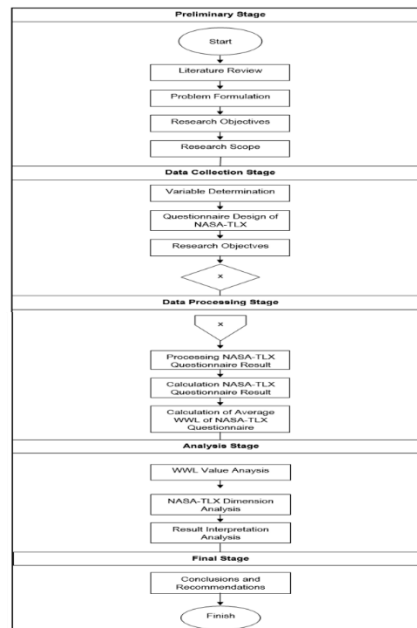


Figure 1. Research Flowchart for Measuring Mental Workload Using NASA-TLX

Data Interpretation

The WWL values are then classified into five categories of mental workload levels, namely:

1. Very Low
2. Low
3. Moderate
4. High
5. Very High

This classification is used to understand the overall level of workload and to identify the dimensions most dominantly felt by respondents.

Focus of Analysis

The analysis in this study focuses on:

1. Determining the overall level of mental workload on content creators
2. Identifying the most dominant NASA-TLX dimensions in influencing workload
3. Exploring participants' experiences related to remote work demands through qualitative interviews
4. Interpreting the results within context of remote-based digital work systems, and comparing them with previous studies to strengthen the scientific contribution of the research.

3. HASIL DAN PEMBAHASAN**3.1. Respondent Characteristic**

Table 1. Demographic Characteristics of Respondents

No	Characteristics	Category	Frequency (n)	Percentage (%)
1	Location	Bandung	44	100%
2	Work system	Remote Work	44	100%
3	Work	Content Creator	44	100%
4	Work experience	≥ 6 months	44	100%
5	Method of collecting data	Online Questionnaire (Google Form)	44	100%

This study involved 44 respondents who work as content creators in Bandung and work remotely. All respondents had at least six months of work experience, indicating a sufficient understanding of the demands of digital content creation. Respondents came from various content fields, such as fashion, beauty, and lifestyle, reflecting the diversity of the digital creative industry. Data were collected through an online questionnaire, reflecting the characteristics of the respondents' digital and remote work environments [19].

3.2. Mental Workload Measurement Results and Field Findings

Based on data analysis using the NASA-TLX method on 44 content creators in Bandung, a fairly clear picture of how mental workload is experienced in remote work environments emerged. The weighting results revealed that the effort dimension emerged as the most dominant factor compared to the other dimensions. Furthermore, the temporal demand dimension (time pressure) also showed a significant contribution. Meanwhile, other dimensions, such as mental demand, physical demand, performance, and frustration, were at relatively lower levels.

This shows that in working as a content creator, the main challenge lies not only in the thinking process or generating ideas, but more in the overall amount of effort required to complete the work, as well as the time pressure in meeting deadlines.

These findings are further strengthened by the assessment results (ratings) in each dimension. The average value shows that: Effort has the highest value of 89, followed by Performance at 83, and Temporal Demand at 77, Physical Demand at 76, Frustration at 58, and the lowest is Mental Demand at 50. Simply put, these numbers show that the work of a content creator is not just "thinking of content ideas", but is a long and quite complex process, starting from generating ideas, producing and editing content, to ensuring the final result is in accordance with client and audience expectations [28]. Furthermore, high scores on the performance dimension indicate a strong pressure to consistently produce high-quality content. This finding is further reinforced by the overall NASA-TLX score.

Table 2. Descriptive Statistics of Overall Mental Workload

Variabel	n	Mean	STD	Min	Max	Category
Weighted Workload (WWL)	44	70.32	15.71	40	93	High

Descriptive analysis revealed that the average Weighted Workload (WWL) score among content creators was 70.32, with a standard deviation (STD) of 15.71, indicating a generally high level of mental workload. WWL scores ranged from 40 to 93, suggesting considerable variability in participants' perceptions of workload intensity. These findings imply that while remote content creators generally experience high mental workload, the degree of perceived burden varies according to individual work conditions and demands. Therefore, it can be concluded that remote content creators experience substantial mental workload, primarily driven by a combination of high effort, time pressure, and performance demands.

3.3. Connecting Numerical Data with Reality on the Ground

What makes these findings even more meaningful is that the results go beyond mere numbers. Interview data helps explain why these workload levels occur. Nearly all respondents described their jobs as consisting of multiple, interrelated tasks. Their responsibilities typically include:

1. generate ideas
2. understand the client's brief
3. producing content
4. carry out the editing process
5. handling revisions (sometimes even multiple times)

In some cases, the revisions required them to start the entire process over again. This, of course, significantly increased the total effort required. This directly explains why the effort dimension was the highest. Time pressure is also very pronounced in real-life work situations. Several respondents reported that when multiple projects came up simultaneously, or when sudden revisions occurred, they were forced to work faster, multitask, and even sacrifice rest time. This clearly explains the high scores on the temporal demand dimension.

On the other hand, performance expectations also pose an additional source of pressure. Content creators are not only required to complete their work but also to ensure that the content they create is engaging, aligns with their brand identity, and meets audience expectations. Interestingly, several respondents revealed that even though their work has been deemed excellent by clients, they still feel dissatisfied. This indicates high personal standards, which indirectly contribute to increased mental workload.

3.4. Thematic Findings

By combining quantitative results and interview data, several important patterns can be identified as follows:

1. Dominance of Effort in Content Creator Work

The research results show that the main burden felt by content creators lies not only in the thought process, but also in the overall effort required. They not only generate ideas but also must manage the entire workflow, from production and editing to time management and coordination with clients and platforms. This demonstrates that content creation is a comprehensive and energy-intensive process, where mental, technical, and even physical aspects are closely interconnected [29].

2. Time Pressure as a Major Source of Fatigue

Time pressure has emerged as one of the most dominant factors in increasing mental workload. Tight deadlines, last-minute revisions, and the demands of multitasking create a fast-paced, non-stop work environment. As a result, content creators often have very limited time to rest or recover, ultimately increasing fatigue and increasing the overall workload.

3. Quality Expectations as an Added Layer of Pressure

Another important finding is the strong influence of quality expectations on workload. This pressure comes not only from external parties, such as clients or audiences, but also from within the content creators themselves. Many respondents admitted to having high personal standards and a constant desire to improve the quality of their work. While this internal drive has a positive impact on performance, it also adds significant psychological stress.

4. Psychological Adaptation through Passion

Interestingly, despite the high workload, frustration levels are not particularly high. This can be explained by psychological adaptations driven by passion. Many content creators view their work as something they love, allowing them to enjoy the process despite the pressure. This passion acts as a buffer, helping mitigate the negative emotional impact while also enabling them to maintain their performance.

4. DISCUSSION

Based on the research results, the mental workload experienced by content creators in a remote work system can be categorized as high, with an average WWL value of around 70.32. This indicates that the work of content creators is not only related to creativity, but also involves quite complex work pressures, especially in terms of effort, time pressure, and performance demands. This finding is in line with the concept of mental workload which states that tasks with high demands will significantly increase the use of individual cognitive resources [30].

A closer look reveals that the effort dimension is the most dominant factor. This suggests that working as a content creator requires significant effort overall, not only in thinking but also in carrying out the entire work process, from idea generation and content production to editing and revision. This finding aligns with previous research showing that digital-based work generally involves multitasking and multiple workloads, which can increase mental fatigue [31].

Furthermore, high scores on the temporal demand dimension indicate that time pressure plays a significant role in increasing mental workload. In remote work environments, the boundaries between work and personal life often become blurred. This situation allows individuals greater flexibility, but also makes them more vulnerable to time pressure. This is supported by research showing that remote work can increase time pressure and multitasking demands [32].

The relatively high performance dimension indicates a strong demand to produce high-quality content. This pressure stems not only from clients or audiences, but also from within the content creators themselves. Many content creators feel that their work is still suboptimal, even though it meets external standards. This reflects internal pressure, which also contributes to mental workload, given that performance expectations are a source of stress in jobs with high cognitive demands.

Interestingly, the mental demand dimension was relatively lower compared to the other dimensions. This may indicate that most content creators are accustomed to the thought processes required in their work. In other words, they have adapted to the cognitive aspects of the job, so what feels more demanding is no longer the thought process itself, but rather the overall effort and pressure of completing the work. This finding aligns with the view that work experience can help individuals manage mental demands more effectively [33].

Meanwhile, the frustration dimension was at a moderate level. This indicates that despite the high workload, not all respondents experienced excessive emotional stress. Interview results indicated that many content creators pursue their work out of passion, allowing them to enjoy the work process despite facing various challenges. This suggests that intrinsic factors such as interest and job satisfaction can act as a buffer against work stress [34].

Overall, the findings of this study indicate that content creators working in a remote work environment have unique characteristics, combining work flexibility with high work pressure. While flexibility provides freedom in

managing time, it also demands high levels of responsibility in managing work independently. This finding is supported by previous research suggesting that while remote work offers flexibility, it also increases the risk of burnout and work pressure [35].

Despite these contributions, this study has several limitations that should be acknowledged. First, the study involved a relatively small sample of content creators from a single city, which may limit the generalizability of the findings to the broader population of digital workers. Second, the use of self-reported measures via the NASA-TLX questionnaire may be susceptible to response bias, as participants' perceptions can be influenced by transient emotional states and individual interpretations of workload. Third, while the interview data enriches the interpretation of the quantitative findings, the limited number of interview participants may not fully represent the diversity of experiences among remote content creators. Future studies are encouraged to involve larger and more diverse samples, incorporate objective workload indicators, and examine additional factors that may influence mental workload in digital work environments.

5. CONCLUSION

This study shows that content creators working remotely experience a relatively high level of mental workload, primarily influenced by effort, time pressure, and performance demands. These findings indicate that content creator work is not simply a matter of thinking or creativity, but rather a complex and comprehensive process that requires significant effort, sustained multitasking skills, and strong time management.

Furthermore, the study findings confirmed that while remote work offers flexibility, it also blurs the boundaries between work and personal life and increases cognitive stress. Interestingly, despite the perceived high workload, frustration levels remained relatively moderate. This suggests that intrinsic factors such as passion play a crucial role in helping individuals cope with work demands.

From a practical perspective, digital agencies and content creators should implement more structured workload management strategies. This can include setting realistic production schedules, allocating dedicated time for revisions, limiting excessive multitasking by prioritizing tasks, and scheduling regular breaks to reduce cumulative fatigue. Furthermore, clear communication regarding performance expectations between clients and content creators can help minimize unnecessary stress while maintaining content quality.

More broadly, this research confirms that the work of content creators in the digital era is no longer simply a creative activity, but has evolved into a complex form of work influenced by technological dynamics, performance pressures, and the constant demands of adaptation. Therefore, understanding and managing mental workload is crucial, not only to maintain productivity but also to ensure the sustainability and well-being of workers in an increasingly competitive digital work environment. These findings are expected to form the basis for developing healthier, more adaptive, and human-centric work models in the future.

REFERENCES

- [1] A. P. Prasetya and K. Z. Hanum, "Transitioning job redesign: dampak perubahan sistem kerja pada saat dan sesudah pandemi COVID-19," *El-Mal: Jurnal Kajian Ekonomi & Bisnis Islam*, vol. 5, no. 3, pp. 1711–1721, 2023, doi: 10.47467/elmal.v5i3.5798.
- [2] C. Ita Erliana and dan Khairul Amri, "Analisis postur kerja menggunakan metode rapid upper limb assesment (RULA) pada proses pembuatan plat sambung tiang pancang PT. wijaya karya, Tbk Binjai," *Industrial Engineering Journal*, vol. 9, no. 1, 2020, doi: <https://doi.org/10.53912/iejm.v9i1.496>.
- [3] A. J. Mou and M. I. Faruk, "Content creation as a growth strategy: Evaluating the economic impact of freelance digital branding," *American Journal of Scholarly Research and Innovation*, vol. 03, no. 02, pp. 28–51, 2024, doi: 10.63125/mj667y36.
- [4] A. Valtonen, J.-P. Kimpimäki, and N. Savela, "Employee wellbeing: A computational review on the consequences of workplace automation," *Technovation*, vol. 152, p. 103424, 2026, doi: 10.1016/j.technovation.2025.103424.
- [5] G. Sun, "Quantitative analysis of online labor platforms' algorithmic management influence on psychological health of workers," *Int. J. Environ. Res. Public Health*, vol. 20, no. 5, p. 4519, 2023, doi: 10.3390/ijerph20054519.
- [6] T. Gillespie, *Custodians of the Internet: Platforms, Content Moderation, and the Hidden Decisions that Shape Social Media*. New Haven: Yale University Press, 2019. doi: 10.12987/9780300235029.
- [7] J. Hron, K. Krauth, M. I. Jordan, N. Kilbertus, and S. Dean, "Modeling content creator incentives on algorithm-curated platforms," in *International Conference on Learning Representations (ICLR 2023)*, Kigali: OpenReview, 2023. doi: <https://doi.org/10.48550/arXiv.2206.13102>.

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- [8] Y. Hutabarat, *Dasar-dasar Pengetahuan Ergonomi*. Malang: Media Nusa Creative, 2017. [Online]. Available: <https://eprints.itn.ac.id/3450/6/Dasar%20dasar%20pengetahuan%20ergonomi.pdf>
- [9] J. Dul *et al.*, “A strategy for human factors/ergonomics: developing the discipline and profession,” *Ergonomics*, vol. 55, no. 4, pp. 377–395, 2012, doi: 10.1080/00140139.2012.661087.
- [10] R. A. B. Prasetyo and H. Iridiastadi, “Mental workload: definition and measurement review,” *International Journal of Technology*, vol. 16, no. 5, p. 1854, 2025, doi: 10.14716/ijtech.v16i5.7072.
- [11] M. S. Young, K. A. Brookhuis, C. D. Wickens, and P. A. Hancock, “State of science: mental workload in ergonomics,” *Ergonomics*, vol. 58, no. 1, pp. 1–17, Jan. 2015, doi: 10.1080/00140139.2014.956151.
- [12] L. Longo and M. C. Leva, *Human Mental Workload: Models and Applications*. Cham: Springer International Publishing, 2020. doi: 10.1007/978-3-030-62302-9.
- [13] N. Mahdavi, L. Tapak, E. Darvishi, A. Doosti-Irani, and M. Shafiee Motlagh, “Unraveling the interplay between mental workload, occupational fatigue, physiological responses and cognitive performance in office workers,” *Sci. Rep.*, vol. 14, no. 1, p. 17866, 2024, doi: 10.1038/s41598-024-68889-4.
- [14] Tiari Rahma Fani and Yudi Ferdiana Permana, “Pengaruh beban kerja dan stress kerja terhadap kinerja karyawan pada kantor kelurahan Cigugur Tengah,” *JEMSI (Jurnal Ekonomi, Manajemen, dan Akuntansi)*, vol. 10, no. 4, pp. 2179–2185, 2024, doi: 10.35870/jemsi.v10i4.2557.
- [15] A. Mahmud, “Analisis beban kerja mental pada dosen menggunakan metode NASA TLX,” *Integrasi : Jurnal Ilmiah Teknik Industri*, vol. 7, no. 2, p. 62, 2022, doi: 10.32502/js.v7i2.4558.
- [16] L. Vyas and N. Butakhieo, “The impact of working from home during COVID-19 on work and life domains: an exploratory study on Hong Kong,” *Policy Design and Practice*, pp. 1–18, 2020, doi: 10.1080/25741292.2020.1863560.
- [17] C. Newport, *Deep work: rules for focused success in a distracted world*. New York: Grand Central Publishing, 2016. Accessed: Jan. 10, 2026. [Online]. Available: <https://cmc.marmot.org/Record/b49708429>
- [18] T. Wei, W. Wang, and S. Yu, “Analysis of the cognitive load of employees working from home and the construction of the telecommuting experience balance model,” *Sustainability*, vol. 14, no. 18, p. 11722, 2022, doi: 10.3390/su141811722.
- [19] G. Bondanini, C. Giovannelli, N. Mucci, and G. Giorgi, “The dual impact of digital connectivity: balancing productivity and well-being in the modern workplace,” *Int. J. Environ. Res. Public Health*, vol. 22, no. 6, p. 845, 2025, doi: 10.3390/ijerph22060845.
- [20] E. Mansuroğlu and A. P. Smith, “Technostress and employee well-being: A systematic review of empirical evidence,” *Computers in Human Behavior Reports*, vol. 21, p. 100941, 2026, doi: 10.1016/j.chbr.2026.100941.
- [21] A. Cao, K. K. Chintamani, A. K. Pandya, and R. D. Ellis, “NASA TLX: Software for assessing subjective mental workload,” *Behav. Res. Methods*, vol. 41, no. 1, pp. 113–117, 2009, doi: 10.3758/BRM.41.1.113.
- [22] C. D. Wickens, “Multiple resources and mental workload,” *Human Factors: The Journal of the Human Factors and Ergonomics Society*, vol. 50, no. 3, pp. 449–455, 2008, doi: 10.1518/001872008X288394.
- [23] R. Hernandez, S. C. Roll, H. Jin, S. Schneider, and E. A. Pyatak, “Validation of the National Aeronautics and Space Administration task load index (NASA-TLX) adapted for the whole day repeated measures context,” *Ergonomics*, vol. 65, no. 7, pp. 960–975, 2022, doi: 10.1080/00140139.2021.2006317.
- [24] S. G. Hart and L. E. Staveland, “Development of NASA-TLX (Task Load Index): Results of Empirical and Theoretical Research,” in *Advances in Psychology*, vol. 52, P. A. Hancock and N. Meshkati, Eds., North-Holland, 1988, pp. 139–183. doi: [https://doi.org/10.1016/S0166-4115\(08\)62386-9](https://doi.org/10.1016/S0166-4115(08)62386-9).
- [25] P. Ø. Braarud, “Investigating the validity of subjective workload rating (NASA TLX) and subjective situation awareness rating (SART) for cognitively complex human–machine work,” *Int. J. Ind. Ergon.*, vol. 86, p. 103233, 2021, doi: 10.1016/j.ergon.2021.103233.
- [26] Y. Zhang, Y. Zhang, X. Cui, Z. Li, and Y. Liu, “Assessment of mental workload using physiological measures with random forests in maritime teamwork,” in *International Conference on Human-Computer Interaction*, D. Haris and W. C. LI, Eds., Cham: Springer, 2020, pp. 100–110. doi: https://doi.org/10.1007/978-3-030-49044-7_10.
- [27] M. S. A. Hermansyah and N. U. Handayani, “NASA-TLX assessment of mental workload in manufacturing industry,” *Spektrum Industri*, vol. 20, no. 2, pp. 1–14, 2022, doi: 10.12928/si.v20i2.43.

-
- [28] E. Babaei, T. Dingler, B. Tag, and E. Velloso, "Should we use the NASA-TLX in HCI? A review of theoretical and methodological issues around mental workload measurement," *Int. J. Hum. Comput. Stud.*, vol. 201, p. 103515, 2025, doi: 10.1016/j.ijhcs.2025.103515.
- [29] R. A. Hidayati and A. S. Basyari, "Pengukuran beban kerja mental mahasiswa pekerja fakultas ekonomi dan bisnis universitas muhammadiyah Gresik menggunakan metode Nasa-TLX," *Jurnal Manajerial*, vol. 11, no. 03, p. 356, 2024, doi: 10.30587/jurnalmanajerial.v11i03.7700.
- [30] X. Zhang and G. Deng, "Protecting work engagement from digital fatigue: the contingent roles of leadership style and network ties," *Front. Psychol.*, vol. 16, 2025, doi: 10.3389/fpsyg.2025.1645057.
- [31] E. E. Howie, O. Ambler, E. G. M. Gunn, R. D. Dias, and S. J. Wigmore, "Surgical sabermetrics," *Ann. Surg.*, vol. 279, no. 6, pp. 973–984, 2024, doi: 10.1097/SLA.0000000000006211.
- [32] A. C. Chris *et al.*, "A meta-analysis of experienced incivility and its correlates: Exploring the dual path model of experienced workplace incivility.," *J. Occup. Health Psychol.*, vol. 27, no. 3, pp. 317–338, 2022, doi: 10.1037/ocp0000326.
- [33] R. Gerards, A. de Grip, and C. Baudewijns, "Do new ways of working increase work engagement?," *Personnel Review*, vol. 47, no. 2, pp. 517–534, 2018, doi: 10.1108/PR-02-2017-0050.
- [34] J. Ribeiro, F. P. da Silva, and P. R. Vieira, "Remote workers' well-being: are innovative organizations really concerned? A bibliometrics analysis," *Journal of Innovation & Knowledge*, vol. 9, no. 4, p. 100595, 2024, doi: 10.1016/j.jik.2024.100595.
- [35] R. Popovac, D. Vukmirović, T. Čomić, and Z. G. Pavlović, "Evaluating the impact of remote work on employee health and sustainable lifestyles in the IT sector," *Sustainability*, vol. 17, no. 19, p. 8677, 2025, doi: 10.3390/su17198677.