Evaluating Website Performance Using EdgeOne as an Automated Web Assessment Tool

Mayang Anglingsari Putri, Dwi Astuti Aprijani, Denisha Trihapningsari, Made Diyah Putri Martinasari, Mochamad Bagoes Satria Junianto

Abstract—**A university website functions not only as an information portal but also as a reflection of institutional credibility and academic reputation. Therefore, maintaining website quality—particularly web performance—is essential and must be evaluated continuously. The website of the Information Systems Study Program at Universitas Terbuka was selected as the focus of this study due to its role in delivering academic information and supporting communication with stakeholders. This research evaluates the website's web performance using EdgeOne, an automated assessment tool that measures key performance indicators such as Time to First Byte (TTFB), First Contentful Paint (FCP), Largest Contentful Paint (LCP), Speed Index, Total Blocking Time (TBT), and Page Load Time. A descriptive quantitative approach is applied to interpret the performance metrics and identify areas requiring optimization. The results show that although the website maintains stable structural functionality, several performance indicators—particularly loading speed—remain below the recommended threshold for modern web standards. These findings highlight the importance of continuous web performance monitoring and technical optimization to improve user experience and ensure the reliability of institutional digital platforms.**

Index Terms— **web performance evaluation, EdgeOne, automated web audit, loading speed, website optimization.**

I. INTRODUCTION

Program study websites in higher education serve as the primary digital interface for disseminating academic information, promoting activities, and facilitating communication between the study program and stakeholders, including students, faculty, prospective students, and the general public. The quality of a website is closely associated with the professionalism and credibility of the academic unit. When a website is slow, unresponsive, or poorly optimized, users may experience difficulties in accessing essential information, potentially leading to negative impressions of the institution.

Previous studies highlight the importance of evaluating usability to ensure that digital platforms can be accessed effectively and comfortably by users. Research on usability evaluation within e-government website services demonstrates that user satisfaction and system effectiveness are strongly influenced by interface quality and ease of navigation [1]. In addition to usability, technical performance, particularly loading speed and page structure is also recognized as a major determinant of digital quality. Performance audits using tools such as GTMetrix and Pingdom have proven effective in identifying performance issues and recommending improvement strategies for institutional websites [2].

Previous studies emphasize that an ideal website should demonstrate high performance, usability, mobile-friendliness, accessibility, SEO optimization, security, and integration with social media. Study [3] shows that automated evaluation tools such as SEOptimer, Website Grader, and Qualidator can comprehensively measure website performance, while research on mobile banking applications [4] highlights the importance of identifying usability issues through Usability Testing to improve user experience. Furthermore, a systematic review on security in software testing [5] underscores that security is a crucial component of application quality, showing that security testing can detect vulnerabilities early and contribute to more reliable and secure systems.

Website quality should not only focus on usability but must also emphasize performance optimization to ensure fast loading times and efficient access to information. Information systems that handle user data are required to implement security mechanisms such as encryption to ensure confidentiality and prevent unauthorized access [6]. Furthermore, learning from feedback and user perception, as explored in studies

Mayang Anglingsari Putri is with the Information System Study Program, Faculty of Science and Technology, Terbuka University, Indonesia; email mayang.anglingsari@ecampus.ut.ac.id)

Dwi Astuti Aprijani is with the Mathematics Study Program, Faculty of Science and Technology, Terbuka University, Indonesia; email dwias@ecampus.ut.ac.id)

Denisha Trihapningsari3 is with the Mathematics Study Program, Faculty of Science and Technology, Terbuka University, Indonesia; email denisha@ecampus.ut.ac.id)

Made Diyah Putri Martinasari is with the Mathematics Study Program, Faculty of Science and Technology, Terbuka University, Indonesia; made.diyah@ecampus.ut.ac.id)

Mochamad Bagoes Satria Junianto is with the Mathematics Study Program, Faculty of Science and Technology, Terbuka University, Indonesia; mochamad.bagoes@ecampus.ut.ac.id)

involving sentiment analysis on digital platforms, can provide valuable insights to refine system design and digital strategies [7].

An evaluation of Universitas Terbuka's website has previously combined User Experience (UX) surveys with web performance analysis using GTMetrix, providing initial insights into how users interact with the platform and how well the website performs technically [8]. However, that study did not employ an automated evaluation platform capable of generating comprehensive and standardized assessments.

To address this gap, the present research utilizes EdgeOne, an *automated web assessment tool*, to evaluate the digital quality of a program study website based on performance metrics, search engine readiness, accessibility compliance, and adherence to web development standards. EdgeOne produces objective scoring and improvement suggestions, which help streamline the evaluation process and support data-driven decision-making.

By applying EdgeOne to assess the website of the Information Systems Study Program at Universitas Terbuka, this research aims to provide structured recommendations that contribute to continuous digital quality enhancement of higher education program study websites.
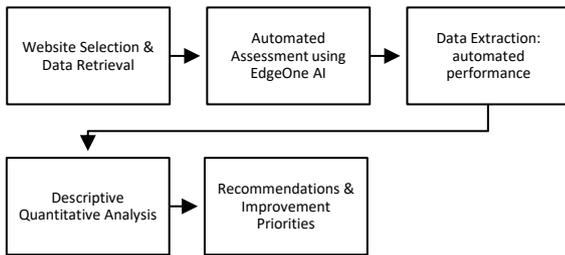
II. METHOD

Fig. 1. Research Flow

The research process begins with Website Selection and Data Retrieval, in which the website of the Information Systems Study Program at Universitas Terbuka (https://si-fst.ut.ac.id/) is designated as the assessment object and preliminary data such as page structure and URLs are collected. The next stage is the Automated Assessment using EdgeOne, where EdgeOne is used to perform an automated performance audit of the website. After the assessment, the Data Extraction phase is conducted to obtain the quantitative scores generated by the tool, covering website performance and compliance with web development standards. The extracted data is then processed using descriptive quantitative analysis to interpret the scores and identify aspects that require improvement. The final stage, Recommendations and Improvement Priorities, formulates data-driven enhancement actions to improve the website's digital quality, user experience, and visibility on online platforms. The test results represent a single measurement and may vary depending on network conditions and geographical testing locations.

A. Program Study Website (Department Website)

Fig. 2. Information Systems Study Program Website (1)

A website is a technological medium used to distribute information in the form of text, images, animations, and audio, whether presented in static or dynamic formats [9]. A program study website refers to the official digital platform managed by an academic department within a higher education institution [9]. Its primary function is to provide academic and administrative information such as curriculum details, announcements, academic activities, services for students, and documentation of achievements.
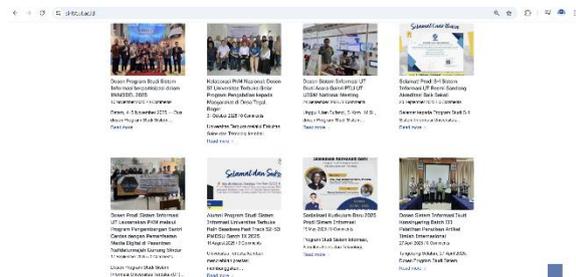

Fig. 3. Information Systems Study Program Website (2)

The website also serves as a representation of institutional credibility and professionalism. Through a clear structure, intuitive navigation, and updated information, a study program website reflects the institution's commitment to transparency and academic excellence. Users tend to associate a well-maintained website with the quality of the institution behind it [10].

Fig. 4. Information Systems Study Program Website (3)

A well-structured and responsive study program website also strengthens the institution's image and enhances user trust. When visitors can easily access information from any device and find what they need without confusion, it creates a positive user experience. This, in turn, supports the institution's reputation as a reliable and modern educational provider.

B. Website Evaluation

Website evaluation is a systematic process of

assessing whether a website meets predefined quality standards. The evaluation typically includes usability, performance (loading speed) readiness [11]. The goal is to identify strengths and weaknesses so that improvements can be implemented in a structured, data-driven manner. Website evaluation ensures that digital platforms are functional, easy to navigate, and able to provide an optimal user experience.

C. EdgeOne (Web Assessment Tool)

EdgeOne is a web assessment tool that automatically evaluates a website's digital quality. Tencent EdgeOne is a Content Delivery Network (CDN) and web security platform from Tencent Cloud designed to accelerate and protect websites using a global edge network, smart caching, and load balancing. Through its Free Website Speed Test tool, EdgeOne utilizes Google Lighthouse to evaluate site performance from multiple regions and provide optimization recommendations [12]. As a result, EdgeOne serves as a comprehensive solution for improving website speed, stability, and security.

D. Automated Audit

Previous studies have applied computational and digital approaches to support data analysis and decision making in various fields [13]–[16]. In line with these developments, this study adopts an automated audit approach to evaluate website performance.

Automated audit refers to the process of examining and evaluating a website using automated tools instead of manual inspection. In this research, automated audit is performed using EdgeOne, which automatically captures key metrics and generates structured reports. Automated auditing improves efficiency, reduces subjective bias, and ensures standardized evaluation results, making it suitable for continuous monitoring of digital platforms.

III. RESULT

The performance evaluation of the Information Systems Study Program website (https://si-fst.ut.ac.id/) was conducted to assess its loading efficiency and overall user experience. The test was performed using a desktop viewport (1920 × 1080) through the EdgeOne automated web assessment platform and produced a speed grade of 55 (C), indicating moderate performance with several optimization issues. The overall page load time reached 31.67 seconds, which exceeds the recommended loading time for modern educational websites and may negatively affect user engagement and accessibility. This high loading time may be influenced by large media files and the distance between the hosting server and the testing network environment.
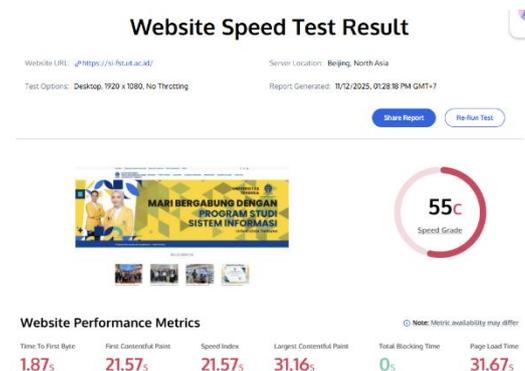

Fig. 5. Website Speed Test Result

The detailed performance metrics are presented in Table 1. The *Time to First Byte (TTFB)* recorded at 1.87 seconds, suggesting a slow initial server response. Both *First Contentful Paint (FCP)* and *Speed Index* showed significant delays of 21.57 seconds, indicating that visible elements and primary layout structures appear slowly on the user's screen. The *Largest Contentful Paint (LCP)* was measured at 31.16 seconds, implying that the main banner or large visual element completes rendering only after more than half a minute. Despite these delays, the *Total Blocking Time (TBT)* was 0 seconds, showing that JavaScript execution did not significantly hinder interactivity.

Table 1. Website Performance Metrics

Metric	Value	Interpretation
Time To First Byte (TTFB)	1.87 s	Slow server response; possible lack of caching or CDN
First Contentful Paint (FCP)	21.57 s	Page visual elements appear very late
Speed Index	21.57 s	Indicates overall slowness of visible rendering
Largest Contentful Paint (LCP)	31.16 s	Main content (banner/image) loads too slowly
Total Blocking Time (TBT)	0 s	No significant JavaScript delays
Page Load Time	31.67 s	Overall site loading time far above optimal (<5 s)

The results suggest that the website's primary performance issues are related to media file optimization, lack of caching mechanisms, and possible distance between the hosting server and the target user base. High-resolution images and uncompressed CSS/JavaScript files contribute significantly to the loading delay. Implementing a Content Delivery Network (CDN), enabling server-side and browser caching, and compressing large assets (e.g., converting images to WebP format) could greatly improve both FCP and LCP scores. Furthermore, adopting *lazy loading* techniques would prevent non-critical elements from delaying the rendering of visible content.

In summary, while the site maintains good interactivity and structural stability, its current loading performance is below acceptable standards for an academic web portal. Strategic technical optimization

particularly on asset compression, CDN deployment, and caching policy should be prioritized to enhance both user experience and accessibility for students and academic stakeholders.

IV. Discussion

A. Recommendations for Website Optimization

Based on the performance evaluation, several improvement strategies are recommended to enhance the website's overall speed, responsiveness, and accessibility. The main focus should be directed toward optimizing the delivery of static content and reducing the total load time. Since the current results indicate delays in the initial rendering (FCP and LCP), it is essential to minimize file sizes and improve server response efficiency. Implementing caching mechanisms, using a Content Delivery Network (CDN), and optimizing image assets will significantly reduce latency and improve user experience. In addition, refining front-end scripts and applying asynchronous loading for non-critical resources can prevent render-blocking issues. Regular monitoring using web performance tools is also necessary to maintain consistent loading efficiency and detect potential degradation over time [13].

Table 2. Recommended Improvements

Area of Improvement	Recommended Action
Server Optimization	Enable server-side and browser caching; integrate CDN to distribute static content efficiently.
Image Handling	Compress images and convert them to WebP format; apply responsive image scaling for various screen sizes.
Front-End Performance	Minify and combine CSS/JavaScript files; eliminate redundant or unused scripts.
Content Loading Strategy	Implement lazy loading for images and videos to prioritize above-the-fold content.
Hosting Configuration	Relocate hosting to a server closer to primary users (e.g., Southeast Asia region) to reduce latency.
Performance Monitoring	Schedule regular performance audits using GTmetrix or Google PageSpeed Insights for consistent evaluation.

By implementing these recommendations, the Information Systems Study Program website is expected to achieve faster response times, improved accessibility, and enhanced user engagement, aligning with global web performance standards for academic institutions. artinya

V. Conclusion

This study evaluated the performance of the *Information Systems Study Program* website (si-fst.ut.ac.id) through a comprehensive analysis of its loading speed and technical efficiency. The results revealed that while the website maintains structural stability and functional interactivity, its overall loading performance remains below the acceptable threshold for an academic portal. Key performance bottlenecks were identified in server response time, unoptimized media files, and the absence of caching and content delivery mechanisms. To address these challenges, several technical recommendations were proposed, including server-side caching, CDN integration, image compression, and the implementation of lazy loading. These improvements are expected to significantly reduce latency, enhance content delivery, and provide a more seamless browsing experience for users. In conclusion, optimizing the website's performance is essential not only for improving usability and accessibility but also for strengthening the institution's digital presence and credibility. Continuous monitoring, periodic evaluation, and the adoption of modern web optimization practices will ensure that the website remains efficient, user-friendly, and aligned with international web standards for higher education platforms. Furthermore, the findings of this study provide practical guidance for institutional web administrators in prioritizing performance optimization strategies to support more reliable and effective digital services.

References

[1] VA Lestari, I Aknuranda, MA Putri. *Usability Evaluation of E-Government: A Case Study of E-Finance.* Internetworking Indonesia Journal, 2017.

[2] MA Putri. *Implementing and Analyzing Web Performance Testing for Universitas Terbuka's Website with GTMetrix and Pingdom.* 2024.

[3] A. Kwangsawad, A. Jattamart, and P. Nusawat, "The Performance Evaluation of a Website using Automated Evaluation Tools," *2019 4th Technology Innovation Management and Engineering Science International Conference (TIMES-iCON)*, Bangkok, Thailand, 2019, pp. 1–5, doi: 10.1109/TIMES-iCON47539.2019.9024634.

[4] M. G. Alfaridzi, B. T. Hanggara, and H. M. Az-zahra, "Usability Testing and User Interface Improvement of Mobile Banking Application: Livin' by Mandiri," *MATICS: Jurnal Ilmu Komputer dan Teknologi Informasi*, vol. 15, no. 1, pp. 15–22, 2023.

[5] H. W. Awalurahman, I. H. Witsqa, I. K. Raharjana, and A. H. Basori, "Security Aspect in Software Testing Perspective: A Systematic Literature Review," *Journal of Information Systems Engineering and Business Intelligence*, vol. 9, no. 1, pp. 95–107, Apr. 2023, doi: 10.20473/jisebi.9.1.95-107.

[6] MA Putri, D Trihapningsari, AG Hapsani, CS Putri. *Data Encryption and Security in Data Storage Management Information System Using Blowfish Algorithm.* MATICS Journal, 2024.

[7] D Trihapningsari, A Widyasuri, MA Putri, A Fatihin. *Sentiment Analysis of ChatGPT Exploration Based on Opinions on Platform X Using Naïve Bayes Algorithm.* International Seminar of Science and Technology, 2025.

[8] M. A. Putri, 2024, "Implementing and analyzing web performance testing for Universitas Terbuka's website with GTMetrix and Pingdom," *Jurnal Teknologi Sistem Informasi dan Aplikasi*, vol. 7, no. 4.

[9] Hidayat, R. (2010). *Cara Praktis Membangun Website Gratis.* Jakarta: Elex Media Komputindo.

[10] Universitas Terbuka, "Program Studi Sistem Informasi – Fakultas Sains dan Teknologi," *si-fst.ut.ac.id*. https://si-fst.ut.ac.id/ (accessed Nov. 20, 2025).

[11] M. Fadli and B. Suranto, "Evaluasi Tingkat Aksesibilitas Website Penyedia Berita Menggunakan Website Accessibility Conformance Evaluation Methodology," *Jurnal Sains, Nalar, dan Aplikasi Teknologi Informasi*, vol. 3, no. 2, pp. 64–71, 2024, doi: 10.20885/snati.v3.i2.33.

[12] EdgeOne, "EdgeOne Official Website," *edgeone.ai*. https://edgeone.ai/ (accessed Nov. 20, 2025).

[13] Syambas, N. R., Ahdan, S., Hamidi, E. A. Z., Negara, R. M., Mayasari, R., Nurhayati, A., Nurfahfi, G., Jupriyadi, Sucipto, A., Arifin, H. N., & Tulloh, R. (2025). *Implementasi Teknologi Content Delivery Network (CDN) sebagai Akselerasi Digitalisasi Sekolah*. GUYUB: Journal of Community Engagement, 6(1).

[14] M. A. Putri, I. Hasvi, D. A. Difah, M. Alifah, F. A. Mufarroha, I. Nurmalasari, and I. Kusyadi, "Hierarchical Clustering Analysis of Biopharmaceuticals Crop Production Across Indonesian Provinces," *Journal of Enhanced Studies in Informatics and Computer Applications*, vol. 3, no. 1, pp. 28–33, 2026.

[15] M. A. Putri, "The Integration of AHP and Rank Order Centroid in a Decision Support System for Selecting Social Media for MSMEs," *Journal of Applied Informatics and Computing*, vol. 10, no. 1, pp. 1030–1037, 2026.

[16] M. B. S. Junianto, M. A. Putri, D. Trihapningsari, and D. Nurdiana, "Program Pengembangan Pengelolaan Manajemen Mushola Berbasis Digital Pada Mushola Al-Amanah Cinangka," *Jurnal Masyarakat Madani Indonesia*, vol. 5, no. 1, pp. 594–602, 2026.

[17] F. Leviany and M. A. Putri, "Analyzing the Distribution of Household Electricity Usage in Indonesia Using Two-Way ANOVA," Journal of Enhanced Studies in Informatics and Computer Applications, vol. 2, no. 2, pp. 62–69, 2025.

Mayang Anglingsari Putri is a lecturer in Information Systems Study Program, Faculty of Science and Technology, Universitas Terbuka, Indonesia. Her research interests are Artificial Intelligence, Software Engineering, Information Systems (Business Informatics), and Human-Computer Interaction.

Dwi Astuti Aprijani is a lecturer in Information Systems Study Program, Faculty of Science and Technology, Universitas Terbuka, Indonesia. Her research interests are Artificial Intelligence, Information Retrieval, and Open & Distance Learning.

Denisha Trihapningsari is a lecturer in Information Systems Study Program, Faculty of Science and Technology, Universitas Terbuka, Indonesia. Her research interests are Information System, Analysis and Design System, and Distance Education Learning.

Made Diyah Putri Martinasari is a lecturer in Mathematics Study Program, Faculty of Science and Technology, Universitas Terbuka, Indonesia. Her research interests are mathematical modeling, smoothing, forecasting, actuarie, graph, and optimization.

Mochamad Bagoes Satria Junianto is a lecturer in Information Systems Study Program, Faculty of Science and Technology, Universitas Terbuka, Indonesia. Her research interests are Information System, Analysis and Design System, and Distance Education Learning..