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Evaluating Public Website Performance: Content Analyses on Malang City Government Website

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Abstract: *This study evaluates the performance of public websites in Malang City, a heavily digitizing government. Using content analysis, we determine the extent to which the availability of public information has been met and what records still need to be corrected by the Malang city government. This study examines five criteria: information quality, usability, privacy and security, interaction, and accessibility. As a result, the Malangkota. go. id website met the evaluation criteria for general public information availability. However, the government still needs improvement in terms of security and citizen-centered values. Thus, in the future, this research can be used as a basis for policy considerations by the Malang City government to improve the performance of its public services through the provision of good public information.*
Keywords*: Website Evaluation; Public Information; Website Performance; E-Government*

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Introduction

The Internet has transformed people's lifestyles and has become a very important aspect of people's daily lives, providing the ease of implementing online marketing in conventional companies and new service sectors, as well as online electronic government activities (Wu & Guo, 2015). The need for digital public services is growing because when people need public services, they have to go to local government offices to get information or services that may be important to their daily lives, especially in regional government. They have to find time to go to the government offices and wait for their turn, which can take a long time (Darem & Al-Hashmi, 2011). Meanwhile, public organizations should be efficient and productive internally and promote democratic values like equality, equity, and participation externally to improve society, where information technology is also used to improve service quality and government democracy (Melitski & Holzer, 2007). Thus, local government information and communication technology (ICT) development must be examined.

During the last three decades, research has yielded a variety of methodologies for assessing the efficacy of ICT (Kaisara & Pather, 2011). Following these improvements in the public's delivery of services resulting from digital innovations, e-government studies have evolved rapidly from the study of web design and stages of growth to the current major topics of open data and open government (Arias & Maçada, 2018; Jetzek, 2016; Jetzek et al., 2012, 2013; Layne & Lee, 2001). According to the citizens, e-government makes municipal governments more accessible and responsive (Harris et al. 2011). In this regard, modern interactive ICTs enable governments to display and distribute information that may promote citizen-government interactions (Choi & Gil-Garcia, 2022). As a result, one of its manifestations can be seen on government websites, which can be important communication and public relations tools (Harris et al., 2011; Moon, 2002).

In today's digital age, a website is essential, especially for a government that operates electronic government processes (Hidayah et al., 2019). The government website is a significant instrument for improving administrative efficiency and public services (Hu & Yang, 2020). A government website is a method of employing information technology management and social service windows, and it is an important part of e-government as well as the major criterion for measuring the success of state e-government (Salvio & Palaoag, 2019; Zhu & Zhang, 2013).

With the release of Presidential Instruction Number 6 Year 2001 (Presidential Decree No. 6/2001) concerning the Development and Utilization of Telematics (Information and Communication Technology) in Indonesia, which was stated clearly by Presidential Instruction Number 3 Year 2003 concerning the National Policy and Strategy of E-Government Development, the creation of websites used by local governments in Indonesia came into operation (Martani & Fitriasari, 2014). However, the urgency of public information availability for the construction of excellent local governance (good governance) requires community engagement and contribution to every public policy process. It can be seen from Law Number 14 of 2008 about Public Information Disclosure (KIP) that this

mission aims to improve information management and services inside Public Agencies to generate quality services. Public agencies construct and develop information systems in a proper and efficient manner so that the public can easily access them (Lawati & Firdaus, 2020). This principle cannot be realized in the implementation of regional governments that apply the principles of good governance if there is no concern for the regional government to realize that the government has an obligation to provide information on regional government implementation to its people, as the government has enacted the Law on Public Information Disclosure. The regions have enacted a set of local government legislation governing the disclosure of public information (Setiaman et al., 2013). In the context of Public Information Disclosure Law No. 14/2008, a unique breakthrough or plan is required for the use of government websites to provide access and public information services that are accurate, efficient, and easily accessible to all citizens. The Malang city administration plans to serve the community by making public information available, which is also included in Malang Mayor Regulation No. 50 of 2010 concerning the Guidelines for Public Information Services (PemKot Malang, 2010). In order to implement public information availability, the City Government of Malang has and is developing an information service system with an official website at www.malangkota.go.id. Sutiaji's vision of the future of Malang and the strengthening of Indonesia's one-data initiative and the Electronic-Based Government System (SPBE) also coincide with the ongoing digitalization of government (Realita.co, 2023; Tubagus Achmad, 2023).

Because of its accessibility and significance, knowing the government website is one of the essential components of the e-government evaluation index (Guo et al., 2010; Li & Le, 2009). Thus, it is important to evaluate government websites. Many researchers have evaluated website performance using diverse perspectives and approaches. Some researchers employ a quantitative approach, surveying service users (Armaini et al., 2022; Choi & Gil-Garcia, 2022; Haryani, 2016; Lewis, 2019; Warjiyono et al., 2020; Warjiyono & Hellyana, 2018), while other studies have used a qualitative approach with various methods (Csontos & Heckl, 2021; Gunawibawa et al., 2019; Rozikin et al., 2020; Song & Liu, 2021; Valtolina & Fratus, 2022). Meanwhile, with a slightly different design from previous research studies, this study used content analysis with a descriptive method by adopting a mixture of indicators used by previous researchers partially and more thoroughly. In the future, this research can be used as a policy consideration for the local government to improve website performance as the first information gateway for the community.

Method

This study employed a qualitative method with content analysis. The proliferation of information sources via Internet media has supplied academics with a wealth of data for research utilizing a content analysis approach (Razak, 2019). In addition, past research has employed content analysis to investigate e-government uptake (Daniel, 2016; Huang, 2006). Content analysis is a qualitative approach to data evaluation and interpretation that is currently applicable (Elo et al., 2014; Schreier, 2013). The goal of content analysis is to characterize the features of a document's content by

examining who says what, toward whom, and how it affects the audience (Bloor & Wood, 2006; Vaismoradi et al., 2013). The findings were obtained using descriptive analysis after content analysis (Bozkurt et al., 2015). This technique was used to analyze the presence of elements that enhance citizen-to-government contact on the websites of Nepalese government departments (Daniel, 2016; Parajuli, 2007). Additionally, Daniel (2016) stated that such studies employed certain metrics-created instruments, and the availability of these kinds of features was used to analyze the overall progress of e-government.

Measuring E-government could be assessed by its functions. E-Government has six functions: 1) providing citizens with access to government information; 2) services that help them comply with rules or regulations; 3) personal benefits; 4) electronic procurement (bidding, purchasing, and paying); 5) government-to-government information and service integration; 6) and citizen participation (Darem & Al-Hashmi, 2011). Meanwhile, government websites serve as a window for citizens to access government services (Ashraf et al., 2017). As a result, governments in sophisticated countries rely extensively on government websites (Rababah et al., 2013). It delivers services within the framework of modern information technology and innovative public management.

The first step in this website evaluation is identifying the instrument that will be utilized in this investigation. We mapped five criteria for government website evaluations developed from year to year. Finally, we determined that we would make extensive use of these criteria, covering previous studies, by choosing the dominance indicators. There are several criteria that have similar meanings or definitions but use different dictions; therefore, we combine them in one row to make it easier to identify instruments, such as interactions. Our mapping then leads to five instruments that will become our evaluation analysis tools: Information Quality, Usability, Security and Privacy, Interaction, Accessibility. To complete some of the indicators in this evaluation, we also used GT Metrix and other website performance tests related to every aspect of the evaluation. This was also done by Salvio & Palaoag (2019) on the same topic to identify the detailed performance of public websites.

Table 1. Comparison of Criterias

Criteria	Sources				
	(Baker, 2009)	(Kaisara & Pather, 2011)	(Karkin & Janssen, 2014)	(Arias & Maçada, 2018)	(Akgül, 2022)
Information Quality, Content	✓	✓	✓	✓	✓
Reliability				✓	
Usability/ Navigation	✓	✓	✓	✓	
Transparency/ Openness, Accountability					✓
Efficiency				✓	
Privacy, Security, Legitimacy	✓	✓	✓	✓	✓
Site Aesthetic		✓			
System Quality				✓	
Website Design		✓			
User Help	✓				
Interaction: Online Service, Communication, Citizen Engagement, Public Participation, Dialog	✓	✓	✓		✓
Accesibility	✓		✓		✓

Source: Processed by Authors, 2023

Result and Discussion

Analysis of Public Malang Local Government Website Performance

Observations and analysis of the content available at Malangkota. go. id are explained next. This analysis complements previous research that also assessed the

usability of this website using three data collection methods (Erwin et al., 2019). The Malang city government uses this website as an example of public information disclosure, and it is managed by the Malang City Information and Documentation Management Officer, who is the official responsible for storing, documenting, providing, and/or providing information services to public bodies. Each evaluation criterion is described below.

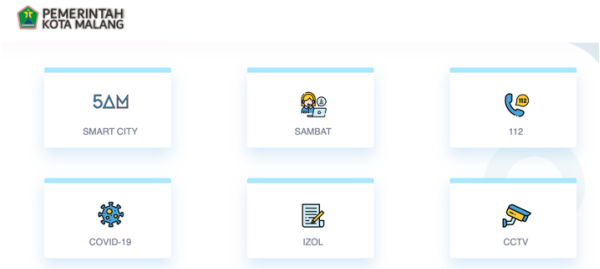
Information Quality

Information architecture devices organize a website's content for the user's appearance (Baker, 2009; Stowers, 2002). It detects footbridges that span consumers' knowledge gaps regarding the organization of a website and the services it provides (Baker, 2009). Information quality includes accurate, reliable, on-time, relevant, and easy-to-understand metadata as well as the right level of detail and format (Warjiyono et al., 2020). It also includes courtesy, value for money, openness, and transparency (Kaisara & Pather, 2011). As an example of transparency and openness, websites should allow citizens to submit complaints and comments, government agencies' financials, regulatory frameworks, policy roadmaps, live streams of meetings, regularly reported acts, and public projects (Akgül, 2022).

When we click on malangkota.go.id, we are presented with various features that we can access according to the information needed. There are many features presented on the Malang City Government website, along with a picture of the page presentation on the Malang City Government website. There are six features presented on the dashboard page of the malangkota.go.id website: smart cities, splice, 112, COVID-19, isol, and cctv. A smart city is a feature that connects the community with a variety of digital-based citizen services, including government (smart governance), services related to the economy (smart economy and branding), and the daily activities of residents, such as information about COVID-19, vaccinations, daily weather, and others (smart living and environment), as well as information about job openings or various government assistance programs (smart society).

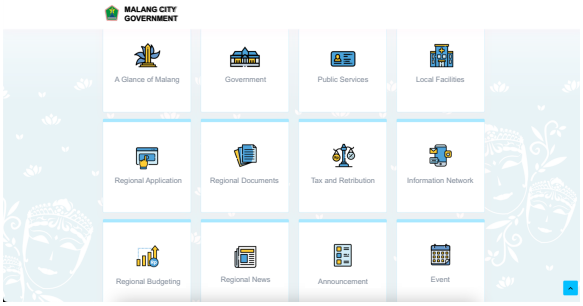
There is a splice feature, which contains a complaint page to assist city residents in providing aspirations, suggestions, criticism of complaints, or questions to the Malang City Government apparatus. There are two options for complaints, namely, via the website and via SMS; at the bottom, there is various information related to complaints by clicking, which can be easily accessed. Then, 112 is an Emergency Call Service provided by the Malang City Government, which is supported by Regional Apparatuses and related agencies within the Malang City Government who are willing to respond to the community asking for help during an emergency. In addition, this 112 service is intended for emergency events only, and those who make false reports or prank calls are subject to sanctions according to applicable regulations. The services provided have a toll-free feature and provide 24-hour service and a fast response. There is also a COVID-19 feature that contains information about COVID-19 because we are still in the post-pandemic period and CCTV can broadcast CCTV monitoring all over the streets of Malang City. Finally, the IZOL feature is a website that provides an online licensing information system that is the responsibility of the Department of Labor and Investment and One-Stop Integrated Services.

Figure 1. Front view of malangkota.go.id



Source: Processed by Authors, 2023

Figure 2. Front view of malangkota.go.id



Source: Processed by Authors, 2023

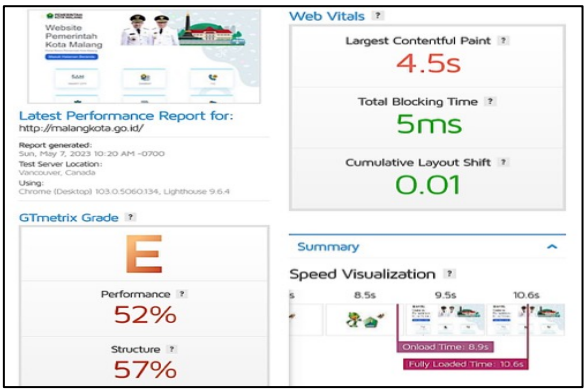
In addition to the information above, the front view of the Malang City website has provided information as mentioned by (Akgül, 2022) regarding the availability of online complaints and comments submissions for citizens through "SAMBAT," government agencies' financial statements that appear in the "Anggaran Daerah" tab which consisting of APBD, DPA, RKA, to Realization of APBD. Legislation, policy plans, and government projects are incorporated in the Dokumen Daerah" tab, which consists of MDA, SAKIP Malang City, SAKIP Regional Apparatus, LAKIP Malang City, IPKD, Regional Regulations, Mayor Regulations, Circulars, Regional Development Plans, List of Public Information, COOPERATION, LKPJ. While live broadcasts of meetings, and regularly reported activities are manifested in the "Malang "Berita Malang, ""Pengumuman, "dan "Event" tabs.

Usability

Usability is a qualitative assessment of a website's relative user-friendliness, using ease of use as the evaluation criterion (Baker, 2009; Karkin & Janssen, 2014). Website usability refers to how simple, effective, and intuitive it is for people to learn to get around and engage with a website (Csontos & Heckl, 2021; Fryonanda & Ahmad, 2017; Tarafdar, 2005). This is a measure of the perceived quality of a website's visibility by users. Usability research typically analyzes all website pages or only the homepage. Developers focus on home pages because home pages are frequently the most accessible pages of a site (Csontos & Heckl, 2021).

GTMetrix was used for usability testing on the Malangkota. go. id website. GTmetrix is a usability testing tool that focuses on page speed statistics (Csontos & Heckl, 2021). Usability analysis using these tools (Fryonanda & Ahmad, 2017). The results are shown in Figure 2. The performance of website pages is at level E, with a percentage of 52%. The full website access speed was 10.6 seconds, as shown in the speed visualization.

Figure 3. Usability Check Result of Website malangkota.go.id

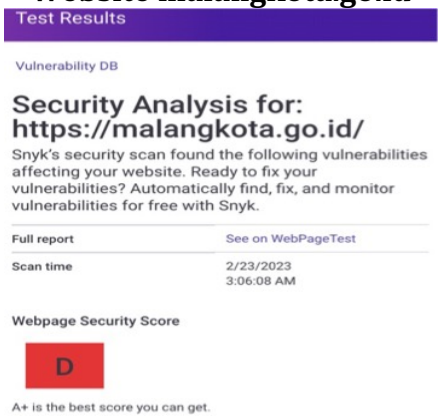


Source: Processed by Authors, 2023

Privacy and Security

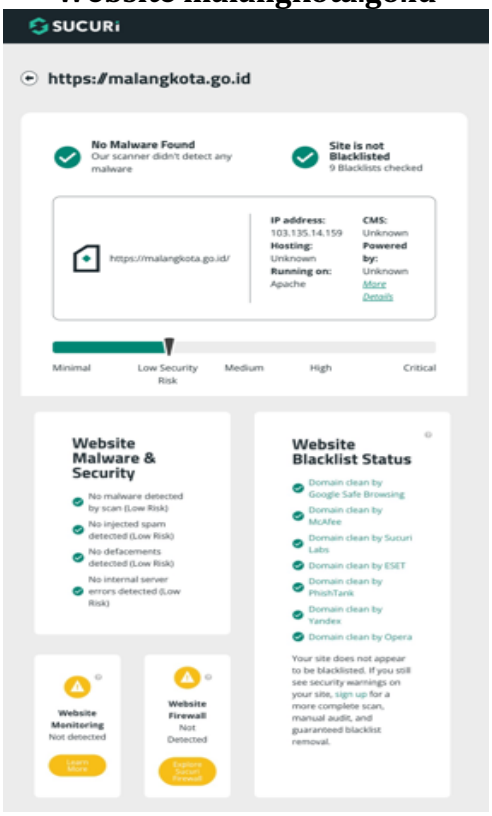
It is critical for e-governments to maintain the security and privacy of citizen information (Akgül, 2022; Bélanger & Carter, 2008; Khanyako & Maiga, 2013). E-government users expect reliable proof that electronic records in general and government websites in particular provide security, privacy, and legality (Baker, 2009). Website security and privacy concerns lead to "trust" and "loyalty" toward websites (Flavián et al., 2006; Flavián & Guinalíu, 2006; Karkin & Janssen, 2014; Kim et al., 2009). The element of security and privacy on the website is that using the website instills confidence in the government, and the security policy is clearly mentioned on the website to guarantee citizens the protection of their data (Kaisara & Pather, 2011). To perform this security test, we performed a multitest. First, Snyk.io, a database for known library vulnerabilities (Kaafar et al., 2022), was used, followed by what (Csontos & Heckl, 2021) was done using Sucuri. Sucuri is a website inspector that can extract website facts at a sufficient depth to assist in determining whether a given website poses a security risk to users.

Figure 4. Security Check Result of Website malangkota.go.id



Source: Processed by Authors, 2023

Figure 5. Security Check Result of Website malangkota.go.id



Source: Processed by Authors, 2023

The results are shown in Figures 3 and 4. It means that based on Sucuri Check, this website is having low minimal risk of malware attack. But, if we use snyk.io. The results of the assessment using the Snyk.io tools showed a D grade, with the highest score being A+. Detailed website security recommendations are also provided by these tools, as seen in the protection tab, which states that to avoid website hacks and DDoS assaults, a cloud-based WAF must be installed.

Interaction

This component mentioned as interaction refers to how a website communicates with its users or citizens. There are two types of interactions on websites that should be provided. First, interaction with users regarding the

website facility and substantive communication are provided. Initially, the website should provide user assistance in identifying techniques that enable effective electronic communication and engagement. User help tools provide broad information on how to navigate websites. The second example is online services, which are tasks that may be carried out by contacting an e-government website via the Internet whenever needed (24 hours a day, 7 days a week) (Baker, 2009). Direct phone numbers, information collection through SMS or smartphone applications, tools or applications for gathering citizen feedback, alternatives for media, warnings, activity updates, and institutional e-mail addresses are all examples of this (Akgül, 2022). According to Kaisara & Pather (2011), the government website should clearly state the operating procedures to which users are authorized as citizens; a system, such as an electronic discussion forum, is provided on the website for citizens to debate issues of interest; and the full names and all contact information of government managers in charge or relevant departments of specific services are provided.

Observations were made on the Malangkota. go. id website. When looking at the availability of user help suggested by Baker (2009), we did not find a helpdesk page that can help users if there are problems accessing the website. However, users can contact them via social media that is displayed on the homepage of Malangkota. go. id, namely the Malang City Government's Facebook and Twitter. Related to communication with the community as citizens and not just page users, the Malang City Government website provides an opportunity to submit complaints about the Sambat feature. This feature is a bridge for city residents to provide aspirations, suggestions, criticism, complaints, or questions to the Malang City Government through various communication channels, namely websites, SMS, and smartphone applications.

Accesibility

Mechanisms for accommodating the disabled are included in accessibility accommodations. Government websites must be accommodated equally by removing disability-related barriers (Baker, 2009). Accessibility is one of the most critical criteria for guaranteeing equal access for everyone who can see, understand, browse, and connect to the Internet, including those with disabilities on public websites. Accessibility enables individuals to acquire knowledge. To provide keyboard control to motor-disabled individuals, give visually disabled people photographs with alt text, and so on (Akgül, 2022). Online accessibility implies that persons with disabilities, regardless of age or ability, can perceive, comprehend, navigate, engage with, and contribute to the web (Csontos & Heckl, 2021). Accessibility encompasses all impairments that influence online access, including visual, auditory, physical, verbal, cognitive, and neurological problems (Doush & Almeraj, 2019).

We identified no features that would make it simpler for people with disabilities to access information on the malangkota.go.id page. The new accessibility tool features appear on the Malangkota. go. id homepage, as shown in figure 6. Various options are available to facilitate the presentation of textual information. Analysis on this site also did not find text-to-speech or alt features on images. These two features are also indicators of website accessibility

(Abanumy et al., 2005; Mohasi & Mashao, 2006).

Figure 6. Accessibility Tools in Website malangkota.go.id/beranda

We also used other methods to assess the accessibility of the page. According to the Web Accessibility Initiative (WAI), there are several methods for evaluating website accessibility (Valtolina & Fratus, 2022). We chose the one with free access to the TAW. TAW is another prominent online free web accessibility evaluation tool available at http://www.tawdis.net/ (Karaim & Inal, 2019). TAW allows the tester to choose one page (such as the home or index page) and delivers a complete report of identified faults as well as extra marked warnings that require manual review and human judgment on the part of the tester. The results are shown in Fig. 7. Website managers must consider various factors that increase site accessibility.

Figure 7. Accesibility Check Result of Website malangkota.go.id

Source: Processed by Authors, 2023

Discussion: The importance of Improvement

According to a report by Deloitte, nearly 80% of Asia-Pacific citizens expect government services online. 67% anticipate government services to match private sector ones (Deloitte, 2022). Citizens expect government services to transform more than other parts of their lives in a digital future". While BPS data also shows an increase in internet users in Indonesia in the period 2017–2022, from 57.33% to 82.07% (Badan Pusat Statistik, 2022). This data shows digital public services are a necessity for contemporary society. Then, back to the global condition, there are 3 sectors of need that many countries provide due to the high demand

for accelerated services, including: business registration (177 countries), business licensing (167 countries), and government locker registration (160 countries) (United Nations, 2022). Therefore, enhancing the functionality of local government websites is critical for providing residents with efficient and effective access to critical information and services.

In addition, according to data from We Are Social, "Finding Information" is still the main reason internet users (83.2%) in Indonesia use the internet in their daily lives (Haryanto, 2023). This shows that adequate information services through the government's website are also part of the community's needs and need to be provided by the local government. This digital service is an effort to accelerate the process of providing public services. Data from the Populi Center shows that complicated requirements (11.4%) and slow service times (11.3%) are still complaints from the public (Annur, 2021).

A well-designed website may promote transparency, increase public involvement, and improve the experience of working with the local government. As part of e-government, government websites should not only host forms, webpages, and services, but also provide a framework for how the government can improve services and adapt to audience demand (Burn & Robins, 2003; Park & Samijadi, 2021). Consequently, it is essential that local governments enhance the performance of their websites. Website quality affects customer satisfaction and website reuse. Because it provides information, public services, and public participation, a government website's design should promote democracy (Lee-Geiller & Lee, 2019). Online platforms can overcome representative democracy's limitations by increasing communication channels, lowering costs, and expanding participants.

The first step in identifying areas for improvement is to conduct a thorough evaluation of the website. This might involve assessing a website's accessibility, speed, user interface, and general performance. This step was initiated with this study and requires further development. Next, we ensured that the website met citizen needs rather than local government needs. User research can reveal the needs, habits, and preferences of residents. Two previous steps were taken to improve the quality of the information available on the website. The website should then be optimized for speed so that citizens can rapidly access the information and services they require. This can be accomplished by optimizing the images, lowering the page load times, and employing caching strategies. This can be accomplished by employing clear text, simple navigation, and consistent design features. Our previous findings have shown the need to increase page speed during usability tests.

Next, regarding privacy and security components, we did not find any user data protection statements. In addition, the results of the simple security check show that the malangkota.go.id website is still not secure enough. This is certainly crucial to be addressed immediately, considering that there have been many cases where local government websites have been hacked (Ardin, 2022; Irwanto, 2022; Putri, 2022), which will certainly harm all parties, both the government and the community, as users of public information. Furthermore, self-service solutions, such as 24-hour public information access services, can help citizens save time and boost efficiency. Although there is still a shortage of public

information services experienced by almost all government sectors in Indonesia, the Malang city government can initiate this innovation by providing user help on the malangkota.go.id website. Finally, we emphasize accessibility. It is necessary to ensure that the website is accessible to all citizens, especially those with impairments. This may be accomplished by following accessibility criteria, such as the Web Content Accessibility Guidelines (WCAG), and offering alternate formats for materials such as audio and video. Enhancing the performance of local government websites is an ongoing task. Local governments may design websites that provide citizens with a good and efficient experience by concentrating on public requirements and iterating based on feedback.

Conclusion

The findings of the assessment that we carried out on the performance of the Malang government website by examining the five criteria indicate that, in general, the Malangkota.go.id website meets the requirements for the availability of public information. The official website of the city government of Malang is user-friendly, contains high-quality information in proper proportions, and offers a forum for citizens to express their complaints. On the other hand, as mentioned earlier, those who are in charge of the development of websites need to consider the website's accessibility and level of security. This research has the potential to serve as a foundation for a more in-depth analysis that will be conducted to improve the functionality of this government website. In the future, the government should carry out the recommendations presented by conducting a community assessment. In addition, the same can be done for other researchers. Because this research is still limited to the use of single methods with content analysis, future evaluations with various data collection methods can add notes to improve website performance as a strategic step in digitizing the Malang city government.

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